

New South Wales Weed Control Handbook

A guide to weed control in non-crop,
aquatic and bushland situations

NSW DPI MANAGEMENT GUIDE, SEVENTH EDITION



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Invasive Plants & Animals Branch

New South Wales Weed Control Handbook – A guide to weed control in non-crop, aquatic and bushland situations 7th Edition

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Disclaimer

The information contained in this publication is based on knowledge and understanding at the time of writing (April 2018). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up-to-date and to check currency of the information with the appropriate officer of the Department of Primary Industries or the user's independent adviser.

Important: ALWAYS READ THE LABEL

Users of agricultural (or veterinary) chemical products must always read the label and any Permit, before using the product and strictly comply with the directions on the label and conditions of any Permit. Users are not absolved from compliance with the directions on the label or conditions of the Permit by reason of any statement made or omitted to be made in this publication.

Other publications

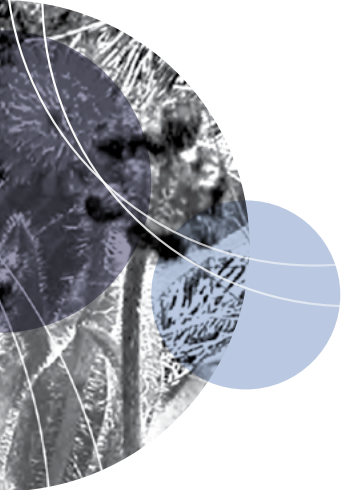
This handbook has been compiled as a guide for noxious and environmental weed control in non-crop, aquatic and bushland situations. For crop or pasture situations, see the following NSW DPI publications:

Weed control in winter crops

Weed control in summer crops

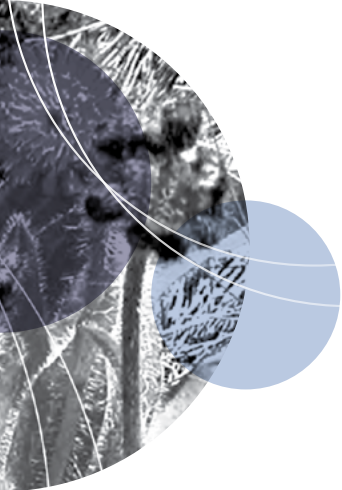
Weed control in lucerne and pastures

Cover Image: istockphoto.com/Imgorthand



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Integrated weed management

Integrated weed management is the coordinated use of a variety of control methods, reducing reliance on herbicides alone, and increasing the chances of successful control or eradication. Integrated weed management programs require long-term planning, knowledge of a weed's biology and ecology and appropriate weed control methods.

For example, an integrated weed management program for a large infestation of lantana on grazing land would involve:

- » removing stock for several months
- » burning at the appropriate time (depending on the terrain and access, burning could be substituted with bulldozing or slashing to reduce the bulk of the mature plants)
- » sowing an improved pasture in early summer
- » continuing to exclude stock until pasture establishes
- » following-up with herbicide spot spraying on regrowth
- » repeating this regime for 2 or 3 years.

Biological control

Biological control of weeds uses a plant's natural enemies such as insects, mites and diseases to reduce and control its population. It is an economical, effective and environmentally sound method, but is a long-term technique with extensive development and establishment phases. Biocontrol does not eradicate a weed, but can reduce it to an acceptable level, or suppress it to a level where it can be controlled with other methods.

Inundative biological control uses mycoherbicides - plant pathogens such as rusts and fungi - applied as a treatment. They are likened to a species-specific natural herbicide, are not self-sustaining and have a short active period.

Classical biological control is the release and establishment of control agents such as insects, rusts and mites into the target weed infestation, creating a natural balance between the weed and its control agent - similar to that found in the weed's native range.

If an agent establishes a population, control becomes self-perpetuating and self-regulating as the agent becomes part of the region's ecology. Monitoring an agent's population dynamics is an important part of a biocontrol strategy.

Biological control should be considered when a control agent has achieved good control in other areas. However, successful programs may take more than 10 years to be effective, and results may vary from area to area. Biological control is practical and effective for:

- » inaccessible areas such as timbered, rocky and steep locations
- » areas of low-priority for control
- » situations where biocontrol is the only option, for example sensitive aquatic areas
- » situations where chemical control may be too expensive or not effective.

Flaming

Flaming is not a common or well-developed control method in Australia, however in Sweden it has been used for many decades for:

- » weed control on organic farms
- » pre-emergent weed control in carrots and other slow-germinating row crops
- » selective post-emergent control in heat-tolerant crops
- » general weed control on hard surfaces in urban areas.

Liquefied petroleum gas or propane is used in flame weeders. The process does not require a weed to be burnt, but ruptures the plant's cell membranes by raising its water content to temperatures to above 100°C. Small seedlings are generally more susceptible to flaming. Species with upright habits and thin leaves are more sensitive than species with a low stature and protected growth points.

Steaming

Steaming is a relatively new weed control method, still in the developmental stage. Applying hot water to a weed results in the loss of the plant's waxy coating, a reduction in moisture, dehydration and death.

The system operates by plumbing water under pressure through a heated chamber, and applying it to the weed. The combination of heat and water pressure breaks down the cellular structure, causing discolouration and death within hours or over a few days.

Field trials carried out in New Zealand have shown that steaming kills annual weeds in 24 hours. The foliage from some perennials also dies within 24 hours, but regrowth recurs from the roots within a week or two.

City councils in Australia have trialled the equipment with mixed results. Trial work and assessments in various situations are still being conducted.

Goats

Controlling weeds with goats is a medium-to-long-term proposition and can be highly effective in certain situations. Goats can be integrated with sheep, cattle and cropping enterprises to provide weed control and pasture improvement. Generally, goats should be only one aspect of an integrated weed control program and stocking rates, timing, weed palatability and farm management strategies need to be considered. It is usually important to have a competitive pasture to colonise bare areas.

Goats control weeds by selectively grazing their foliage, bark, stems and flowers. Goats eat a variety of weed species that sheep and cattle avoid, such as blackberry, sweet briar, scotch broom, thistles, Paterson's curse and horehound. The nutritional value of these species can be quite high. Occasionally goats will eat fireweed, groundsel bush, St John's wort, serrated tussock and spear grass. Goats are grazers of weeds in inaccessible areas where conventional control methods are not possible.

Herbicides

Herbicides are widely used to control weeds in agricultural, commercial and domestic situations. Herbicides are chemicals that kill plants by affecting their enzyme systems, interfering with their growth processes, replacing their hormones or blocking their chemical reactions. Herbicides are effective and practical in a wide variety of situations, and often provide the most economical means of control.

Some herbicides act on contact with the plant; others need to be translocated through the plant's system.

Contact herbicides

Contact herbicides kill the parts of the plants they are applied to - usually limited to leaves and stems of the plant. They are more effective on annual weeds or on seedlings of perennial weeds. Contact herbicides can be either selective (i.e. they only kill broadleaf plants) or non-selective (i.e. they kill all plants). Plants need to be actively growing when contact herbicides are applied, and good coverage is required to achieve effective results. Contact herbicides include paraquat and diquat.

Translocated herbicides

Translocated herbicides must be moved around a plant's system. They disrupt growth processes and interfere with biochemical reactions. This usually occurs where cells are actively dividing in growth tissue, such as at the bases of stems in grasses, and in growing tips or buds in broadleaf weeds. Translocated herbicides include glyphosate and metsulfuron-methyl.

Regulation of herbicides

The *Pesticides Act 1999* (NSW) provides for registration of herbicides, labels and containers. Only registered herbicides can be used to control weeds according to the directions on the product label. Labels are designed to prevent misuse of a product, and users have a legal obligation to read and follow the instructions on it.

Handling and applying herbicides

Herbicides can have potentially harmful effects on human health, livestock, and the environment. Trained users can avoid adverse effects by following the instructions on the product label.

Equipment for herbicide applications includes boom sprayers, hand guns, knapsacks, wick-wipers, granular applicators, aerial sprayers and gas guns. Application methods include foliar spraying, basal bark and cut stump applications, stem injection, and wick-wiping.

The choice of equipment and application method depends on the size of the infestation, type and susceptibility of weed, topography, access, and potential environmental and health hazards. For herbicide treatments to be safe and effective, weather, soil conditions and the timing of the treatment must be considered. Weather conditions should be assessed and monitored during treatments to reduce the risk of drift and off-target damage. If heavy rain follows application, effectiveness can be reduced and contamination of waterways can occur through run-off.

Cultivation

Destroying weeds through cultivation is a proven method of control. It is particularly effective on young weeds. Implements are used to dig up and destroy weeds, ranging from large tractors, discs and ploughs to hand tools such as mattocks and chip hoes. Shoots can be separated from their roots or buried deeply to prevent regrowth, and roots can be dragged to the surface to dry out. Some types of weeds can be controlled with repeated passes; however eradication of perennial weeds can be difficult and depends on their root systems.

Cultivation is more effective if weeds are cultivated before they flower and under reasonably dry conditions. Manual cultivation is a viable means of weed control in small-scale situations or as a follow-up control measure.

Slashing

Slashing can be done mechanically with a tractor and slasher or by using a hand-held brush-cutter. It is cheaper than cultivation and preserves ground cover, reducing soil erosion and allowing access in wet weather. Continual slashing may provide control if a desirable pasture species is present and encouraged to replace the weed, but slashing will not eradicate a weed, and can't be used for weed control in crops.

Slashing can:

- » prevent tall weeds from flowering and seeding
- » remove unpalatable or inedible weeds left after stock have selectively grazed a paddock
- » temporarily control weeds until they re-shoot
- » control vegetation and weeds along roadsides

However, slashing can also have negative effects, such as encouraging the growth of less desirable weed species, or spreading weeds that grow vegetatively.

Mulching

Mulching involves the use of physical barriers such as black plastic or woven weed matting to exclude sunlight and prevent weed establishment. Mulching is used for weed control in row crop production such as strawberries, where machinery lays black plastic between rows. Woven weed matting is useful along roadsides, steep banks and cuttings where areas need to be revegetated and where bank stabilisation is necessary.

Natural mulches include sawdust, timber chips, straw, manures and grass clippings. These have other beneficial effects including adding organic matter and nutrients to the soil. However there can be a risk of introducing weed seeds in the mulch material. Most perennial weeds can penetrate mulches such as sawdust and wood chips.

Fire

The success of fire as a weed control method depends on the amount of fuel, the speed and intensity of the fire, and the time of year that burning takes place. Fire is a major control method for woody weeds in western regions of NSW, and can be a useful for controlling lantana and blackberry in certain situations. Fire is best used as part of an integrated weed management program.

Unlike wildfire, a controlled burn - where only the desired area is burned using firebreaks and back-burning techniques - is the best approach for woody weed control. Direct costs are lower than alternative methods such as herbicide treatments or mechanical clearing. A controlled burn:

- » minimises damage to the environment
- » avoids damage to property and livestock
- » helps restore land to an open condition suitable for pasture
- » creates access for further weed control.

Reafforestation

Reafforestation is a long-term method of weed control, where a dense tree canopy is formed to restrict sunlight penetration to weeds on the forest floor. Reafforestation can be in the form of revegetation with native species or through establishment of plantation forests. A weed control program can involve agro-

forestry principles, which include growing trees in conjunction with other agricultural enterprises such as cropping or domestic animals. Reafforestation is suitable over large areas where other forms of weed control are uneconomic or impractical.

Mature trees compete for moisture, nutrients and sunlight and restrict potential weed establishment and growth. It can take 5 to 10 years before trees form a dense canopy and during this establishment phase it is critical to undertake other forms of weed control. A competitive, desirable, shade-tolerant grass or legume can also assist with weed control.

Land management

Good land management is critical to reducing the incidence and impact of weeds. The initial increased costs associated with better land management are compensated with reduced weed control. Management strategies that help to reduce weed problems include:

- » maintenance of pastures or desirable ground covers
- » reduced disturbances and tillage
- » management of nutrient run-off
- » grazing management
- » early weed identification
- » good weed hygiene.

Grazing and pasture management

Competitive, desirable pastures can provide effective weed control. Stocking rates must be managed so as not to cause overgrazing, as weeds will establish in overgrazed areas.

A vigorous pasture competes more effectively with weeds and has added benefits of increased production. Weeds can be controlled in a pasture situation by improving the existing pasture or replacing it with a more suitable or competitive species. Pastures can be improved by adding fertilisers and lime according to soil test results.

Crop management

Crop rotations can minimise weed problems, help control diseases and insects, and improve soil fertility and structure – producing increased yields. Crop rotations can break the seeding and germinating cycle of the weeds.

Weed hygiene

Weed hygiene includes sowing only weed-free seed, cleaning machinery and vehicles, checking clothing and equipment for weed seeds or weed fragments, and removing sources of weed reinfestation around a control site.

New livestock being introduced to a property should be quarantined for several days so any potential weed seeds can pass through their systems into a known area, and be treated later.

Weed identification

When weeds are identified in the early stages of their infestation, eradication is more likely. Control is economical when carried out early, rather than waiting until the weed infestation has spread and become established.



Managing your legal responsibilities in applying pesticides

Pesticides Act

The *Pesticides Act 1999* is the primary legislative instrument controlling the use of pesticides in NSW and is administered by the Environment Protection Authority (EPA). The underlying principle of the Pesticides Act is that pesticides must only be used for the purpose described on the product label and all the instructions on the label must be followed. Consequently, all label directions must be read by, or explained to, the user before each use of the pesticide.

All pesticide users should take reasonable care to protect their own health and the health of others when using a pesticide. They should also make every reasonable attempt to prevent damage occurring from the use of a pesticide, such as off-target drift onto sensitive areas or harm to endangered or protected species.

A Regulation was gazetted in 2009 renewing the requirement for all commercial pesticide users, i.e. all farmers and spray contractors, to keep records of their pesticide application.

While no set form has to be used, records must include:

- » the full product name
- » a description of the crop or situation
- » the rate of application and quantity applied
- » a description of the equipment used
- » the address of the property, identification of the area treated and order of paddocks treated
- » the date and time of the application (including start and finish)
- » the name, address, and contact details of the applicator and of the employer or owner if an employee or contractor is the applicator
- » the estimated wind speed and direction (including any significant changes during application)
- » other weather conditions specified on label as being relevant (e.g. temperature, rainfall, relative humidity).

A form that captures all the information required by the Regulation, together with notes on how to fill it in, is included in this guide.

A self-carboning record book is available from DPI. Call 1800 138 351 to order your copy of the SMARTtrain spray record book (\$10.00). Other websites, including Spraywise, have record forms or you can download an app from **Farming with apps** (www.farmingwithapps.com). More information on your spray record responsibilities is available on the **Environment Protection Authority** website (epa.nsw.gov.au/pesticides/pestrecords.htm). The EPA also has a **spray record form** (epa.nsw.gov.au/resources/pesticides/130814PestFmEg.pdf) you can download and use.

Records must be made within 24 hours of application, be made in legible English, and kept for three years.

The 2009 Regulation requires all commercial pesticide users to be trained in pesticide application.

Trained aerial applicators, pest control operators and fumigators are recognised as satisfying the requirements of the Regulation. Apart from these groups, all commercial users must have a prescribed qualification. Only domestic use, such as home gardens, is excluded, provided the pesticide is a specific domestic/home garden product. Covered by the Regulation is pest control by/on:

- » public authorities, e.g. State Rail
- » golf courses, sporting fields and bowling greens
- » agricultural, horticultural, aquacultural and forestry operations
- » businesses, educational institutions, and hospitals.

The minimum prescribed training qualification is the AQF2 unit of competency, 'Apply chemicals under supervision', although owner-applicators are encouraged to train and be assessed in the two higher AQF3 competencies, 'Prepare and apply chemicals' and 'Transport, handle and store chemicals'.

Growers are recommended to undertake the SMARTtrain course, Chemical Application, or the standard ChemCert course, both of which cover the higher AQF3 competencies. For growers with literacy and/or numeracy problems, the lower level AQF2 competency will provide a minimum qualification that satisfies the Regulation.

Hazardous Chemicals legislation

Many registered pesticides are classified as hazardous chemicals. Even those that are not classified as hazardous pose some risk to the health of those who use them or are exposed to them.

The *Work Health and Safety Act 2011* (WHS), and the Hazardous Chemical section of the Work Health and Safety Regulation 2011, detail legal requirements of suppliers, workers and persons conducting businesses or undertakings in the workplace for hazardous chemicals management. The Act and accompanying Regulation are intended to protect workers from both the short- and long-term health effects of exposure to hazardous chemicals and to improve current health and safety practices by:

- » providing health and safety information to workers (including a list or register of all hazardous chemicals and an SDS (Safety Data Sheet) for each hazardous chemical)
- » consultation with, and training, workers
- » minimising the risks from hazardous chemicals exposure
- » health surveillance (if warranted by the risk assessment in respect of organophosphates).

Both storage and use are covered by the WHS legislation.

Storage limits have changed. Premises storing large quantities require both the storage shed and the entrances to the premises to display placards. If very large quantities are stored – which would be rare on-farm – a manifest, site plan and written emergency plan are required. Consult your local WorkCover office for advice.

WorkCover NSW's Code of Practice for safely using and storing chemicals (including pesticides and herbicides) in agriculture is an approved industry code of practice and provides practical guidance for farm chemical users to comply with this legislation.

How to complete your Pesticide Application Record Sheet

The application record form includes more than the Pesticide Regulation requires, so compulsory information is in *italics* below each heading.

Property/holding:

Attaching a property map or line drawing, showing adjoining sensitive areas, with paddocks and other features clearly identified can be helpful.

Fill in the residential address.

Applicator details:

The person applying the pesticide must fill in their contact details. If the applicator is not the owner, e.g. a contractor or employee, then the owner's details must also be completed. In the case of a contractor, one copy of the record should be kept by the applicator and another given to the owner.

Sensitive area identification:

If there are sensitive areas, either on the property or on land adjoining, these should be identified in advance, and marked on the sensitive areas diagram, together with any precautions or special instructions. When using a contractor or giving the job to an employee, this section should be filled in and given to the person doing the application BEFORE the job starts. The property map with sensitive areas marked should be shown to them, and the job fully discussed.

Paddock identification:

Identify the paddocks/blocks and order of treatment (if there is more than one) in the 'paddock' row of the form. This should be filled in before starting application, along with the residential address. If using a contractor or employee, this information should also be given to them BEFORE they start the job. Applicators using GPS systems could include a GPS reading as well as the paddock number/name.

Crop/animal identification:

The left hand side of the Crop/situation section of the table is for crops, pastures and plants (non-crop, e.g. bushland and fallow), the right hand side for animals. *As a minimum, identify the host (crop/situation) and the weed.* It would be helpful to provide as much detail about the weed as possible, e.g. 4 leaf. Additional details such as crop variety and growth stage are often important for quality assurance schemes, but could also be necessary to positively identify the area treated as required by the Regulation.

Product details:

Transcribe the product name and rate or dose from the label, including all products and additives included in tank mixes. If the use pattern is on a permit, include the permit number, expiry date and label details. A permit rate or dose might vary from the label. Water rate might come from the label, or from your standard practice or calibration. The total litres (L) or kilograms (kg) can be calculated when the application is finished.

Withholding periods: (WHP)

Labels often have a number of different withholding periods. They may be different harvest WHP for different crops, grazing WHP or Export Slaughter Interval (ESI). All WHP's are the minimum number of days after treatment before harvest, grazing or livestock slaughter for export markets can take place.

Equipment details:

As a minimum, you have to fill in what equipment you used. Specifying the setting used for the application can help positive identification, e.g. nozzle type and angle; pressure. The nozzle type will usually include the angle. With pressure, the reading should be as close to the nozzle as possible. Other details e.g. date of calibration and water quality, are useful as a reminder for future use, or as a check on your set-up should you have a treatment failure. Water quality is important for herbicide efficacy. At the most basic level, water quality can be described in terms of its source, e.g. rainwater, dam water, bore water.

Weather:

As a minimum, you have to record wind speed and direction. It is better to measure with instruments than estimate. Record any changes during application.

You must also record the time of day when you started, and the time when you finished.

You will need to record weather information for all equipment that distributes pesticide through the air.

Rainfall should be recorded for the 24 hours before and the 24 hours after application, unless a different figure is given in the restraints or critical comments sections of the label. Rainfall before or after application can affect efficacy.

Temperature and relative humidity should also be recorded, particularly if either or both are referred to in the restraints or critical comments sections of the label. Temperature and relative humidity can affect efficacy, increase the risk of off-target drift or could damage the host (e.g. phytotoxicity) or a combination of all three.

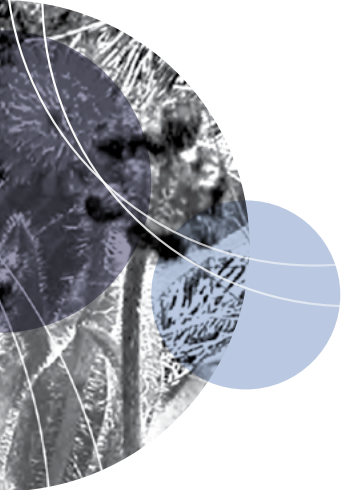
Pesticide Application Record

Property holding (residential address):					Date:	
Applicator's full name:				Owner (if not applicant):		
Address:				Address		
Phone: Mobile:	Fax:	Email:	Phone: Mobile:	Fax:	Email:	
Sensitive areas (include distances and buffers): N W S E			Comments (include risk controls for sensitive areas):			
Paddock no/name:		Paddock area:		Order paddocks sprayed:		
Crop/situation:			Type of animals:			
Crop/pasture/variety:			Age/growth stage:			
Growth stage:			Mob/paddock/shed:			
Pest/weed/disease:			No animals treated:			
Pest density/incidence: Heavy <input type="checkbox"/> Medium <input type="checkbox"/> Light <input type="checkbox"/>						
Full product name:			Rate/dose:		Water rate (L/ha):	
Permit no:		Expiry date:		Adjuvants:		Total ha:
Total L or kg:		WHP:		ESI:		Date suitable sale:
Equipment type:		Release height:		Speed:	Nozzle type*:	Pressure:
Date last calibrated:			Water quality (pH and/or description):			
Showers <input type="checkbox"/>		Overcast <input type="checkbox"/>		Light cloud <input type="checkbox"/>		Clear sky <input type="checkbox"/>
Rainfall (24 hours before and after)						
Before		mm		During		mm
Time		Temperature		RH %		Wind speed
Start:						
Finish:						
Comments:						

* Include brand and capacity, e.g. TeeJet AI 11002.

A self-carboning record book is available from DPI. Call 1800 138 351 to order your copy of the SMARTtrain spray record book (\$10.00). A number of other websites, including Spraywise, have record forms or you can download an app from **Farming with apps** (www.farmingwithapps.com). More information on your spray record responsibilities is available on the **Environment Protection Authority** website (epa.nsw.gov.au/pesticides/pestrecords.htm). The EPA also has a **spray record form** (epa.nsw.gov.au/resources/pesticides/130814PestFmEg.pdf) you can download and use.

Sequentially numbered forms are required for those producers in QA schemes where spray records are mandatory. The forms in the spray record book can be used for livestock and vertebrate pests as well as crops and pastures.



Reducing herbicide spray drift

Herbicide applicators should aim to maximise the amount of herbicide reaching the target plants and minimise drift hazard – the likelihood of the herbicide reaching off-target areas through spray drift. This results in:

1. maximum effectiveness, and
2. reduced damage to and/or contamination of off-target crops, pastures and environmental areas.

There are moral and legal responsibilities to prevent herbicides from drifting and contaminating or damaging neighbouring crops and sensitive areas. Sensitive crops may be up to 10,000 times more sensitive than the crop being sprayed. Even small quantities of drifting herbicide can cause severe damage to highly sensitive plants.

Many labels have drift reduction recommendations that must be followed. These recommendations include wind speed, temperature, droplet size and buffer zones. Look for these recommendations in the Restraints and General Instructions sections of the label.

Types of drift

All pesticides are capable of drift. Sprayed herbicides can drift as droplets, vapours or particles.

Droplet drift is the easiest type of drift to control because under good spraying conditions, droplets are carried down by air turbulence and gravity and onto target plant surfaces, yet droplet drift is the most common cause of off-target damage due to applications being made under the wrong conditions.

Particle drift occurs when water and other herbicide carriers evaporate quickly from the droplet leaving tiny particles of concentrated herbicide. This can occur with herbicide formulations other than esters. Instances of this form of drift have damaged susceptible crops up to 30 km from the source.

Vapour drift is confined to volatile herbicides such as 2,4-D ester. Vapours may arise directly from the spray or evaporation of herbicide from sprayed surfaces. Use of 2,4-D ester in summer can lead to vapour drift damage of highly susceptible crops such as tomatoes, sunflowers, soybeans, cotton and grapes. This may occur hours after the herbicide has been applied.

Vapours and minute particles float in the airstream and are poorly collected on catching surfaces. They may be carried for many kilometres in thermal updraughts before being deposited.

Other off-target movement of herbicide

Soil active or residual herbicides are also able to affect off-target plants by moving away from the original target plant in the following ways:

Physical soil movement: cultivating, land levelling, bulldozing, soil erosion etc. can move herbicide-treated soil.

Underground water movement: some herbicides are prone to leaching through the soil profile into water-tables and aquifers. Off-target plants that access water from these underground sources are therefore at risk.

Leaking of herbicide active ingredients from treated plants roots to other non-target species: this is called 'flash back' and is sometimes observed with picloram-based herbicides (e.g. Tordon DSH, Graxon Extra).

Minimising spray drift

Select equipment to reduce the number of small droplets produced, being mindful that this in turn may affect coverage of the target plant, and therefore the possible effectiveness of the herbicide. This needs to be carefully considered when planning to spray, as the number of smaller droplets decreases, so does the coverage of the spray.

A good example of this is the use of air-induction nozzles that produce large droplets that splatter. These nozzles may produce a droplet pattern and number unsuitable for small targets such as seedling grasses. As the volume median diameter (see Table – Nozzle selection guide for ground application, below) of the spray becomes coarser, spray application volumes need to be increased to compensate for the fewer droplets being produced.

Before spraying

Always check for nearby sensitive areas such as houses, schools, and riparian areas. Check for susceptible crops in the area, e.g. if using a broadleaf herbicide check for broadleaf crops such as grape vines, cotton, pulse or vegetable crops. Notify neighbours of planned herbicide treatments. Under Regulations of the *Pesticides Act 1999* it is essential that weather and other details are recorded (see Record keeping in Managing your legal responsibilities when applying pesticides).

During spraying

- » Continuously monitor meteorological conditions carefully and understand their effects on drift hazard.
- » Don't spray if conditions are not suitable, and stop spraying if conditions change and become unsuitable.
- » Record weather conditions (especially temperature and relative humidity), wind speed and direction, herbicide and water rates, and operating details for each paddock.
- » Supervise all spraying, even when a contractor is employed. Provide a map marking the areas to be sprayed, buffers to be observed, sensitive crops and areas.
- » Spray when temperatures are less than 28°C.
- » Minimise spray release height (lowest possible boom height).
- » Use the largest droplets that give adequate spray coverage.
- » Always use the least-volatile formulation of herbicide available.
- » Maintain a down-wind buffer zone (which may be in-crop e.g. keep a boom width from the downwind edge of the field).
- » If sensitive crops, pastures or environmental situations are in the area, use the herbicide which is the least damaging to them.

Spot spraying

Powered hand guns and knapsack sprayers can usually apply variable spray patterns, ranging from wide, fine spray cone patterns to coarse, thin jet streams. For most situations it is recommended to apply a moderate width cone spray pattern, in order to reduce the quantity of fine droplets produced, reducing spray drift. It is however essential to use a jet stream spray to penetrate into thick canopies of vegetation when underlying foliage requires treatment.

Factors affecting the risk of herbicide spray drift

Any herbicide can drift. The drift hazard, or off-target potential, of a herbicide in a particular situation depends on the following factors.

Volatility

Volatility refers to the likelihood that the herbicide will evaporate and become a gas, and the use of low volatile formulations will reduce drift hazard. Esters volatilise (evaporate) more readily than other formulations, and many ester formulations are highly volatile when compared with the non-volatile amine, sodium salt and acid formulations. Some low volatile ester formulations may have a proportion of high volatile esters present, so caution should be exercised when using these products.

Formulation

Formulations such as emulsifiable concentrates have a tendency to produce more small droplets than dry flowable products. Use a low volatile formulation.

Type of adjuvant

Non-ionic surfactants and penetrants added to the spray solution produce more small droplets than oil-based adjuvants.

Susceptible crops

Closeness of crops susceptible to the particular herbicide being applied, and their growth stage affect susceptibility. For example cotton is most sensitive to Group I herbicides in the seedling stage.

Size of the treated area

The larger an area under treatment, the longer it takes to apply herbicide to it, and relatively large amounts of herbicide are involved. Weather conditions are more likely to change during lengthy applications, and if they do there is more herbicide available to volatilise. Applying volatile formulations to large areas increases the chances of vapour drift damage to susceptible crops and pastures.

Nozzle selection guide for ground application

Drift Risk Hazard Level	High	Medium	Low
Distance downwind to susceptible crop	< 1 km	1–30 km	> 30 km
Preferred droplet size (ASAE) (to minimise risk)	Coarse	Medium	Fine
Volume median diameter (microns)	310	210	135
Pressure (bars) Δ Note: 1 bar = 100 kPa = 14.5 p.s.i.	5.0–6.5	2.0–3.5	3.5
Flat fan nozzle size (equivalent)	11008	11004	11002
Recommended nozzles (Examples only)	Raindrop Whirljet® Air induction Yamaha® Turbodrop® Hardi Injet® AI Teejet® Lurmark Drift-beta®	Drift reduction DG TeeJet® Turbo TeeJet® Hardi® ISO LD 110 Lurmark® Lo-Drift	Conventional XR TeeJet® Hardi® S3110 Hardi® S4110 Hardi® ISO F series Lurmark® Fan Tip
CAUTION	Can lead to poor coverage and control of grass weeds. Requires higher spray volumes.	Suitable for grass control at recommended pressures. Some fine droplets.	High proportion of 'driftable' droplets. Temperature and humidity critical.

Please note that it is recommended to apply a coarse spray quality as much as possible even if herbicide drift potential is low (drift risk hazard).

Volume Median Diameter (VMD): 50% of the droplets are less than the stated size and 50% greater.

Δ – NOTE – Refer to manufacturers' selection charts as droplet size will vary with recommended pressure.

Always use the lowest pressure stated to minimise the number of fine droplets.

Adapted from P. Hughes, Department of Agriculture, Fisheries and Forestry, (DAFF), Queensland.

Droplet capture

Targets vary in their ability to collect or capture spray droplets. Well grown, leafy crops are efficient collectors of droplets. Fallow paddocks or seedling crops are poor catching surfaces. Drift hazard is far greater when applying herbicide in these situations or adjacent to these poor capture surfaces.

The type of catching surface between the sprayed area and susceptible crops should always be considered in conjunction with the characteristics of the target area when assessing drift hazard.

Release height of droplets

As release height of droplets is increased, the time for droplets to fall increases allowing more time for weather conditions to have an influence on the distribution of the droplets, hence increasing the potential for drift to occur. To reduce spray release height:

- » operate the boom at the minimum practical height. Drift hazard doubles as nozzle height doubles. If possible, angle nozzles forward or back 30° to allow lower boom height with double overlap. Lower heights however can lead to striping as the boom sways and dips below the optimum height
- » 110° nozzles produce a higher percentage of fine droplets than 80° nozzles. However they allow a lower boom height while maintaining the required double overlap, and
- » operate within the pressure range recommended by the nozzle manufacturer. Production of driftable fine droplets increases as the operating pressure is increased. Lower volumes such as 30–40 L/ha produce a higher percentage of fine droplets than higher spray volumes at the same pressure and nozzle design.

Weather conditions

Weather conditions during and shortly after application both affect drift. Influential factors include:

Midday turbulence

Up-drafts during the heat of the day cause rapidly shifting wind directions. Spraying should stop by 11 am during summer.

High temperatures

Avoid spraying when temperatures exceed 28°C.

Humidity

Avoid spraying when there is low relative humidity, i.e. when Delta T (the difference between wet and dry thermometers) exceeds 10°C. Spraying when Delta T is between 8–10° is considered moderate risk. Evaporation rates under such low relative humidity conditions are high and will consequently reduce the size of smaller droplets, making them more prone to drift. Always measure temperatures and relative humidity before and during spraying and consult a Delta T chart (page 13) to establish whether conditions are favourable. (Delta T chart stickers can be obtained from Nufarm and placed in tractors etc.)

Wind

Avoid spraying under still (stable) conditions. Suitable wind speeds are 7–10 km/h. This is when leaves and twigs are in constant motion – a light breeze. Turbulent airflows normally carry spray droplets down into an infestation within a very short distance from the point of release.

If using low drift nozzles or higher volume applications (80–120 L/ha) wind speeds of 11–14 km/h are also suitable for spraying. In these conditions small branches move, dust is raised and loose paper is moving – a moderate breeze.

Inversions

The most hazardous condition for creating spray drift is an atmospheric inversion, especially when combined with high humidity. Spraying should not be done while an inversion exists.

Inversions exist when temperatures increase with altitude instead of decreasing. An inversion is like a cold blanket of air above the ground, usually less than 50 m thick. Air will not rise above this blanket, and smoke, dust or fine spray droplets and particles of spray deposited within an inversion will float until the inversion breaks down.

Inversions usually occur on clear, calm mornings and nights. Windy or turbulent conditions prevent inversions from forming. Blankets of fog, dust or smoke and the tendency for sounds and smells to carry long distances indicate inversion conditions.

Smoke generators or smoky fires can be used to detect inversion conditions. Smoke will not continue to rise but will drift along at a constant height under the inversion 'blanket'.

Night spraying

Night spraying is often undertaken because there is little wind to move pesticides off-target, and because Delta T conditions can be favourable. While the risk of spray drift is reduced at night, inversion conditions are common and have resulted in massive off-target damage in recent seasons, particularly to cotton and grapes. Night spraying is inherently high risk and should be avoided.

Helpful meteorological information

Real time data needs to be collected in the paddock at the time of spraying. This can be done with:

- » handheld units which measure temperature, Delta T and wind speed
- » on-farm weather stations. Some can now be accessed by smart phones.

Hourly data

Hourly data from Bureau of Meteorology (BOM) weather stations including temperature, Delta T, wind speed and direction is available for the previous 72 hours from:

www.bom.gov.au/weather/nsw/nsw-observations-map.shtml – click on the relevant town.

This data can help when planning spray activities and is useful for developing an understanding of the current daily patterns of meteorological conditions.

Meteograms™ from the BOM

Meteograms™ provide 7 day forecasts of temperature, relative humidity, rainfall, wind speed and wind direction.

Meteograms™ are very helpful in planning spray programs for periods of lowest drift risk and highest herbicide efficacy. They are available via subscription at a cost.

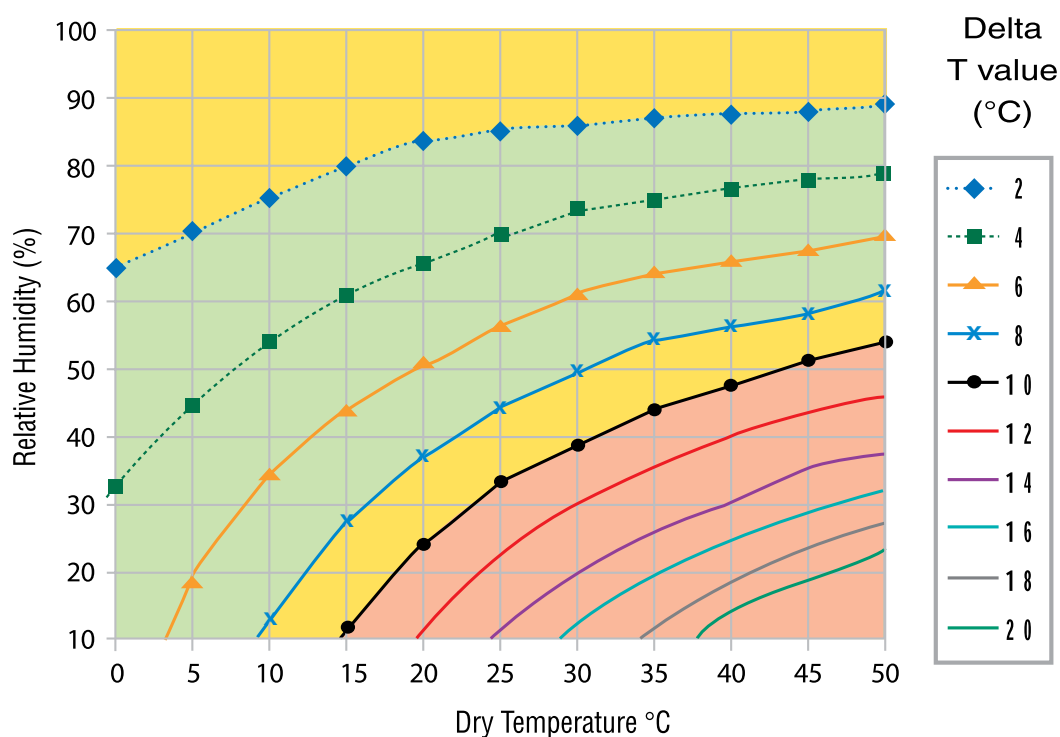
APVMA spray drift initiative

To control spray drift, the APVMA is revising labels for boom and aerially applied pesticides to include:

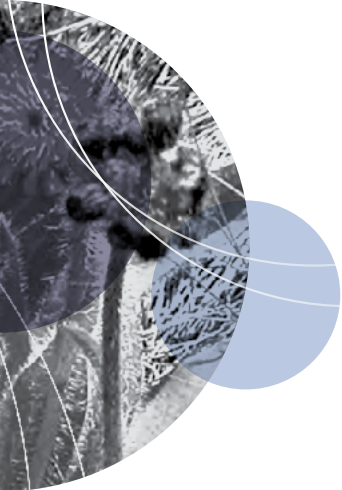
- » mandatory downwind buffer or no spray zones,
- » specific droplet spectrum, e.g. not less than coarse droplets according to the ASAE S572 standard,
- » wind speed, e.g. between 3 and 20 km/hr, and
- » a prohibition on spraying if inversion conditions are present.

SELECTING THE RIGHT DELTA T CONDITIONS FOR SPRAYING.

- preferred delta T conditions for spraying
- delta T conditions marginal
- delta T conditions unsuitable for spraying



Delta T diagram supplied by Nufarm Ltd.



Using adjuvants with herbicides

An adjuvant is any additive to a herbicide that is intended to improve the effectiveness of the herbicide. Some herbicides have sufficient adjuvant and require no additional adjuvant to perform well. However, some herbicides need help to spread across the leaf and penetrate the leaf surface of the target weed. The requirement of an adjuvant is usually detailed on the product label. Always read the product label before opening the container.

There are many adjuvants that have been developed to help herbicides to contact, remain on and penetrate the weed leaf.

The APVMA classes adjuvants into two categories;

- » Adjuvants which enhance product efficacy
- » Adjuvants which improve the ease of application

Adjuvants which enhance product efficacy

Wetters / spreaders

Wetters/spreaders enhance adhesion to and spreading of spray droplets on target surfaces by reducing the surface tension of the pesticide formulation and improving coverage, such as;

- » Non-ionic surfactants – non-reactive, i.e. they do not have a negative charge or a positive charge; they remain on the leaf once dry and allow rewetting after rain, permitting additional pesticide uptake
- » Anionic surfactants – negative charge
- » Cationic surfactants – positive charge
- » Amphoteric surfactants
- » Organo-silicate surfactants
- » Acidified surfactants

Stickers

Stickers increase adhesion of pesticides to target surfaces, such as;

- » Latex-based
- » Terpene / pinolene
- » Pyrrolidone-based

Penetrants

Penetrants improve the transfer of active ingredients from the target surface to interior tissues and may include;

- » Mineral oil
- » Vegetable oil
- » Esterified vegetable oil
- » Organo-silicate surfactants
- » Acidified surfactants

Extenders

Extenders enhance the amount of time the active ingredient remains toxic by increasing resistance to environmental degradation, and may include;

- » Ammonium sulphate
- » Menthene-based

Humectants

Humectants increase the density/drying time of an aqueous spray deposit, including;

- » Glycerol
- » Propylene glycol
- » Diethyl glycol

Adjuvants which improve ease of application**Acidifying/buffering agents**

Acidifying/buffering agents adjust the pH of alkaline or acidic water and minimise decomposition of the pesticide through alkaline hydrolysis.

Anti-foaming/de-foaming agents

Anti-foaming/de-foaming agents reduce or suppress the formation of foam in the spray tank preventing foam overflow;

- » Dimethopolysiloxane

Compatibility agents

Compatibility agents permit the mixing of different agrochemicals by preventing antagonism between different ingredients in the spray solution such as;

- » Ammonium sulphate

Drift control agents

Drift control agents alter the viscoelastic properties of the spray solution yielding a coarser spray with greater mean droplet sizes;

- » Polyacrylamides
- » Polysaccharides

Dyes

Dyes are commonly used for spot or boom spraying herbicides to detect missed spots or avoid spraying a plant or area twice.

Water conditioners

Water conditioners prevent reaction between hard water ions in spray solutions and suppress formation of precipitates or salts;

- » Ammonium sulphate

Factors affecting adjuvant use**Crop safety**

Addition of an adjuvant can reduce herbicide selectivity and thereby increase crop damage. This is not an issue for fallow and pre-emergent herbicides.

Effectiveness or activity

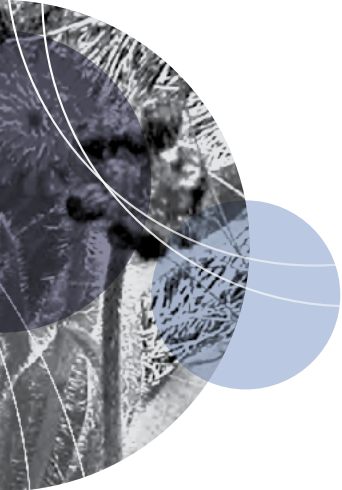
Adjuvants are usually added to increase the effectiveness of herbicides. However, using the wrong type or rate can reduce effectiveness, such as decreasing herbicide retention on leaves.

Water hardness

Hard water can lead to poor mixing of the chemical with water. This particularly occurs with emulsifiable concentrates. High levels of calcium and magnesium ions bind with amine formulations, causing them to be less soluble and therefore less effective.

Water temperature

Low water temperature can lead to jelling in the tank. High-concentration herbicides may not mix and surfactants may perform poorly.



Cleaning spray equipment

The importance of cleaning and decontaminating spray equipment after herbicide applications cannot be over-stated. Crops and pastures have been severely damaged and destroyed by spray equipment that was not thoroughly cleaned before use.

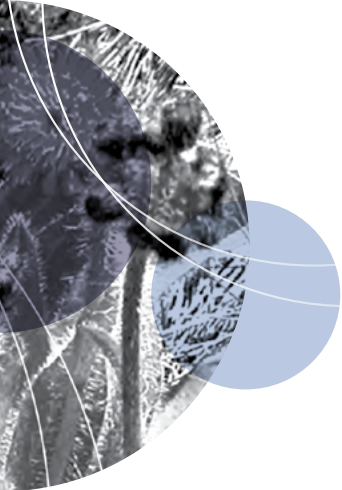
Grass control herbicides (such as Verdict®, Fusilade®, Correct®, Select®, Targa® and Sertin®) have an ability to strip residues of broadleaf herbicides (particularly sulfonylurea herbicides such as Glean® and Logran®) from spray tanks and lines. These very small concentrations can be extremely damaging to winter cereal and summer crops like canola, sunflowers, cotton, pulses and legumes and other desirable broadleaf vegetation.

Take particular care to follow the directions on the product label for cleaning and decontaminating spray equipment. Note: Rinse water should be discharged into a designated disposal area.

A number of tank and equipment cleaners are commercially available (see below).

Cleaning and decontaminating spray equipment

Herbicide	Rate of agent/100 L water	Instructions for cleaning and decontamination
Glyphosate (Roundup®) or Imidazolinone herbicides: imazamox (Raptor®), imazapic (Flame®), imazethapyr (Spinnaker®)	Clean water, (*Nufarm Tank and Equipment Cleaner)	Rinse thoroughly several times with clean water before use.
Hormone-type, salt or amine formulations: 2,4-D amine, MCPA amine, 2,4DB, dicamba	2 L household ammonia (*Nufarm Tank and Equipment Cleaner)	Thoroughly agitate and flush a small amount of solution through the system and let stand in sprayer overnight. Flush and rinse with clean water several times before use.
Hormone-type, ester formulations: 2,4-D ester, MCPA ester	500 g washing soda (crystalline sodium carbonate) + 4 L kerosene + 125 g powdered detergent (*Nufarm Tank and Equipment Cleaner)	Rinse the inside and outside of the tank and flush a small amount through the system for 15–20 minutes. Let stand for at least 2 hours or preferably overnight. Flush and rinse before use.
Triazine herbicides: atrazine, simazine	125 g powdered detergent (*Nufarm Tank and Equipment Cleaner)	Rinse with clean water before and after using the solution.
Sulfonylurea herbicides: chlorsulfuron (Glean®), triasulfuron (Logran®), metsulfuron (Ally®, Brushoff®)	300 mL fresh household chlorine bleach containing 4% chlorine or 300 mL BC-45 Spray Equipment Cleaning Agent (*Nufarm Tank and Equipment Cleaner)	1. Drain and flush the tank, hoses, and boom with clean water for 10 minutes. 2. Fill the tank with clean water and add the chlorine bleach. Flush the boom and allow to stand for 15 minutes, then drain. 3. Repeat Step 2. 4. Nozzles, screens and filters should be removed and cleaned separately.
Sulfonamide herbicides: flumetsulam (Broadstrike®), metosulam (Eclipse®) Pyridine herbicides: clopyralid (Lontrel®)	500 mL liquid detergent such as Surf®, Omo®, Dynamo Matic® or 500 g of the powder equivalent	Flush the system, then quarter-fill the tank with water and add the detergent. Start the pump and circulate for at least 15 minutes. Drain the whole system. Remove and clean the filters, screens and nozzles with clean water and allow draining.
Grass selective herbicides: haloxyfop (Verdict®), fluazifop (Fusilade®), clethodim (Select®), quizalofop-p-ethyl (Targa®)	500 mL alkali liquid detergent such as Surf®, Omo®, Dynamo Matic® or 500 g of the powder equivalent	Before spraying cereals, maize, sorghum or other sensitive crops, wash the tank and rinse after use. Completely drain the tank and wash filters, screens and nozzles. Drain and repeat the procedure twice. To decontaminate, wash and rinse the system as above, quarter-fill the tank, add the detergent and circulate through the system for at least 15 minutes. Drain the whole system. Remove filters, screens and nozzles and clean separately. Finally, flush the system with clean water and allow to drain.



Withholding periods

The withholding period (WHP) is the minimum period of time that must elapse between:

- » the last application of a chemical (herbicide) to any plant, crop, or pasture, and
- » the harvesting, cutting or grazing of animals on the plant, crop or pasture; or the shearing, slaughter, collection of milk, or collection of eggs from animals grazed on the plant, crop or pasture

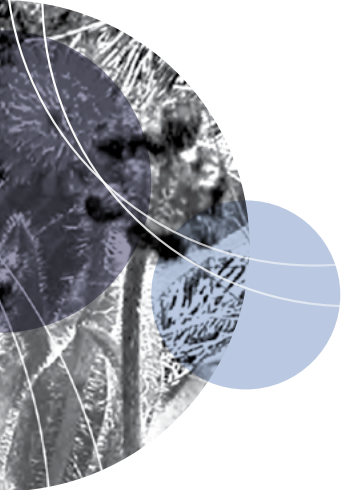
In order to ensure that the chemical's residues in the treated produce fall below the maximum permitted level known as the **Maximum Residue Limit** (MRL).

Observance of the withholding period stated on a registered herbicide label is a legal requirement.

To calculate the date when treated produce can be harvested or livestock slaughtered, add the WHP (for example 7 full 24- hour days) to the time when chemical application finished. For example, if chemical application finished at 11am and harvest or slaughter needs to be carried out earlier in the day than 11am, then it must wait until the next (eighth) day.

Active ingredient	Example product	Withholding period
2,2-DPA	Propon®	7 days for harvest; 2 days for grazing/foraging
2,4-D	Affray 300®	7 days.
2,4-D + Picloram	Tordon® 75-D	1-8 weeks (see label).
2,4-D amine	Various products	7 days.
2,4-D amine	Amicide® 625	7 days.
2,4-D amine	Amicide Advance 700	Do not graze or cut for stock food for 7 days after application.
2,4-D ester	Various products	7 days.
2,4-D ester	Various products	7 days.
2,4-D LV ester	Various products	7 days.
2,4-D LV ester	Estercide® Xtra	7 days
2,4-D LV ester	Estercide® 800	7 days
Amitrole	Amitrole T®	Nil.
Amitrole + Ammonium thiocyanate	Various products	Nil
Atrazine	Various products	28 days.
Bromacil	Various products	Not required when used as directed.
Bromoxynil	Bromicide®	8 weeks.
Bromoxynil + Diflufenican	Jaguar	14 days
Carfentrazone-ethyl	Shark™ Aquatic Herbicide	Nil.
Clopyralid	Lontrel®	1-12 weeks (see label).
Clopyralid	Various products	1-12 weeks
Clopyralid	Lontrel 750 SG Herbicide	Do not graze or cut for stock food for 7 days after application.
Copper	Cupricide 110®	Do not treat drinking waters used by livestock grazing on heliotrope or ragwort.
Dicamba	Kamba® 500	7 days.
Dichlobenil	Casoron 4G Herbicide	Do not graze livestock on treated areas.
Dichlobenil	Casoron G®	Nil.
Dichlorprop	Lantana 600®	Nil.
Diflufenican	Various products	14 days
Diquat	Watrol®	1 day in pasture, 10 days in treated water.
Diquat	Reglone®	1 day in pasture, 10 days in treated water.

Active ingredient	Example product	Withholding period
Diuron	Various products	Do not allow animals to drink water from treated bore drains for 3 days before slaughter for human consumption.
Fluazifop-p	Various products	
Flumioxazin	Terrain	Do not allow livestock to graze vegetation present at the time of treatment for 2 weeks after application.
Flupropanate	Tussock®	Don't graze cows or goats that are being milked on treated areas. Blanket sprayed pastures - grazing or cutting for stock feed - 120 days. Spot sprayed areas - grazing or cutting for stock feed - 14 days. Don't graze stock on treated areas for 14 days prior to slaughter.
Fluroxypyr + Aminopyralid	Hot Shot™	7 days. See label for export restrictions.
Fluroxypyr	Starane™	7 days.
Fluroxypyr	Starane™ Advanced	7 days.
Glufosinate-ammonium	Basta®	8 weeks.
Glyphosate	Roundup®	Nil.
Glyphosate	Various products	Nil.
Glyphosate	Various products	Not required when used as directed.
Glyphosate + Metsulfuron-methyl	Trounce®	Nil (recommended not to graze for 7 days before treatment and for 7 days after treatment to allow adequate chemical uptake in target weeds).
Glyphosate-trimesium	Glyphosate Trimesium 480	Not required when used as directed.
Haloxypop	Verdict®	7 - 28 days
Hexazinone	Velpar® L	No stated withholding period.
Imazapyr + Glyphosate	Arsenal Express®	7 weeks.
Imazapyr	Various products	
Imazapyr	Various products	Do not graze or cut for stock feed.
MCPA + Dicamba	Kamba® M	7 days.
MCPA	Various products	7 days.
Metsulfuron-methyl + Aminopyralid	Stinger™	3 - 56 days (see label)
Metsulfuron-methyl	Brush-off®	Nil (recommended not to graze for 7 days before treatment and for 7 days after treatment to allow adequate chemical uptake in target weeds).
Metsulfuron-methyl + Glyphosate	Cut-out®	Nil (recommended not to graze for 7 days before treatment and for 7 days after treatment to allow adequate chemical uptake in target weeds).
Metsulfuron-methyl	Various products	Nil (recommended not to graze for 7 days before treatment and for 7 days after treatment to allow adequate chemical uptake in target weeds).
MSMA	Armada 720 SL	5 weeks.
Orange oil	Water Clear®	Nil.
Oxyfluorfen	Goal Herbicide	Do not allow livestock to graze treated weeds
Picloram + Triclopyr + Aminopyralid	Grazon Extra®	Where product is used to control woody weeds in pastures there is a restriction of 12 weeks for use of treated pastures for making hay and silage; using hay or other plant material for compost, mulch or mushroom substrate; or using animal waste from animals grazing on treated pastures for compost, mulching, or spreading on pasture/crops.
Picloram	Tordon® Granules	Nil.
Picloram + Aminopyralid	Vigilant II®	Nil.
Propyzamide	Kerb	Do not harvest, graze or cut for stock food or for seed for 25 days after application
Simazine	Various products	Not required when used as directed.
Tebuthiuron	Graslan®	Nil.
Triclopyr + Picloram	Tordon® DSH	Nil.
Triclopyr + Picloram + Aminopyralid	Tordon™ Regrowthmaster™ Herbicide	Not required when used as directed.
Triclopyr + Picloram	Access™	Nil
Triclopyr + Picloram	Grazon® DS	Nil.
Triclopyr	Garlon® 600	Nil.



Herbicide resistance

Herbicide resistance is the inherent ability of a weed to survive treatment with a herbicide that would normally kill it. If a resistant plant is allowed to reproduce, the resistance spreads resulting in more and more plants that are resistant to that particular herbicide. This is not the same as poor herbicide performance. Once herbicide resistance occurs it will persist indefinitely.

Herbicides act by interfering with specific processes in plants, known as the herbicide's mode of action. Different herbicides may have the same mode of action and herbicides with the same modes of action are grouped from Group A to Group Z (see below). The risk of herbicide resistance developing is higher in certain Groups. For example, Groups A and B are more likely to develop resistance than Groups I, L and M.

The best way to manage herbicide resistance is to adopt integrated weed management by combining herbicide use with non-chemical control options (as described in Integrated weed management), as well as:

- » ensuring any resistant plants do not set seed;
- » regularly monitoring the results of herbicide treatments and looking out for resistant plants;
- » undertaking herbicide resistance testing on suspect plants that survive herbicide treatments; and
- » not relying on the same herbicide Group for regular weed control (rotate treatments using herbicides from different Groups).

Herbicide Group	Risk	Mode of Action	Active ingredient	Example product
A	High	Inhibitors of fat synthesis (ACC'ase [acetyl coA carboxylase] inhibitors)	Haloxypop	Verdict®
A	High	Inhibitors of fat synthesis (ACC'ase [acetyl coA carboxylase] inhibitors)	Fluazifop-p	Various products
B	High	Inhibitors of acetolactate synthase (ALS inhibitors)	Imazapyr	Various products
B	High	Inhibitors of acetolactate synthase (ALS inhibitors)	Metsulfuron-methyl	Brush-off®
B + M	High + Moderate	Inhibitors of acetolactate synthase (ALS inhibitors) + Inhibitors of EPSP synthase	Metsulfuron-methyl + Glyphosate	Cut-out®
B + M	High + Moderate	Inhibitors of acetolactate synthase (ALS inhibitors) + Inhibitors of EPSP synthase	Imazapyr + Glyphosate	Arsenal Express®
B + I	High + Moderate	Inhibitors of acetolactate synthase (ALS inhibitors) + Disruptors of plant cell growth (synthetic auxins)	Metsulfuron-methyl + Aminopyralid	Stinger™
C	Moderate	Inhibitors of photosynthesis at photosystem II (PS II inhibitors)	Atrazine	Various products
C	Moderate	Inhibitors of photosynthesis at photosystem II (PS II inhibitors)	Diuron	Various products
C	Moderate	Inhibitors of photosynthesis at photosystem II (PS II inhibitors)	Bromacil	Various products
C	Moderate	Inhibitors of photosynthesis at photosystem II (PS II inhibitors)	Simazine	Various products
C	Moderate	Inhibitors of photosynthesis at photosystem II (PS II inhibitors)	Hexazinone	Velpar® L
C	Moderate	Inhibitors of photosynthesis at photosystem II (PS II inhibitors)	Bromoxynil	Bromicide®
C	Moderate	Inhibitors of photosynthesis at photosystem II (PS II inhibitors)	Tebuthiuron	Graslan®

Herbicide Group	Risk	Mode of Action	Active ingredient	Example product
C + F	Moderate	Inhibitors of photosynthesis at photosystem II (PS II inhibitors) + Bleachers: inhibitors of carotenoid biosynthesis at the phytoene desaturase step (PDS inhibitors)	Bromoxynil + Diflufenican	Jaguar
D	Moderate	Inhibitors of microtubule assembly	Propyzamide	Kerb
F	Moderate	Bleachers: inhibitors of carotenoid biosynthesis at the phytoene desaturase step (PDS inhibitors)	Diflufenican	Various products
G	Moderate	Inhibitors of protoporphyrinogen oxidase (PPOs)	Oxyfluorfen	Goal Herbicide
G	Moderate	Inhibitors of protoporphyrinogen oxidase (PPOs)	Flumioxazin	Terrain
G	Moderate	Inhibitors of protoporphyrinogen oxidase (PPOs)	Carfentrazone-ethyl	Shark™ Aquatic Herbicide
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	2,4-D	Affray 300®
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	Dichlorprop	Lantana 600®
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	Triclopyr	Garlon® 600
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	Fluroxypyr	Starane™ Advanced
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	2,4-D amine	Various products
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	2,4-D ester	Various products
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	2,4-D LV ester	Various products
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	Dicamba	Kamba® 500
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	Clopyralid	Lontrel®
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	MCPA	Various products
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	Picloram	Tordon® Granules
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	Triclopyr + Picloram	Tordon® DSH
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	2,4-D + Picloram	Tordon® 75-D
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	MCPA + Dicamba	Kamba® M
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	Picloram + Aminopyralid	Vigilant II®
I	Moderate	Disruptors of plant cell growth (synthetic auxins)	Picloram + Triclopyr + Aminopyralid	Grazon Extra®
J	Moderate	Inhibitors of fat synthesis (Not ACCase inhibitors)	Flupropanate	Tussock®
J	Moderate	Inhibitors of fat synthesis (Not ACCase inhibitors)	2,2-DPA	Propon®
L	Moderate	Inhibitors of photosynthesis at photosystem I (PSI inhibitors)	Diquat	Reglone®
M	Moderate	Inhibitors of EPSP synthase	Glyphosate	Various products
M	Moderate	Inhibitors of EPSP synthase	Glyphosate-trimesium	Glyphosate Trimesium 480
M + B	Moderate + High	Inhibitors of EPSP synthase + Inhibitors of acetolactate synthase (ALS inhibitors)	Glyphosate + Metsulfuron-methyl	Trounce®
N	Moderate	Inhibitors of glutamine synthetase	Glufosinate-ammonium	Basta®
O	Moderate	Inhibitors of cell wall (cellulose) synthesis	Dichlobenil	Casoron G®
Q	Moderate	Bleachers: Inhibitors of carotenoid biosynthesis unknown target	Amitrole	Amitrole T®
Q	Moderate	Bleachers: Inhibitors of carotenoid biosynthesis unknown target	Amitrole + Ammonium thiocyanate	Various products
Z	Moderate	Herbicides with unknown and probably diverse sites of action	MSMA	Armada 720 SL



Control techniques using herbicides

Herbicides are commonly used for controlling weeds in agricultural and non-agricultural situations, and there are many types of equipment and techniques available for applying them. The appropriate option will be determined by the size of the infestation, the available resources, access and personal preferences. The most commonly used application techniques are listed and described below. Always remember to read the product label and any relevant permit before using a herbicide.

Foliar spraying

Foliar spraying is the use of herbicide diluted with water at a specific rate, and sprayed over the foliage to the point of runoff (until every leaf is wetted, but not dripping).

It is suitable for shrubs, grasses and dense vines where complete coverage can be achieved. Advantages include speed of application and economy. Disadvantages include the potential for spray drift and off-target damage.

Foliar spraying can be done a number of ways, depending on the size of the weed plant and/or the infestation. Blanket spraying using a boom spray mounted on a vehicle can be used to treat large areas with infestations up to 1 m in height. Taller infestations or those with difficult access can be sprayed with a handgun connected by a hose to a herbicide tank and pump, carried by a tractor or vehicle. Smaller infestations can be sprayed using a backpack/knapsack spray unit. Spot spraying is treating individual weed plants, areas that have only small clumps of weed infestations, or regrowth areas.

Gas gun/splatter gun

Gas guns or splatter guns apply a low volume of high concentration, translocatable herbicide to the foliage of an infestation (generally woody weeds). The herbicide is squirted from a gas-powered gun, placing very large droplets onto the leaves from 6–10 m away. The splatter is arched over the tops of bushes and down their sides, at specific intervals (refer to product labels for exact rates). Only a small portion of the foliage needs to be treated minimising off-target damage and reducing chemical usage. This technique allows for specific targeting of the herbicide and a marker dye is necessary to identify treated areas.

Rope/wick applicators

A wick or rope is soaked in herbicide that is pumped from a reservoir (either by hand or with 12-volt equipment). The wetted wick is used to wipe or brush herbicide over the weeds. Commercially available equipment such as Weed Wand and Weed Wiper are available in sizes ranging from hand-held to vehicle- or tractor-mounted.

It is sometimes necessary to provide some resistance for the wiper when the weed leaf or stem is soft. Stem swiping involves using a knife to provide resistance down the back of the stem or leaf, while manually wiping herbicide down the front.



Figure 1. Foliar spraying using a knapsack.

Basal bark spraying

An oil-soluble herbicide is mixed with diesel and sprayed around the full circumference of the trunk or stem of the plant. It works for plants with basal diameters up to 10 cm and heights of 30 to 100 cm (check herbicide product labels as some plants can only be treated if their basal diameter is less than 5 cm). The diesel helps move the herbicide through the bark and into the underground storage organs of the plant, slowly killing it.

The whole circumference of the stem or trunk must be sprayed or painted with herbicide solution from ground level to a height of 30 cm. It is important to saturate the full circumference of the trunk, and to treat every stem or trunk arising from the ground.

Basal bark spraying is suitable for thin-barked woody weeds and undesirable trees, and is also an effective way to treat saplings, regrowth and multi-stemmed shrubs and weeds in inaccessible areas such as steep banks. It creates little or no spray drift or off-target damage, and will usually control difficult-to-kill weeds at any time of the year, as long as the bark is not wet or too thick for the diesel to penetrate.

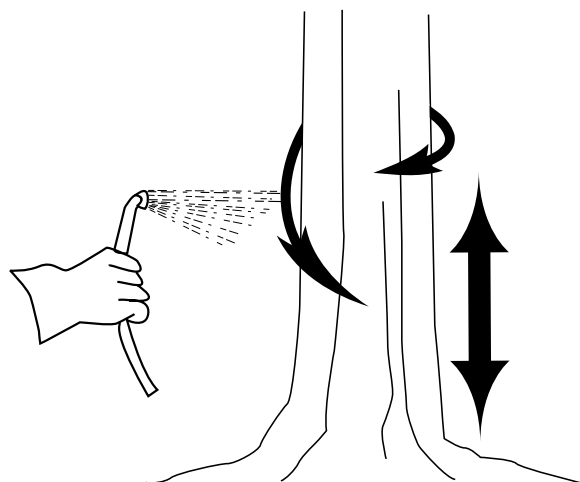


Figure 2. Basal bark spraying.

Stem injection methods

Herbicide is placed immediately into holes or cuts made by drilling or cutting through the bark into the sapwood tissue in the trunks of woody weeds and trees. The aim is to reach the sapwood layer just under the bark (the cambium), where the chemical will be transported throughout the plant.

It is essential to apply the herbicide immediately (within 15 seconds of drilling the hole or cutting the trunk), as stem injection relies on the active uptake and growth of the plant to move the chemical through its tissues.

Stem injection methods kill the tree or shrub where it stands, and only trees and shrubs that can be safely left to die and rot should be treated this way. If the tree or shrub is to be felled, allow it to die completely before felling.

Stem injection - drill and fill method

This method is for trees and woody weeds with stems or trunks greater than 5 cm in circumference. A battery-powered drill is used to make downward-angled holes in the sapwood approximately 5 cm apart. Herbicide is then injected in measured doses using a backpack reservoir and syringe.

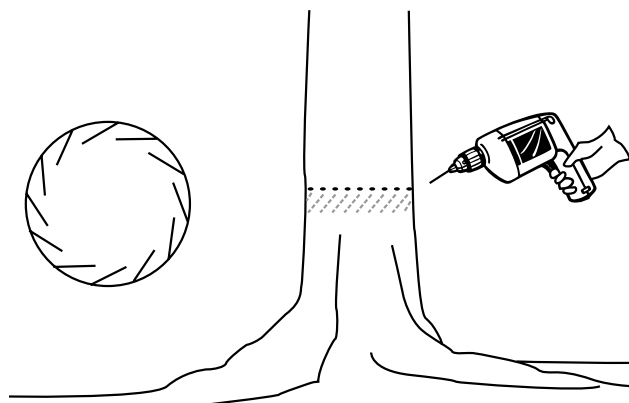


Figure 3. Stem injection, drill and fill method.

Stem injection - axe cut method

The axe cut method can be used for trees and woody weeds with stems or trunks greater than 5 cm in circumference. Using an axe or tomahawk, horizontal cuts are made into the sapwood around the circumference of the trunk at waist height. While still in the cut, the axe or tomahawk is leaned out to make a downward angled pocket, which will allow herbicide to pool. The herbicide is then immediately injected into the pocket. Cuts should be made no farther than 3 cm apart. This method is also referred to as frilling or chipping.

It is important not to entirely ringbark the trunk, as this will decrease the uptake of the herbicide into the plant.

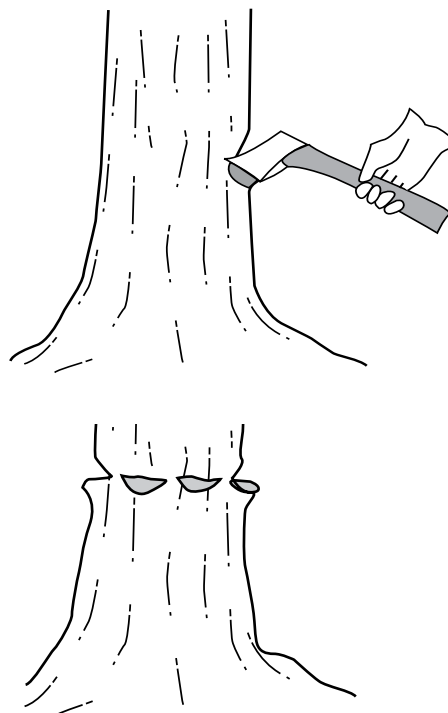


Figure 4. Stem injection, axe cut method.

Tree spearing

Tree spearing is an alternative stem injection method to the use of an axe or drill. The method uses a specifically designed tree spear and technique. The spear is thrust into the tree at an angle of 30° to 40° from the vertical, opening a cut in the tree and applying the appropriate herbicide amount. The process is repeated, forming a row of cuts approximately 50 mm apart.

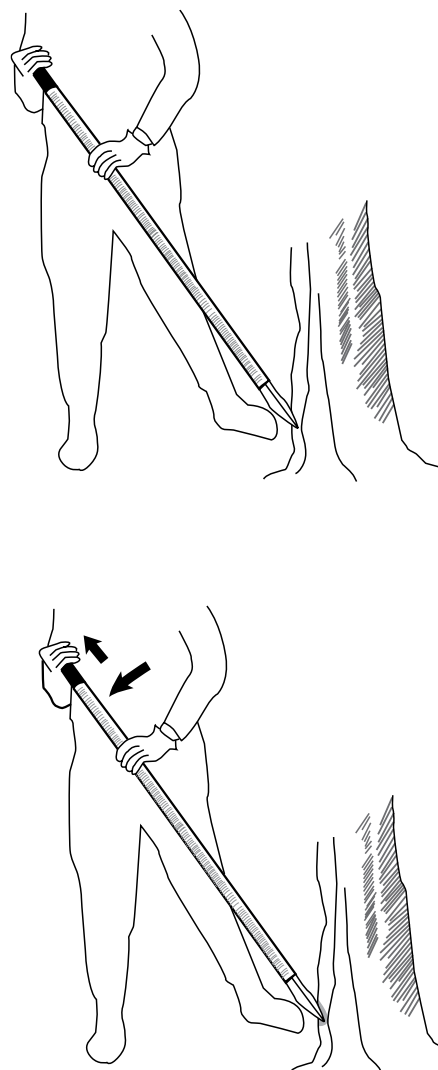


Figure 5. Stem injection, tree spearing.

Cut stump

Here the plant is cut off completely at its base (no higher than 15 cm from the ground) using a chainsaw, axe, brushcutter or machete (depending on the thickness of the stem/trunk). Herbicide is then sprayed, squirted or painted on to the exposed surface of the cut stump emerging from the ground, killing the stump and the root system.

It is imperative that the herbicide solution is applied as soon as the trunk or stem is cut. A delay of more than 15 seconds between cutting and applying the chemical will give poor results. Two operators working as a team can use this method effectively. The herbicide can be applied from a knapsack, or with a paintbrush, drench gun or a hand spray bottle. A coloured dye should be used in the solution to mark the stumps that have been treated.

This method has the appeal of removing the weed immediately, and is used mainly for trees and woody weeds.

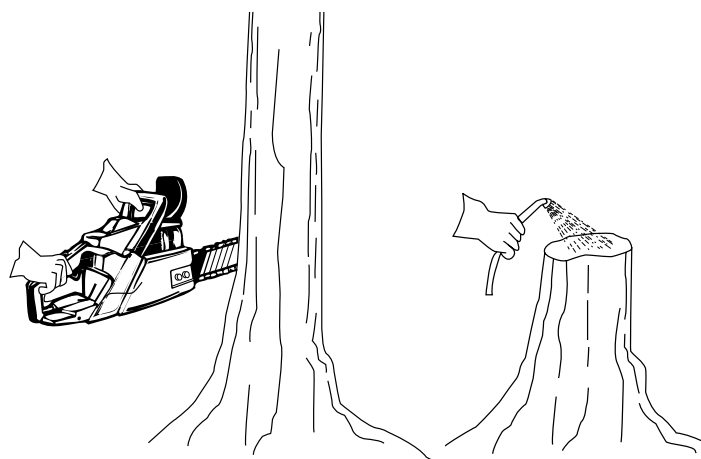


Figure 6. Cut stump method.

Cut and swab

This method is similar to the cut stump method, but is suited to vines and multi-stemmed shrubs. Here, the plant stems are cut through completely, close to the ground. Herbicide is then applied immediately to the cut surface emerging from the ground, via spray or brush application.

In the case of Madeira vine and some other vines with aerial tubers, both ends of the cut stems must be treated with herbicide.

Stem-scraping

This method is also called bark-stripping or stem-painting. Stem-scraping is used for plants and vines with aerial tubers. A sharp knife is used to scrape a very thin layer of bark from a 15–30 cm section of the stem. Herbicide is then immediately applied to the exposed soft underlying green tissue. In the case of Madeira vine, all tubers within reach should be collected, removed and composted or destroyed before starting the scraping.

With some woody weeds the bark can be peeled away and the exposed wood painted or sprayed with herbicide.

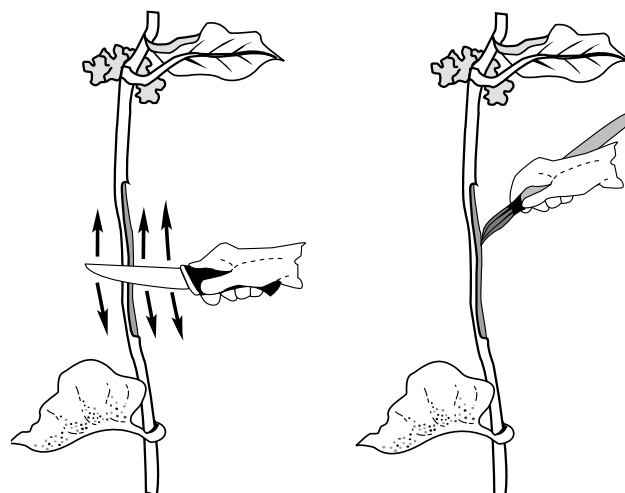
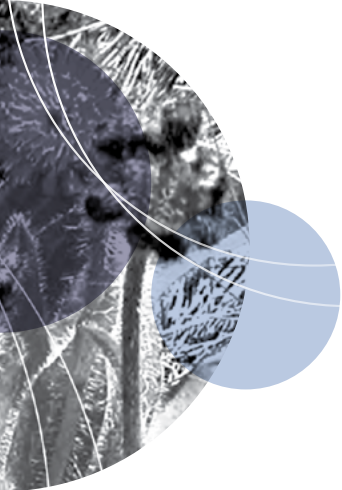


Figure 7. (left) Stem scrape method. A sharp knife is used to scrape the bark; (right) Herbicide is applied to the green tissue.



Weeds with state priority biosecurity duties in NSW

The following weeds have state priority biosecurity duties in NSW under the *Biosecurity Act 2015*. Many weeds also have regional priority biosecurity duties. A general biosecurity duty applies to all plants in New South Wales. Visit NSW WeedWise for details weeds.dpi.nsw.gov.au

Prohibited matter	
Common name	Scientific name
Anchored water hyacinth	<i>Eichhornia azurea</i>
Black knapweed	<i>Centaurea X moncktonii</i>
Bridal veil creeper	<i>Asparagus declinatus</i>
Broomrapes	<i>Orobanche species</i>
Eurasian water milfoil	<i>Myriophyllum spicatum</i>
Frogbit	<i>Limnobium laevigatum</i>
Gamba grass	<i>Andropogon gayanus</i>
Hawkweeds	<i>Hieracium species</i>
Hydrocotyl	<i>Hydrocotyle ranunculoides</i>
Karoo thorn	<i>Vachellia karroo</i>
Kochia	<i>Bassia scoparia</i>
Koster's curse	<i>Clidemia hirta</i>
Lagarosiphon	<i>Lagarosiphon major</i>
Mexican feather grass	<i>Nassella tenuissima</i>
Miconia	<i>Miconia species</i>
Mikania vine	<i>Mikania micrantha</i>
Mimosa	<i>Mimosa pigra</i>
Parthenium weed	<i>Parthenium hysterophorus</i>
Pond apple	<i>Annona glabra</i>
Prickly acacia	<i>Vachellia nilotica</i>
Rubber vine	<i>Cryptostegia grandiflora</i>
Siam weed	<i>Chromolaena odorata</i>
Spongeplant	<i>Limnobium spongia</i>
Spotted knapweed	<i>Centaurea stoebe subsp. micranthos</i>
Water caltrop	<i>Trapa species</i>
Water soldier	<i>Stratiotes aloides</i>
Witchweeds	<i>Striga species</i>
Yellow burrhead	<i>Limnocharis flava</i>
Prohibition on dealings	
Common name	Scientific name
African boxthorn	<i>Lycium ferocissimum</i>
Alligator weed	<i>Alternanthera philoxeroides</i>

Prohibition on dealings	
Common name	Scientific name
Athel pine	<i>Tamarix aphylla</i>
Bellyache bush	<i>Jatropha gossypifolia</i>
Bitou bush	<i>Chrysanthemoides monilifera subsp. rotundata</i>
Black willow	<i>Salix nigra</i>
Blackberry	<i>Rubus fruticosus species aggregate</i>
Boneseed	<i>Chrysanthemoides monilifera subsp. monilifera</i>
Bridal creeper	<i>Asparagus asparagoides</i>
Cabomba	<i>Cabomba caroliniana</i>
Cape broom	<i>Genista monspessulana</i>
Cat's claw creeper	<i>Dolichandra unguis-cati</i>
Chilean needle grass	<i>Nassella neesiana</i>
Climbing asparagus	<i>Asparagus africanus</i>
Climbing asparagus fern	<i>Asparagus plumosus</i>
Fireweed	<i>Senecio madagascariensis</i>
Flax-leaf broom	<i>Genista linifolia</i>
Gorse	<i>Ulex europaeus</i>
Grey sallow	<i>Salix cinerea</i>
Ground asparagus	<i>Asparagus aethiopicus</i>
Hymenachne	<i>Hymenachne amplexicaulis and hybrids</i>
Lantana	<i>Lantana camara</i>
Madeira vine	<i>Anredera cordifolia</i>
Mesquite	<i>Prosopis species</i>
Parkinsonia	<i>Parkinsonia aculeate</i>
Parthenium weed	<i>Parthenium hysterophorus</i>
Prickly pears	<i>Austrocylindropuntia species</i>
Prickly pears	<i>Cylindropuntia species</i>
Prickly pears	<i>Opuntia species</i>
Sagittaria	<i>Sagittaria platyphylla</i>
Salvinia	<i>Salvinia molesta</i>
Scotch broom	<i>Cytisus scoparius subsp. scoparius</i>
Serrated tussock	<i>Nassella trichotoma</i>

Prohibition on dealings	
Common name	Scientific name
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Snakefeather	<i>Asparagus scandens</i>
Water hyacinth	<i>Eichhornia crassipes</i>
Willows	<i>Salix species</i>

Biosecurity Control Order	
Common name	Scientific name
Boneseed	<i>Chrysanthemoides monilifera subsp monilifera</i>
Parkinsonia	<i>Parkinsonia aculeata</i>
Tropical soda apple	<i>Solanum viarum</i>

Biosecurity Zone	
Common name	Scientific name
Alligator weed	<i>Alternanthera philoxeroides</i>
Bitou bush	<i>Chrysanthemoides monilifera subsp. Rotundata</i>
Water hyacinth	<i>Eichhornia crassipes</i>

General biosecurity duty: All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Anyone who deals with any plant, or knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Prohibited matter: Dealing with prohibited matter is an offence. Anyone who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Prohibition on dealings: These plants must not be sold in or imported into NSW

Biosecurity zone: These plants are regulated within zones – refer to NSW WeedWise for details

Biosecurity Control Order: Duty to notify the presence or suspected presence, certain movement, controls and destruction requirements

Regional priority weed: These plants are regulated under Regional Strategic Weed Management Plans – refer to NSW WeedWise for details.

NSW WeedWise: visit weeds.dpi.nsw.gov.au for information about each plant and its associated biosecurity duties.

Duty to notify on importation into the State: If a plant is not currently present in NSW, a person must not import it without notifying the Department of Primary Industries of the plant and its proposed location.

Contact your local council weeds officer or NSW Department of Primary Industries via email weeds@dpi.nsw.gov.au or the NSW Invasive Plants & Animals Enquiry Line 1800 680 244



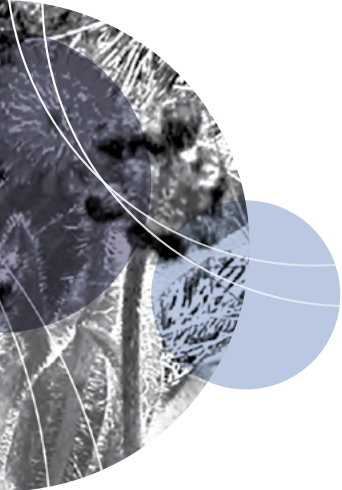
Minor-use permits

Minor-use permits allow for an 'off-label' use of a registered herbicide. The Australian Pesticides & Veterinary Medicines Authority (APVMA) issues permits based on careful decisions about the stability and efficacy of a herbicide product for a particular use and the extent to which use of the product might pose economic, environmental or social risks.

Before using a chemical product under a permit issued by the APVMA, users must obtain a copy and read the permit and all details, conditions and limitations relevant to that permit, and must comply with the details, conditions and limitations prior to use. The following list comprises permits mentioned in this publication.

Permit	Expiry date	Weed	Active ingredient
PER9792	30/11/2020	African feather grass	Flupropanate
		African feather grass	Glyphosate
PER9907	31/03/2020	Arum lily	Fluroxypyr
		African boxthorn	Glyphosate
		Arum lily	Metsulfuron-methyl
PER10615	31/03/2020	Camphor laurel	Glyphosate
PER11427	30/06/2019	Green cestrum	Triclopyr
PER11604	30/06/2019	Kudzu	Metsulfuron-methyl
		Kudzu	Triclopyr + Picloram
PER12251	31/03/2021	Bitou bush	Metsulfuron-methyl
PER12362	30/11/2021	Khaki weed	Triclopyr + Picloram
PER12942	30/06/2022	Brazilian nightshade	Glyphosate
		Brazilian nightshade	Picloram + Triclopyr + Aminopyralid
		Brazilian nightshade	Triclopyr + Picloram
PER13678	30/09/2022	Chinese violet	MCPA + Dicamba
PER13891	31/03/2023	Mimosa bush	Tebuthiuron
PER13914	31/03/2026	Madeira vine	Picloram + Triclopyr + Aminopyralid
		Cat's claw creeper	Triclopyr + Picloram
PER13917	31/03/2020	Horsetails	Dichlobenil
PER13921	30/06/2022	Hymenachne	Glyphosate
PER14197	31/07/2018	Lippia	2,4-D amine
PER14200	30/06/2018	Alligator weed	Metsulfuron-methyl
PER14302	30/09/2018	Bamboo	Flupropanate
PER14327	30/06/2022	Salvinia	Glyphosate
PER14442	30/06/2018	Harrisia cactus	Picloram + Triclopyr + Aminopyralid
		Harrisia cactus	Triclopyr + Picloram
		Harrisia cactus	Triclopyr
PER14549	30/06/2018	Sagittaria	Glyphosate

Permit	Expiry date	Weed	Active ingredient
PER14558	30/06/2024	Hawkweeds	Clopyralid
PER14729	30/06/2019	Hygrophila	Glyphosate
		Hygrophila	Metsulfuron-methyl
PER14731	30/06/2019	Long-leaf willow primrose	Glyphosate
PER14733	30/06/2019	Alligator weed	Dichlobenil
		Alligator weed	Glyphosate
		Alligator weed	Metsulfuron-methyl
PER14877	30/06/2019	Mother-of-millions	Glyphosate
PER14928	30/09/2019	Hawkweeds	Picloram + Triclopyr + Aminopyralid
		Hawkweeds	Triclopyr + Picloram
PER14929	30/10/2019	Mimosa bush	Clopyralid
PER83083	31/03/2022	Alligator weed	Carfentrazone-ethyl
PER84767	31/05/2020	Salvinia	Metsulfuron-methyl
PER84772	30/06/2022	Alligator weed	Imazapyr



Weed control in non-crop, aquatic and bushland situations

Registration of a herbicide is not a recommendation from the NSW Department of Primary Industries for the use of that herbicide in a particular situation. Users must satisfy themselves that the herbicide they choose is the best one for the situation and weed. Users must also carefully study the container label before using any herbicide, so that specific instructions relating to the rate, timing, application and safety are noted. This publication is presented as a guide to assist users in planning their weed control.

Only herbicides registered for use in non-cropping areas are listed on the following pages. If there is any omission or error in this list of chemicals please notify the NSW Department of Primary Industries via the NSW Invasive Plants & Animals Hotline 1800 680 244.

Product names

The product names in this publication are supplied on the understanding that no preference between equivalent products is intended and that the inclusion of a product does not imply endorsement by NSW Department of Primary Industries over any other equivalent product from another manufacturer. Various products is stated where there are a number of products on the market with the same active ingredient/s.

Unit abbreviations

ha	hectare
g	gram
mg	milligram
kg	kilogram
mL	millilitre
L	litre
m	metre

African boxthorn - *Lycium ferocissimum*

Non-chemical options: Mechanically remove mature bushes/thickets when soil is wet (winter) and spray regrowth.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Stem injection or stem scrape application
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	1.3 L per 100 L of water	Handgun application for small bushes only. Spray soil to drip line. Thorough coverage is essential. Spray prior to budburst.
	Glyphosate 360 g/L Roundup®	0.7–1.0 L per 100 L	Handgun application, with low rate on young bushes, high water rate on mature bushes. Do not spray in hot dry summer periods.
	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	10 g metsulfuron-methyl plus 1 litre glyphosate in 100 L of water	Always add non-ionic surfactant to the spray mix. Apply to actively growing weeds.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL per 100 L water	Handgun application for when bushes have good leaf cover, growth and no leaf fall. Only apply to plants less than 2 m tall.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

	Chemical and Concentration	Rate	Comments
	Tebuthiuron 200 g/kg Graslan®	2 g per m ²	Hand application (granules). Estimate the area within 30 cm beyond the drip line of the target plant and calculate the amount of Graslan required. Do not apply near desirable trees.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 60 L of diesel	Basal bark application up to 5 cm basal diameter. Cut stump application for over 5 cm diameter.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Handgun application for when bushes have good leaf cover, growth and no leaf fall. Only apply to plants less than 2 m tall.
	Triclopyr 600 g/L Garlon® 600	2.0 L per 60 L of diesel	Basal bark application up to 5 cm basal diameter. Cut stump application for over 5 cm diameter.

African feather grass - *Cenchrus macrourus*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	3 L per ha	Selective broadacre control
	Flupropanate 745 g/L Tussock®	300 mL in 100 L of water	Spot spray
	Flupropanate 745 g/L Tussock®	500 mL in 10 L of water	Wiper application
	Glyphosate 360 g/L Roundup®	6 L per ha	Non-selective broadacre control
	Glyphosate 360 g/L Roundup®	1 L in 100 L of water	Spot spray
	Glyphosate 360 g/L Roundup®	3.3 L in 10 L of water	Wiper application

African lovegrass - *Eragrostis curvula*

Non-chemical options: Pasture improvement and grazing management will reduce re-establishment.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	1.5–3.0 L/ha	Ground and aerial boom application. Only apply to green actively growing plants.
	Flupropanate 745 g/L Tussock®	150–300 mL per 100 L water	Spot spray application. Only apply to green actively growing plants.
	Flupropanate 745 g/L Tussock®	300 mL per 100 L of water	Spot spray application.
	Flupropanate 745 g/L Tussock®	3.0 L/ha	Boom spray application using 150 L water/ha. Apply July to December.
	Glyphosate 360 g/L Roundup®	1.0 L per 100 L water	Apply to actively growing plants.
	Glyphosate 360 g/L Roundup®	6.0 L per 100 L water	Boom application.

African olive - *Olea europaea* subsp. *cuspidata*

Non-chemical options: Hand remove seedlings.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spray seedlings / coppice shoots.
	Glyphosate 360 g/L Roundup®	1 part glyphosate per 1.5 parts of water	Cut stump, stem scrape or injection, saplings or large trees and shrubs.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
	Triclopyr 600 g/L Garlon® 600	4.0 L per 60 L diesel	Basal bark application up to 5 cm basal diameter or cut stump application over 5 cm.

African turnip weed - eastern - *Sisymbrium thellungii*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Oxyfluorfen 240 g/L Goal Herbicide	3 to 4 L per hectare	Forestry: pre-emergence application
	Simazine 900 g/kg Various products	5 to 24 kg per ha or 500 g to 2.4 kg in 100 L of water	Non-crop areas: Light soils. Higher rates for longer residual control or for summer rainfall areas
	Simazine 900 g/kg Various products	5 to 48 kg per ha or 500 g to 4.8 kg in 100 L of water	Non-crop areas: Heavy soils. Higher rates for longer residual control or for summer rainfall areas
	Simazine 900 g/kg Various products	1.6 to 6.7 kg per ha	Forestry: pre-emergence application

African turnip weed - western - *Sisymbrium runcinatum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Oxyfluorfen 240 g/L Goal Herbicide	3 to 4 L per ha	Forestry: pre-emergence application
	Simazine 900 g/kg Various products	5 to 24 kg per ha or 500 g to 2.4 kg in 100 L of water	Non-crop areas: Light soils. Higher rates for longer residual control or for summer rainfall areas.
	Simazine 900 g/kg Various products	5 to 48 kg per ha or 500 g to 4.8 kg in 100 L of water	Non-crop areas: Heavy soils. Higher rates for longer residual control or for summer rainfall areas.
	Simazine 900 g/kg Various products	1.6 to 6.7 kg per ha	Forestry: pre-emergence application

Aleman grass - *Echinochloa polystachya*

Non-chemical options: Individual plants can be carefully dug up, dried and burnt or buried.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	Up to 200 mL in 10 L of water	Spot spray application.

Alligator weed - *Alternanthera philoxeroides*

Non-chemical options: Biological control agents are effective in some core coastal wetland situations for the aquatic plant form.

	Chemical and Concentration	Rate	Comments
PER83083	Carfentrazone-ethyl 240 g/L Shark™ Aquatic Herbicide	830 mL per 100,000 L of pond water	DO NOT apply more than two (2) applications per year with a minimum re-treatment interval of 90 days between consecutive treatments.
PER84772	Imazapyr 250 g/L Various products	500 mL in 100 L of water	Plus Hasten or Uptake spray oil
PER14733	Dichlobenil 67.5 g/kg Casoron G®	43–63 g per square metre	Granular application for home garden situations. DO NOT apply to water which will be used for crop irrigation, for livestock watering, or for human consumption.
PER14733	Glyphosate 360 g/L Roundup®	10 mL in 1 L of water	For control in urban and residential backyards.
PER14733	Metsulfuron-methyl 600 g/kg Brush-off®	1 g in 10 L of water	For control in urban and residential backyards.
PER14734	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L water (to a maximum rate of 600 L/ha of weed surface)	Aquatic areas and terrestrial areas across NSW except for the core areas of Port Stephens Council, Maitland City Council, Penrith City Council and Hawkesbury City Council. Only apply as a spot spray using a hand directed spray. Do not apply more than 3 applications per growing season. See permit for details.
PER14200	Metsulfuron-methyl 600 g/kg Brush-off®	10 g in 100 L of water	Hand gun application. Refer to permit for critical use comments.
	Glyphosate 360 g/L Only products registered for aquatic use	10 mL per 1 L of water	Spot spray. Actively growing from summer through winter, floating form only.
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g per 100 L of water	Spot spray application, for terrestrial situations only.
	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L water	Apply in terrestrial situations only. A minimum of 3 years' spraying is required to achieve complete control.

Anchored water hyacinth - *Eichhornia azurea*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Plants can be manually removed from the water body and carefully disposed of.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	Up to 200 mL in 10 L of water	Spot spray application

Annual ragweed - *Ambrosia artemisiifolia*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Bromacil 800 g/kg Various products	3.5 to 6.5 kg per ha	Industrial weed control: lowest rate suited to lower rainfall areas
	Dicamba 500 g/L Kamba® 500	8.8 L per ha	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	600 mL in 100 L of water	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	130 mL in 15 L of water	Non-crop situation: Spray prior to flowering

Arrowhead - *Sagittaria calycina* var. *calycina*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 50 parts water	Spot spray.
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 9 parts water	Splatter gun.

Artichoke thistle - *Cynara cardunculus*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Dicamba 500 g/L Kamba® 500	1.6 L per ha	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	100 mL in 100 L of water	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	24 mL in 15 L of water	Non-crop situation: Spray prior to flowering
	Glyphosate 360 g/L Roundup®	10 ml per 1 L water	Spot spray

Arum lily - *Zantedeschia aethiopica*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL - 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Arundinaria reed - *Arundinaria* species

Non-chemical options: Physical removal gives best results.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray. Spray regrowth up to 0.5 m only.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump. Retreatment necessary.

Asparagus fern - *Asparagus virgatus*

Non-chemical options: Mechanically remove rhizomes where possible.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L of water	Spot spray application
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray application, best done between flowering and berries forming.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump / stem scrape application
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	1–2 g per 10 L of water plus a non-ionic surfactant.	Spot spray application, best done between flowering and berry formation.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application

Athel pine - *Tamarix aphylla*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 (ratio glyphosate to water) plus 1 g metsulfuron to 1 L water	Stem injection

Azolla - *Azolla* species

Non-chemical options: Small infestations can be mechanically removed.

	Chemical and Concentration	Rate	Comments
PER83083	Carfentrazone-ethyl 240 g/L Shark™ Aquatic Herbicide	933 mL of product per ha	DO NOT apply more than two (2) applications per year with a minimum re-treatment interval of 90 days between consecutive treatments.
	Diquat 200 g/L Reglone®	5.0–10.0 L/ha	Spray to wet all foliage thoroughly. Observe withholding period.
	Orange oil 55.2 g/kg Water Clear®	1 part product per 100 parts water	Spray on to free-floating plants.

Balloon vine - *Cardiospermum grandiflorum*

Non-chemical options: Seedlings can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray. Spray regrowth up to 0.5 m only.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump. Retreatment necessary.
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL of glyphosate plus 1.5 g of metsulfuron-methyl in 10 L of water	Spot spray application.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Bamboo - *Bambusa species*

Non-chemical options: Physical removal will give best results.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray. Spray regrowth up to 0.5 m only.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump. Retreatment necessary.
PER14302	Flupropanate 745 g/L Tussock®	1 L in 100 L of water	Hand gun application
	Glyphosate 360 g/L Roundup®	10 mL per 1 L of water.	Foliar application between 1 and 2 m tall.
	Glyphosate 360 g/L Roundup®	1 part glyphosate to 6 parts water	Cut stump method. Cut stems to 20 cm. Pour mixture down stem or wet cut.

Barleria - *Barleria prionitis*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray

Bathurst burr - *Xanthium spinosum*

Non-chemical options: Slash before flowering. Maintain competitive pastures.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	1 L per Hectare	Boom spray application
	2,4-D amine 625 g/L Amicide® 625	80–110 mL per 150 L water	Spot spray. Seedlings only, actively growing.
	2,4-D LV ester 680g/L Estericide® Xtra	1.7 to 3.3 L per hectare	Boom spray application, use higher rates on mature plants
	Fluroxypyr 200 g/L Starane™	75 mL per 100 L of water	Apply to actively growing plants.
	Fluroxypyr 333 g/L Starane™ Advanced	45 mL per 100 L water	Apply to actively growing plants.
	MCPA 500 g/L Various products	1-2 L/ha	Apply at seedling stage.

Bear-skin fescue - *Festuca gautieri*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Bellyache bush - *Jatropha gossypifolia*

Non-chemical options: Small individual plants can be manually removed.

Chemical and Concentration	Rate	Comments
Fluroxypyr 333 g/L Starane™ Advanced	300 mL in 100 L of water	Spot spray application

Bitou bush - *Chrysanthemoides monilifera subsp. rotundata*

Non-chemical options: Hand removal of young plants, encourage native regeneration and integrate the use of biological control agents. Fire can be effective where practical.

Chemical and Concentration	Rate	Comments
PER12251 Glyphosate 360 g/L Roundup®	2 L /ha	Aerial boom spray applications. Refer to the critical use comments in the permit.
PER12251 Metsulfuron-methyl 600 g/kg Brush-off®	20–30g /ha	Aerial boom spray applications. Refer to the critical use comments in the permit.
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL per 100 L of water	Spray to wet all foliage thoroughly. Treat at flowering to fruiting stage.
Glyphosate 360 g/L Roundup®	5 or 10 mL per 1 L of water	Handgun or knapsack. Spray to wet all foliage. Apply at peak flowering to actively growing bushes during winter. Do not apply during periods of drought stress. Use the higher rate for plants over 1.5 m.
Glyphosate 360 g/L Roundup®	1 part per 29 parts water or 1 part per 19 parts water	Gas gun / Splatter gun application. Use the higher rate on bushes over 1.5 m
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g per 100 L of water	Spray to thoroughly wet all foliage.
Metsulfuron-methyl 600 g/kg Brush-off®	1 g/L + organosilicone penetrant	Gas gun / Splatter gun application. Apply as close as possible to the flowering stage.
Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Spray to wet all foliage thoroughly.
Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .

Black knapweed - *Centaurea x moncktonii*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Dig out single plants. Improve pastures with a vigorous perennial species.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	10 mL per 1 L of water	Spot spray on non-crop land – aquatic areas, dams, irrigation channels and banks.

Black locust - *Robinia pseudoacacia*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
PER9907 Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907 Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907 Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection
PER9907 Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 glyphosate to water + 1 g metsulfuron to 1 L water	Stem injection

Black roly-poly - *Sclerolaena muricata*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Black willow - *Salix nigra*

Non-chemical options: Mechanical removal.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	1.0–1.3 L in 100 L of water	Spray to wet all foliage. Use the higher rate for trees 1–2 m high.
Glyphosate 360 g/L Roundup®	Undiluted	Stem injection.
Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 15 L of diesel	Cut stump application method, for plants in excess of 5cm basal diameter

Blackberry - *Rubus fruticosus* species aggregate

Non-chemical options: Slashing of juvenile bushes and the use of goats will give some control. Biological control agents are also available. Improve pastures with a vigorous perennial species.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	10–13 mL per 1 L of water	Flowering to leaf fall. Use higher rate on old, dense infestations.
Glyphosate 835 g/kg + Metsulfuron-methyl 10 g/kg Trounce®	1 measured pack (173 g) per 100 L of water	Apply from flowering until before leaf yellowing. Do not apply to bushes with mature fruit.
Hexazinone 250 g/L Velpar® L	Undiluted (4 mL per spot)	Bushes up to 1 m in height.
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g per 100 L of water	Spray to thoroughly wet all foliage, Uptake spray oil or Pulse penetrant should be added.
Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Apply when bushes are actively growing. Thoroughly wet all foliage and canes at commencement of flowering.
Metsulfuron-methyl 600 g/kg Brush-off®	1 g/L + organosilicone penetrant	Gas gun / Splatter gun application. Thoroughly wet all foliage and canes. Commence application at flowering as this indicates good growing conditions.
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 or 500 mL per 100 L water	Treat in late spring to autumn. Use an adjuvant.
Picloram 20 g/kg Tordon® Granules	35–45 g/m ²	Apply granules over an area extending from main stem to 30 cm outside the drip line.
Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
Triclopyr 200 g/L + Picloram 100 g/L Tordon® DSH	500 mL per 100 L of water	Late spring to autumn treatment. Use an adjuvant.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 or 500 mL per 100 L of water	Late spring to early autumn when bushes are actively growing. Use the higher rate on plants which have been damaged by grazing stock or insects.

Chemical and Concentration	Rate	Comments
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	335 mL per 10 L of water	Gas gun / Splatter gun application. Apply to actively growing bushes.
Triclopyr 600 g/L Garlon® 600	170 mL per 100 L of water	Late spring to early autumn. Actively growing bushes. Do not use under dry conditions.
Triclopyr 600 g/L Garlon® 600	280 mL per 10 L of water	Gas gun / Splatter gun application. Good control will be achieved, similar to high volume application, where bush size enables good coverage of entire bush. The use of marking agent is recommended.

Blue heliotrope - *Heliotropium amplexicaule*

Non-chemical options: Dig out single plants. Improve pastures with a vigorous perennial species.

Chemical and Concentration	Rate	Comments
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	1.0 L per 100 L of water	Grass pastures only. Spot spray. Apply to young actively growing plants.
Dicamba 500 g/L Kamba® 500	130 mL per 15 L of water	Knapsack spray.
Dicamba 500 g/L Kamba® 500	0.6 L per 100 L of water	High volume spot spray.
Dicamba 500 g/L Kamba® 500	8.8 L/ha	Boom spray. Apply to young, actively growing plants.
Fluroxypyr 200 g/L Starane™	1.0 L per 100 L of water	Spot spray. Apply during flowering.
Fluroxypyr 333 g/L Starane™ Advanced	600mL per 100 L of water	Spot spray. Apply during flowering.
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL per 100 L water	Treat at flowering.
Tebuthiuron 200 g/kg Graslan®	0.5 g /m2	Do not use within 30 m of trees. Do not apply to areas greater than 0.5 hectares in size.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Apply at flowering in a minimum spray volume of 1250 L/ha.

Blue hound's tongue - *Cynoglossum creticum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Blue passionflower - *Passiflora caerulea*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
PER9907 Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907 Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907 Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907 Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907 Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut, scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Blue periwinkle - *Vinca major*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut, scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Boneseed - *Chrysanthemoides monilifera* subsp. *monilifera*

Non-chemical options: Hand removal of young plants, encourage native regeneration and integrate the use of biological control agents. Fire can be effective where practical.

	Chemical and Concentration	Rate	Comments
PER12251	Glyphosate 360 g/L Roundup®	2 L /ha	Aerial boom spray applications. Refer to the critical use comments in the permit.
PER12251	Metsulfuron-methyl 600 g/kg Brush-off®	20–30g /ha	Aerial boom spray applications. Refer to the critical use comments in the permit.
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL per 100 L of water	Spray to wet all foliage thoroughly. Treat at flowering to fruiting stage.
	Glyphosate 360 g/L Roundup®	5 or 10 mL per 1 L of water	Handgun or knapsack. Spray to wet all foliage. Apply at peak flowering to actively growing bushes during winter. Do not apply during periods of drought stress. Use the higher rate for plants over 1.5 m.
	Glyphosate 360 g/L Roundup®	1 part per 29 parts water or 1 part per 19 parts water	Gas gun / Splatter gun application. Use the higher rate on bushes over 1.5 m

	Chemical and Concentration	Rate	Comments
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g per 100 L of water	Spray to thoroughly wet all foliage.
	Metsulfuron-methyl 600 g/kg Brush-off®	1 g/L + organosilicone penetrant	Gas gun / Splatter gun application. Apply as close as possible to the flowering stage.
	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Spray to wet all foliage thoroughly.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II ®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .

Boxing glove cactus - *Cylindropuntia fulgida* var. *mamillata*

Non-chemical options: Small plants can be carefully mechanically removed.

	Chemical and Concentration	Rate	Comments
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL per 100 L of water	Spot spray application, add 0.5 % Uptake spray oil.
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Spot spray application, add 0.5 % Uptake spray oil.
PER14442	Triclopyr 600 g/L Garlon® 600	1 L per 75 L of diesel	Spot spray application.
PER14442	Triclopyr 600 g/L Garlon® 600	3 L per 100 L of water	Add 0.5% Uptake® spray oil.

Bracken fern - *Pteridium esculentum*

Non-chemical options: Manually remove small or individual plants

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	1.5 L per 100 L of water	Spot spray application. Apply during autumn at full frond expansion, while plants are actively growing. Repeat treatments necessary. Add surfactant.
	Glyphosate 360 g/L Roundup®	9.0 L/ha	Boom spray application. Apply during autumn at full frond expansion, while plants are actively growing. Repeat treatments necessary. Add surfactant.
	Glyphosate 360 g/L Roundup®	1 L in 2 L of water	Wiper application
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g per 100 L of water	Spray after full frond expansion.
	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Spot spray.
	Metsulfuron-methyl 600 g/kg Brush-off®	60 g/ha	Boom spray. Spray after full front expansion. Avoid spraying when plants are in stress.

Brazilian nightshade - *Solanum seafortianum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER11916	Glyphosate 360 g/L Roundup®	1 part product to 100 parts water plus surfactant	Urban bushland, forests and coastal reserves.
PER12942	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	2 L + 10 g per 100 L of water plus wetter	Riparian areas

	Chemical and Concentration	Rate	Comments
PER12942	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	300-500 mL per 100 L water	Urban bushlands, pastures, rights of way, forests
PER12942	Triclopyr 300 g/L + Picloram 100 g/L with Metsulfuron-methyl 600 g/kg Various products	300-500 mL per 100 L water plus 10 g metsulfuron-methyl per 100 L water	Urban bushland, pastures, rights of way, forests

Bridal creeper - *Asparagus asparagoides*

Non-chemical options: Dig out all tubers and burn. A biocontrol fungus is also available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spray August to September only.
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g metsulfuron-methyl to 100 L water	Spray August to September only.

Bridal veil creeper - *Asparagus declinatus*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Mechanically remove rhizomes where possible.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosat to 50 parts water	Spot spray application
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump / scrape stem application
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	1 - 2 g in 10 L of water plus a non-ionic surfactant	Spot spray application
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump / stem injection application

Broad-leaf pepper tree - *Schinus terebinthifolius*

Non-chemical options: Small seedling plants can be removed manually.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spray seedlings and coppice shoots.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/scrape stem application for saplings. Stem injection application large trees and shrubs.
	Fluroxypyr 333 g/L Starane™ Advanced	2.1 L per 100 L of diesel	Basal bark application.
	Fluroxypyr 333 g/L Starane™ Advanced	300 mL per 100 L water	Foliar spray.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .

Broomrapes - *Orobanche* species

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Brown-top bent - *Agrostis capillaris*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
	Propyzamide 500 g/L Kerb	1.5 to 2.0 L per ha	Lucerne, clovers or medic pastures

Buffalo burr - *Solanum rostratum*

Non-chemical options: Single plants can be manually removed.

	Chemical and Concentration	Rate	Comments
	2,4-D LV ester 680g/L Estericide® Xtra	800 mL - 1.15 L / Ha	Use in grass pastures only. Seedling to pre-flowering. Use higher rate as plants mature.

Burr ragweed - *Ambrosia confertiflora*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Dicamba 500 g/L Kamba® 500	8.8 L per ha	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	600 mL in 100 L of water	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	130 mL in 15 L of water	Non-crop situation: Spray prior to flowering
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Cabomba - *Cabomba caroliniana*

Non-chemical options: Physical removal is recommended where appropriate. Draining and drying in suitable situations can control plants. Contain infestations to avoid further spread.

	Chemical and Concentration	Rate	Comments
	Carfentrazone-ethyl 240 g/L Shark™ Aquatic Herbicide	830 mL per 100,000 L water [2 ppm (2 mg/L) carfentrazone-ethyl]	Non-flowing water bodies. Apply onto the surface or below the surface where cabomba is growing. The intention is to achieve a concentration of 2 ppm (2 mg/L) carfentrazone-ethyl in the water where cabomba is growing. Refer to the label for nozzle requirements. Do not apply to more than 50% of the volume of the water body in a single application. Do not apply subsequent application to the waterbody within 3 months. Retreatments of heavy infestations may be required.

Californian burr - *Xanthium orientale*

Non-chemical options: Slash before flowering. There are a number of biological control agents that work in selected areas and situations.

	Chemical and Concentration	Rate	Comments
	2,4-D amine 625 g/L Amicide® 625	0.8 – 1.1 L/ha	Boom spray. Seedlings only.
	2,4-D LV ester 680g/L Estericide® Xtra	800 mL/ha	Boom spray application, from seedlings to pre-flowering. Use higher rates as plants mature

Camel thorn - *Alhagi maurorum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray (smaller plants)
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Camphor laurel - *Cinnamomum camphora*

Non-chemical options: Seedlings can be manually removed. Trees can be physically removed if the cut stump is then treated with herbicide.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spray seedlings and coppice shoots.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/scrape stem application for saplings. Stem injection application large trees and shrubs.
PER10615	Glyphosate 360 g/L Roundup®	Undiluted	4 mL per drill hole / axe cut
	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1 part water, 2 mL per cut	Stem injection for basal diameter up to 25 cm.
	Glyphosate 360 g/L Roundup®	Undiluted, 2 mL per cut.	Stem injection for basal diameter 25 cm to 60 cm.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 or 500 mL per 100 L water	Use higher rate on trees over 2 m tall. Apply as a thorough foliar spray.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
	Triclopyr 200 g/L + Picloram 100 g/L Tordon® DSH	1 part per 4 parts water	Stem injection application.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1 L per 60 L of diesel	Basal bark application for basal diameter less than 10 cm or cut stump application for greater than 10 cm.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 10 L of water	Gas gun / Splatter gun application. Apply to actively growing bushes.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 or 500 mL per 100 L of water	Use higher rate on trees over 2 metres tall. Apply as a thorough foliage spray.
	Triclopyr 600 g/L Garlon® 600	170 mL per 100 L of water	Seedling to three metres tall.

Cane cactus - *Austrocyllindropuntia cylindrica*

Non-chemical options: Small plants can be carefully mechanically removed.

	Chemical and Concentration	Rate	Comments
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL per 100 L of water	Spot spray application, add 0.5 % Uptake spray oil.
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Spot spray application, add 0.5 % Uptake spray oil.
PER14442	Triclopyr 600 g/L Garlon® 600	1 L per 75 L of diesel	Spot spray application.
PER14442	Triclopyr 600 g/L Garlon® 600	3 L per 100 L of water	Add 0.5% Uptake® spray oil.

Cane needle grass - *Nassella hyalina*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropionate 745 g/L Tussock®	1.5 to 3 L per ha	Broadacre control
PER9792	Flupropionate 745 g/L Tussock®	100 to 300 mL per 100 L of water	Spot spray control
PER9792	Flupropionate 745 g/L Tussock®	500 mL per 10 L water	Wiper suppression
PER9792	Glyphosate 360 g/L Roundup®	3 L per ha	Broadacre control
PER9792	Glyphosate 360 g/L Roundup®	1 L per 100 L of water	Spot spray
PER9792	Glyphosate 360 g/L Roundup®	3.3 L per 10 L water	Wiper suppression

Canna lily - *Canna indica*

Non-chemical options: Small infestations can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray. Apply as foliar application. Spray regrowth after slashing.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel across the cut surface on the rhizome.

Cape broom - *Genista monspessulana*

Non-chemical options: Mechanical control can be an option for small, isolated infestations.

	Chemical and Concentration	Rate	Comments
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	250 or 350 mL per 100 L water	Use higher rate on trees over 2m tall. Apply as a thorough foliar spray.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel across the cut surface on the rhizome.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	250 or 350 mL per 100 L of water	Spring to mid summer prior to pod formation. Apply as a thorough foliage spray.

Cape ivy - *Delairea odorata*

Non-chemical options: Runners can be rolled up and manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray application
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/scrape stem.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel across the cut surface on the rhizome.

Cape tulip - one leaf - *Moraea flaccida*

Non-chemical options: Cultivation is ineffective alone, renovate pastures after chemical treatment.

	Chemical and Concentration	Rate	Comments
	2,4-D LV ester 680g/L Estericide® Xtra	1.7–3.3 L/ha	Boom spray. Spray before flowering.
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	10 g/ha	Apply at bulb exhaustion, usually during July/early August. Repeat treatments may be required.
	Metsulfuron-methyl 600 g/kg Brush-off®	5 g/ha	Apply at bulb exhaustion, usually during July/early August. Repeat treatments may be required.

Cape tulip - two-leaf - *Moraea miniata*

Non-chemical options: Cultivation is ineffective alone, renovate pastures after chemical treatment.

	Chemical and Concentration	Rate	Comments
	2,4-D LV ester 680g/L Estericide® Xtra	1.7–3.3 L/ha	Boom spray. Spray before flowering.
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	10 g/ha	Apply at bulb exhaustion, usually during July/early August. Repeat treatments may be required.
	Metsulfuron-methyl 600 g/kg Brush-off®	5 g/ha	Apply at bulb exhaustion, usually during July/early August. Repeat treatments may be required.

Carrian flower - *Orbea variegata*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray

Cassia - *Senna pendula* var. *glabrata*

Non-chemical options: Young seedlings can be manually removed. Seed pods should be collected and removed from the site.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part per 1.5 parts of water	Stem injection/cut stump application.
PER9907	Glyphosate 360 g/L Roundup®	200 mL glyphosate per 10 L water	Spot spray application.
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL glyphosate plus 1.5 g metsulfuron-methyl per 10 L water	Spot spray application.
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	1.0–2.0 g metsulfuron-methyl per 10 L water	Spot spray application.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Castor oil plant - *Ricinus communis*

Non-chemical options: Physically remove young plants.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spray seedlings and coppice shoots.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/scrape stem application for saplings. Stem injection application large trees and shrubs.
	2,4-D amine 625 g/L Amicide® 625	340 mL per 150 L of water, or 3.4 L/Ha	Apply to young, actively growing plants.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
	Triclopyr 600 g/L Garlon® 600	1.0 L per 60 L of diesel	Basal bark application for plants up to 5 cm basal diameter. Cut stump application for plants with larger basal diameter.

Cat's claw creeper - *Dolichandra unguis-cati*

Non-chemical options: Difficult to manually control because of the root and rhizome system.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spray to kill regrowth
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/scrape stem/inject
PER13914	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	400 mL product per 100 L water.	Hand gun spray vines on ground.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Cayenne snakeweed - *Stachytarpheta cayennensis*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Cecropia - *Cecropia* species

Non-chemical options: Seedlings can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump application
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply a 5 mm layer on stems above 20 mm.

Cherry guava - *Psidium cattleianum*

Non-chemical options: Physical removal gives best results.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per 1 L of diesel	Basal bark application
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/ stem injection
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Chilean needle grass - *Nassella neesiana*

Non-chemical options: Good grazing management combined with a pasture improvement program is required for most effective control.

	Chemical and Concentration	Rate	Comments
PER9792	Glyphosate 360 g/L Roundup®	1 L per 100 L water	Spot spray
PER9792	Glyphosate 360 g/L Roundup®	1 L/ha	Boom spray
	Flupropanate 745 g/L Tussock®	1.5–3.0 L/ha	Boom application. Apply to actively growing plants.
	Flupropanate 745 g/L with Glyphosate 360 g/L Various products	200 mL flupropanate plus 150 mL glyphosate 360g/L per 100 L of water	Spot spray application. Apply to actively growing plants.

Chinese celtis - *Celtis sinensis*

Non-chemical options: Seedlings can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spray seedlings and coppice shoots.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/scrape stem application for saplings. Stem injection application large trees and shrubs.
	Fluroxypyr 333 g/L Starane™ Advanced	2.1 L per 100 L of diesel	Basal bark application, for plants up to 2m high
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Chinese knotweed - *Persicaria chinensis*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Chinese rain tree - *Koelreuteria elegans* subsp. *formosana*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 glyphosate to water + 1 g metsulfuron to 1 L water	Stem injection

Chinese tallow tree - *Triadica sebifera*

Non-chemical options: Seedlings and small trees may be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	Tank mix of 1:1.5 of glyphosate plus 1 g of metsulfuron-methyl in 1 L of water	Stem injection method.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .

Chinese violet - *Asystasia gangetica* subsp. *micrantha*

Non-chemical options: Seedlings and small plants can be manually removed.

	Chemical and Concentration	Rate	Comments
PER13678	MCPA 340 g/L + Dicamba 80 g/L Kamba® M	100 mL per 15 L of water per 150 sq. m. (1 L /10 m²)	Spot spray application. Apply to actively growing weeds before seed set on the plants.

Climbing asparagus - *Asparagus africanus*

Non-chemical options: Mechanically remove rhizomes where possible.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600mL per 100 L of water	Spot spray application
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/scrape stem.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray application, best done between flowering and berries forming.
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	1 - 2 g in 10 L of water plus add a non-ionic surfactant	Spot spray application

Climbing asparagus fern - *Asparagus plumosus*

Non-chemical options: Mechanically remove rhizomes where possible.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600mL per 100 L of water	Spot spray application
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/scrape stem.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray application, best done between flowering and berries forming.
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	1 - 2 g in 10 L of water plus add a non-ionic surfactant	Spot spray application

Clockweed - *Oenothera curtiflora*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves
	2,4-D amine 700 g/L Amicide Advance 700	285 mL in 100 L water	Pastures, rights of way and industrial areas

Cockspur coral tree - *Erythrina crista-galli*

Non-chemical options: Physical removal is an option, always treat the remaining stump. Take care when removing this plant as all parts can potentially regrow.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/drill/axe cut/inject
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Cocos palm - *Syagrus romanzoffiana*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray (for smaller plants)

Columbus grass - *Sorghum x aluum*

Non-chemical options: Summer cultivation before heading will give some control.

	Chemical and Concentration	Rate	Comments
	Flupropanate 745 g/L Tussock®	1.0 L per 100 L of water	Apply when actively growing.
	Glyphosate 450 g/L Various products	10 mL per 1 L of water	Apply at early flowering to actively growing plants.

Common pear - *Opuntia stricta*

Non-chemical options: The use of Cochineal and Cactoblastis biological control agents suited to the variety of pear is the best management practice, where appropriate.

Chemical and Concentration	Rate	Comments
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL in 100 L of water	Apply as a thorough foliar spray
Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 60 L of distillate	Foliar application; thoroughly wet plants.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL in 100 L of water	Apply as a thorough foliar spray.
Triclopyr 600 g/L Garlon® 600	1.0 L in 75 L of distillate.	Apply as a thorough foliar spray.
Triclopyr 600 g/L Garlon® 600	3.0 L in 100 L of water	Apply as a thorough foliar spray.

Common tansy - *Tanacetum vulgare*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Common thornapple - *Datura stramonium*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
2,4-D amine 625 g/L Amicide® 625	1.6 to 2.4 L per ha	Pasture
2,4-D amine 700 g/L Amicide Advance 700	285 mL in 100 L of water	Pastures, rights of way and Industrial areas
Bromacil 800 g/kg Various products	3.5 or 6.5 kg per ha	Industrial areas and rights of way: lower rate for lighter soil
Glyphosate 450 g/L Various products	1.6 to 2.4 L per ha	Boom spray
Glyphosate 450 g/L Various products	400 to 560 mL per 100 L of water	Spot spray
Glyphosate 450 g/L Various products	60 to 80 mL per 15 L of water	Knapsack spraying
Imazapyr 250 g/L Various products	4 L per ha	Industrial areas

Coolatai grass - *Hyparrhenia hirta*

Non-chemical options: Individual plants can be pulled by hand.

Chemical and Concentration	Rate	Comments
PER9792 Glyphosate 360 g/L Roundup®	200 mL glyphosate in 10 L of water	Spot spray application. Can be used 2–3 times from September to May.
PER9792 Glyphosate 360 g/L with Flupropanate 745 g/L Various products	200 mL glyphosate plus 20 mL flupropanate per 10 L of water	Spot spray application between July and October. Only use the tank mix once per season.
Flupropanate 745 g/L Tussock®	300 mL per 100 L water	Apply in winter and spring between July and October.

Corky passionfruit - *Passiflora suberosa*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Corn sowthistle - *Sonchus arvensis*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	300 mL per hectare	Commercial and industrial areas, rights of way, pastures and non-crop areas
	Glyphosate 540 g/L Various products	1.3 to 2 L per ha	Boom spray. Use higher rate on weeds over 15 cm
	Glyphosate 540 g/L Various products	330 - 480 mL per 100 L	Handgun. Use higher rate on weeds over 15 cm
	Glyphosate 540 g/L Various products	50 - 70 mL per 15 L	Knapsack. Use higher rate on weeds over 15 cm

Cotoneaster - *Cotoneaster glaucophyllus*

Non-chemical options: Seedlings and small plants can be hand pulled. Ensure all roots are removed

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate per 1.5 parts of water	Cut stump or drill/axe cut/inject.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Creeping knapweed - *Rhaponticum repens*

Non-chemical options: Avoid cultivation, as it will increase plant populations from root pieces.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	1.3–2.0 L per 100 L of water	Spot spray.
	Amitrole 250 g/L + Ammonium thiocyanate 220 g/L Various products	1.1 L per 100 L of water	Actively growing plants before flowering.

Chemical and Concentration	Rate	Comments
Dicamba 500 g/L Kamba® 500	130 mL per 15 L of water	Knapsack spray.
Dicamba 500 g/L Kamba® 500	600 mL per 100 L of water	High volume spot spray.
Dicamba 500 g/L Kamba® 500	8.8 L/ha	Boom spray. Spray at flowering, using a minimum water rate of 1500 L/ha.

Creeping lantana - *Lantana montevidensis*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Fluroxypyr 200 g/L Starane™	500 mL per 100 L of water	Apply at flowering
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 mL and 500 mL or 750 mL per 100 L of water	Lower rate for plants less than 1 m tall.

Crofton weed - *Ageratina adenophora*

Non-chemical options: Well-managed and improved pastures will assist control.

Chemical and Concentration	Rate	Comments
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL per 100 L of water	For use in grass pasture when weed is actively growing.
Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	700 mL in 100 L of water	Spot spray application. Apply to actively growing plants from October to April
Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	1.5 L/ha	Boom spray application. Apply to actively growing plants from October to April
Fluroxypyr 200 g/L Starane™	500 mL per 100 L of water	Apply to actively growing seedlings and young plants up to flowering.
Fluroxypyr 333 g/L Starane™ Advanced	300 mL in 100 L of water	Apply to actively growing seedlings and young plants up to flowering.
Glyphosate 360 g/L Roundup®	500 mL per 100 L of water	Actively growing plants with full foliage.
MCPA 340 g/L + Dicamba 80 g/L Kamba® M	190–270 mL per 100 L of water	Spray during active growth. For use in grass pastures.
MCPA 340 g/L + Dicamba 80 g/L Kamba® M	2.8–4.0 L/ha	Spray during active growth. For use in grass pastures.
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	30 g per 100 L of water	Folia spray to thoroughly wet the plants.
Metsulfuron-methyl 600 g/kg Brush-off®	15 g per 100 L of water	Add surfactant. Thoroughly wet all foliage to point of run-off up to bud stage to prevent seed set.
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 mL in 100 L of water	Spring to autumn. Spray all foliage to point of run-off. Actively growing plants.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 mL per 100 L of water	Spring to autumn. Spray all foliage to point of run-off. Actively growing plants.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 10 L of water	Gas gun / Splatter gun application. Apply to actively growing bushes.

Cumbungi - *Typha* species

Non-chemical options: Small infestations can be mechanically removed.

Chemical and Concentration	Rate	Comments
2,2-DPA 740 g/kg Propon®	1.0–2.0 kg per 100 L of water	Hand gun, spot spray application. For use in irrigation channels and bore drains.
Amitrole 250 g/L Amitrole T®	2.3 L per 100 L of water	Spot spray application. Apply during flowering between January and May.
Glyphosate 360 g/L Only products registered for aquatic use	13 mL per 1 L of water	Spot spray application. Apply to actively growing plants at early flowering.
Imazapyr 250 g/L Various products	3 L/Ha	Boom spray in irrigation channels and drains.

Cutch tree - *Acacia catechu*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Clopyralid 750 g/L Lontrel 750 SG Herbicide	200 g product diluted into 2.5 L water (1 or 2 mL per cut)	Stem injection for trees with less than 25 cm basal stem diameter

Cyperus - *Cyperus teneristolon*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Devil's claw - purple-flowered - *Proboscidea louisianica*

Non-chemical options: Mechanical removal or hoe single plants before pods form.

Chemical and Concentration	Rate	Comments
2,4-D LV ester 680g/L Estericide® Xtra	1.15 to 1.7 L/kg per ha	Boom spray application, before pods form.

Devil's claw - yellow-flowered - *Ibicella lutea*

Non-chemical options: Mechanical removal or hoe single plants before pods form.

Chemical and Concentration	Rate	Comments
2,4-D LV ester 680g/L Estericide® Xtra	1.15 to 1.7 L/kg per ha	Boom spray application, before pods form.

Dipogon - *Dipogon lignosus*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Dodder - *Cuscuta* species

Non-chemical options: Quarantine the infestation and burn; maintain a grass pasture for a minimum period of 5 years to exhaust seed supply in the soil.

	Chemical and Concentration	Rate	Comments
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	2 g per 100 L of water	Handgun application to the point of run off.
	Metsulfuron-methyl 600 g/kg Brush-off®	1 g per 100 L of water	Apply as a spot spray to point of run before flowering.

Duckweed - *Lemna minor*

Non-chemical options: Small infestations can be mechanically removed.

	Chemical and Concentration	Rate	Comments
	Carfentrazone-ethyl 240 g/L Shark™ Aquatic Herbicide	933 mL of product per ha	DO NOT apply more than two (2) applications per year with a minimum re-treatment interval of 90 days between consecutive treatments.
	Diquat 200 g/L Reglone®	400 mL in 100 L of water	Spray to wet all foliage thoroughly, add Agral 600.
	Diquat 200 g/L Reglone®	5.0–10.0 L/ha	Observe withholding period.
	Orange oil 55.2 g/kg Water Clear®	1.0 L per 100 L of water	Spray on to free-floating plants.

East Indian hygrophylla - *Hygrophylla polysperma*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun

Elodea - *Elodea canadensis*

Non-chemical options: Small infestations can be mechanically removed.

	Chemical and Concentration	Rate	Comments
	Copper 110 g/L Cupricide 110®	1 L per 10 cm water depth	Follow label directions.
	Diquat 200 g/L Reglone®	5 L /megalitre water	Apply by injection below the surface or as a surface spray.

Espartillo - broad kernel - *Amelichloa caudata*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	1.5 to 3 L per ha	Broadacre control
PER9792	Flupropanate 745 g/L Tussock®	100 to 300 mL per 100 L of water	Spot spray control
PER9792	Flupropanate 745 g/L Tussock®	500 mL per 10 L water	Wiper suppression
PER9792	Glyphosate 360 g/L Roundup®	3 L per ha	Broadacre control
PER9792	Glyphosate 360 g/L Roundup®	1 L per 100 L of water	Spot spray
PER9792	Glyphosate 360 g/L Roundup®	3.3 L per 10 L water	Wiper suppression

Espartillo - narrow kernel - *Amelichloa brachychaeta*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	1.5 to 3 L per ha	Broadacre control
PER9792	Flupropanate 745 g/L Tussock®	100 to 300 mL per 100 L of water	Spot spray control
PER9792	Flupropanate 745 g/L Tussock®	500 mL per 10 L water	Wiper suppression
PER9792	Glyphosate 360 g/L Roundup®	3 L per ha	Broadacre control
PER9792	Glyphosate 360 g/L Roundup®	1 L per 100 L of water	Spot spray
PER9792	Glyphosate 360 g/L Roundup®	3.3 L per 10 L water	Wiper suppression

Eurasian water milfoil - *Myriophyllum spicatum*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Dichlobenil 40 g/kg Casoron 4G Herbicide	2.9 to 3.9 kg per 10m ²	Exposed soil. DO NOT apply to water which will be used for crop irrigation, for livestock watering, or for human consumption.
	Dichlobenil 40 g/kg Casoron 4G Herbicide	287 to 388 kg per ha or 2.87 to 3.88 kg per 100m ²	Water less than 1m deep. Apply when weeds are dormant. DO NOT apply to water which will be used for crop irrigation, for livestock watering, or for human consumption.
	Dichlobenil 40 g/kg Casoron 4G Herbicide	388 to 574 kg per ha or 3.88 to 5.74 kg per 100m ²	Water more than 1 m deep. Apply when weeds are dormant. DO NOT apply to water which will be used for crop irrigation, for livestock watering, or for human consumption.

European hackberry - *Celtis australis*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 glyphosate to water + 1 g metsulfuron to 1 L water	Stem injection
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection

False yellowhead - *Dittrichia viscosa*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Feral olive - *Olea europaea* subsp. *europaea*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray (smaller plants less than 1 m)
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3 – 5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Fine-bristled burr grass - *Cenchrus brownii*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	2 to 3 L per ha	Boom spray
	Glyphosate 360 g/L Roundup®	500 to 700 mL per 100 L of water	Spot spray
	Glyphosate 360 g/L Roundup®	75 to 100 mL per 15 L of water	Knapsack spray

Firethorn - *Pyracantha* species

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 glyphosate to water + 1 g metsulfuron to 1 L water	Stem injection

Fireweed - *Senecio madagascariensis*

Non-chemical options: Pasture improvement and proper grazing management will assist with control. For more information visit www.dpi.nsw.gov.au/weeds

	Chemical and Concentration	Rate	Comments
PER80063	Metsulfuron-methyl 600 g/kg Brush-off®	10 g in 100 L of water	Spot spray application
PER80063	Metsulfuron-methyl 600 g/kg Brush-off®	40 g/ha	Boom spray

	Chemical and Concentration	Rate	Comments
	Bromoxynil 200 g/L Bromicide®	1.4 L/ha	Boom spray. Seedling application. In pastures apply with low volume boom spray during autumn/winter when weeds are young and actively growing. Observe withholding period.
	Bromoxynil 200 g/L Bromicide®	2.8 L/ha	Boom spray. Early flowering application. In pastures apply with low volume boom spray during autumn/winter when weeds are young and actively growing. Observe withholding period.
	Bromoxynil 250 g/L + Diflufenican 25 g/L Jaguar	500 mL per ha	Booms spray application, up to 4 leaf stage
	Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL in 100 L of water	Apply to flowering plants up to 30 cm tall
	Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	1.5 L/ha	Treat seedling plants up to flowering
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 mL in 100 L of water	Apply as a thorough foliar spray

Fishbone fern - *Nephrolepis cordifolia*

Non-chemical options: Dig out, burn. This plant has rhizomes, which are a means of spread.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL glyphosate plus 1.5 g metsulfuron-methyl per 10 L of water	Knapsack spot spray.
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	1.0–2.0 g metsulfuron-methyl per 10 L of water	Knapsack spot spray.

Flax-leaf broom - *Genista linifolia*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	250 mL per 100 L water	Spring to mid summer prior to pod formation. Commercial and industrial areas, rights of way, pastures and non-crop areas.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 mL per 100 L water	Autumn to winter. Commercial and industrial areas, rights of way, pastures and non-crop areas.

Fleabane - *Conyza* species

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	2,4-D amine 700 g/L Amicide Advance 700	285 mL in 100 L of water	Pastures, rights of way and Industrial areas
	Flumioxazin 500 g/L Terrain	700g per ha	Fence lines (pre-emergence)
	Glufosinate-ammonium 200 g/L Basta®	3 to 5 L per ha	Boom spray: Commercial and industrial areas, rights of way, pastures and non-crop areas
	Glufosinate-ammonium 200 g/L Basta®	500 mL in 100 L of water	Spot spray: Commercial and industrial areas, rights of way, pastures and non-crop areas
	Glufosinate-ammonium 200 g/L Basta®	75 mL in 15 L of water	Knapsack: Commercial and industrial areas, rights of way, pastures and non-crop areas
	Glyphosate-trimesium 480 g/L Glyphosate Trimesium 480	2 to 3 L per ha	Industrial, commercial, domestic and public service areas
	Glyphosate-trimesium 480 g/L Glyphosate Trimesium 480	500 to 700 mL per 100 L of water	Pastures (wiper and spot treatment), industrial, commercial, domestic and public service areas

	Chemical and Concentration	Rate	Comments
	Glyphosate-trimesium 480 g/L Glyphosate Trimesium 480	1 part product to 2 parts water	Pastures (wiper and spot treatment)
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	2 L/ha + 2.4 L/ha glyphosate	Commercial and industrial areas, rights of way, pastures and non-crop areas.

Fountain grass - *Cenchrus setaceus*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	3 L per ha	Selective broadacre control
PER9792	Flupropanate 745 g/L Tussock®	300 mL in 100 L of water	Spot spray
PER9792	Flupropanate 745 g/L Tussock®	500 mL in 10 L of water	Wiper application
PER9792	Glyphosate 360 g/L Roundup®	6 L per ha	Non-selective broadacre control
PER9792	Glyphosate 360 g/L Roundup®	1 L in 100 L of water	Spot spray
PER9792	Glyphosate 360 g/L Roundup®	3.3 L in 10 L of water	Wiper application

Freckle face - *Hypoestes phyllostachya*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER11916	Glyphosate 360 g/L Roundup®	1 part product to 100 parts water plus surfactant	Urban bushland, forests and coastal reserves.

Frogbit - *Limnobium laevigatum*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 9 parts water	Splatter gun
	Diquat 200 g/L Reglone®	5 L of product per megalitre of water	Apply by injection below the surface or as a surface spray.

Galenia - *Galenia pubescens*

Non-chemical options: A perennial prostrate or semi-prostrate plant that is difficult to control.

	Chemical and Concentration	Rate	Comments
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL per 100 L of water	Fresh spring/summer growth. High volume spot spray, treat to visual wetness.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	5 L/ha	Boom spray. Apply in 2000 L water /ha.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Fresh spring/summer growth. High volume spot spray, treat to visual wetness.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	5 L/ha	Boom spray application

Gallon's curse - *Cenchrus biflorus*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	2 to 3 L per ha	Boom spray
Glyphosate 360 g/L Roundup®	500 to 700 mL per 100 L of water	Spot spray
Glyphosate 360 g/L Roundup®	75 to 100 mL per 15 L of water	Knapsack spray

Galvanised burr - *Sclerolaena birchii*

Non-chemical options: Deep cultivation to bury the seed, with pasture improvement and grazing management, will give control.

Chemical and Concentration	Rate	Comments
2,4-D amine 625 g/L Amicide® 625	320 mL per 100 L of water	Apply to young, actively growing plants.
Dicamba 500 g/L Kamba® 500	600 mL per 100 L of water	High volume spot spray.
Dicamba 500 g/L Kamba® 500	8.8 L/ha	Boom spray. Use a minimum of 1500 L water /ha. Add a surfactant.
Dichlorprop 600 g/L Lantana 600®	1.0 L per 100 L of water	Apply to young, actively growing plants.

Gamba grass - *Andropogon gayanus*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
PER9907 Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907 Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun

Garden geranium - *Pelargonium alchemilloides*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
PER9907 Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907 Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907 Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907 Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907 Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907 Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907 Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Giant devil's fig - *Solanum chrysotrichum*

Non-chemical options: Small individual plants can be carefully manually removed.

	Chemical and Concentration	Rate	Comments
PER12942	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Only products registered for aquatic use	2 L Roundup plus 10 g of Brushoff in 100 L of water	A wetter must be used at a rate of 500 mL per 100 L. Apply a maximum of 2 times per year at a minimal interval of 60 days. DO NOT use products containing picloram and triclopyr within 5 m of a waterway. Ensure spray covers all foliage and stems as incomplete application will result in regrowth.
PER12942	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 to 500 mL per 100 L of water + wetter	A wetter must be used at a rate of 500 mL per 100 L. Apply a maximum of 2 times per year at a minimal interval of 60 days. DO NOT use products containing picloram and triclopyr within 5 m of a waterway. Ensure spray covers all foliage and stems as incomplete application will result in regrowth.
PER12942	Triclopyr 300 g/L + Picloram 100 g/L with Metsulfuron-methyl 600 g/kg Various products	350 to 500 mL of Grazon plus 10g of Brushoff in 100 L of water	A wetter must be used at a rate of 500 mL per 100 L. Apply a maximum of 2 times per year at a minimal interval of 60 days. DO NOT use products containing picloram and triclopyr within 5 m of a waterway. Ensure spray covers all foliage and stems as incomplete application will result in regrowth.

Giant Parramatta grass - *Sporobolus fertilis*

Non-chemical options: Pasture improvement and proper grazing management will assist control. For further information visit www.dpi.nsw.gov.au/weeds

	Chemical and Concentration	Rate	Comments
PER9792	Glyphosate 360 g/L Roundup®	3.3 L per 10 L of water	Wick wiper application. Apply when plant is actively growing.
	2,2-DPA 740 g/kg Propon®	1.0 kg per 100 L of water	Handgun application.
	2,2-DPA 740 g/kg Propon®	5–10 kg/ha	Boom spray application. Apply when plants are actively growing.
	Flupropanate 745 g/L Tussock®	200 mL per 100 L of water	High volume spot spray. Best results during late winter and early spring when desirable species are semi-dormant. Observe 4 month withholding period for blanket spray application.
	Flupropanate 745 g/L Tussock®	1.5–2.0 L/ha	Boom spray. Best results during late winter and early spring when desirable species are semi-dormant. Observe 4 month withholding period for blanket spray application.
	Glyphosate 360 g/L Roundup®	10–15 mL per 1 L of water	Spot spray. Apply when plants are actively growing.
	Glyphosate 360 g/L Roundup®	6.0 L/ha	Boom application for pasture replacement/improvement and best done as a split treatment.

Giant rat's tail grass - *Sporobolus pyramidalis*

Non-chemical options: Pasture improvement and proper grazing management will assist control.

	Chemical and Concentration	Rate	Comments
PER9792	Glyphosate 360 g/L Roundup®	3.3 L per 10 L of water	Wick wiper application. Apply when plant is actively growing.
	Flupropanate 745 g/L Tussock®	200 mL per 100L of water	Handgun application.
	Flupropanate 745 g/L Tussock®	1.5–2.0 L/ha	Boom spray. Best results during late winter and early spring when desirable species are semi-dormant. Four month withholding period for blanket spray application.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10–15 mL per 1 L water	Handgun application for when plants are actively growing.
	Glyphosate 360 g/L Roundup®	6.0 L/ha	Boom application for pasture replacement/ improvement and best done as a split treatment. Apply when plants are actively growing.

Giant reed - *Arundo donax*

Non-chemical options: Physical removal of small infestations is possible.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Knapsack application
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts of water	Cut stump application.

Ginger lily - *Hedychium gardnerianum*

Non-chemical options: Small individual plants can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL of glyphosate plus 1.5 g of Metsulfuron methyl in 10 L of water	Spot spray application, add a surfactant.

Glaucous starthistle - *Carthamus leucocaulos*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Dicamba 500 g/L Kamba® 500	1.6 L per ha	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	100 mL in 100 L of water	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	24 mL in 15 L of water	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	280 mL to 1.1 L per ha	Grass pastures and perennial grasses
	Dicamba 500 g/L Kamba® 500	40 mL and 76 mL per 100 L of water	Grass pastures and perennial grasses: Low rate for seedlings
	Dicamba 500 g/L Kamba® 500	10 mL and 18 mL per 10 L of water	Grass pastures and perennial grasses: Low rate for seedlings
	MCPA 340 g/L + Dicamba 80 g/L Kamba® M	2.8 to 4.0 L per ha	Grass pastures
	MCPA 340 g/L + Dicamba 80 g/L Kamba® M	190 to 270 mL per 100 L of water	Grass pastures
	MCPA 340 g/L + Dicamba 80 g/L Kamba® M	60 mL per 15 L of water	Grass pastures

Glory lily - *Gloriosa superba*

Non-chemical options: Physical removal for small infestations.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Knapsack application
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts of water	Cut stump/ scrape stem application.
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL glyphosate plus 1.5 g metsulfuron-methyl per 10 L of water	Knapsack application

Golden dodder - *Cuscuta campestris*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	2 g in 100 L of water	Non-agricultural areas, native pastures, rights of ways commercial and industrial areas.

Golden thistle - *Scolymus hispanicus*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	300 mL per 100 L of water	Commercial and industrial areas, rights of way, pastures.
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	3.5 L per ha	Commercial and industrial areas, rights of way, pastures.
2,4-D LV ester 680g/L Estericide® Xtra	3.3 L per ha	Pasture: non-legumes

Goldflower - *Hypericum kouytchense*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Gorse - *Ulex europaeus*

Non-chemical options: Physical removal of large bushes.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	1.0 L per 100 L of water	Add Pulse (wetting agent), apply to actively growing bushes. Spray to wet all foliage.
Glyphosate 835 g/kg + Metsulfuron-methyl 10 g/kg Trounce®	1 measured pack (173 g) in 100 L of water	Apply to bushes up to 2 m high when actively growing.
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	30 g per 100 L of water	Handgun application for bushes up to 2m tall. Add Pulse penetrant.
Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water, plus 200 mL of glyphosate 360g/kg	Apply to bushes up to two metres tall. Ensure thorough spray penetration and coverage of whole plant.
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	250 or 350 mL per 100 L of water	Handgun application to actively growing plants. Use higher rate on bushes over 1.5 m high or as an autumn treatment.
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL in 100 L of water	Handgun application for Winter treatment
Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
Triclopyr 200 g/L + Picloram 100 g/L Tordon® DSH	375 mL per 100 L of water	Handgun application from September to March.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	250 or 350 mL per 100 L of water	Handgun application for actively growing plants. Use higher rate on bushes over 1.5 m high or as an autumn treatment.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Handgun application for Winter treatment
Triclopyr 600 g/L Garlon® 600	170 or 340 mL per 100 L water	Handgun application, add non-ionic surfactant. Spring to mid-summer, higher rate on older bushes.

Green cestrum - *Cestrum parqui*

Non-chemical options: A toxic plant in both the green and dead state. Physical removal is difficult because of the persistent regrowth from roots.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut, scrape and paint.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray.
PER11427	Triclopyr 600 g/L Garlon® 600	1.0 L per 30 L of diesel	Basal bark application. DO NOT over treat as excessive run-off might affect adjacent trees and shrubs through root absorption.
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL per 100 L of water	Handgun application on actively growing bushes in full leaf.
	Amitrole 250 g/L + Ammonium thiocyanate 220 g/L Various products	1.1 L per 100 L of water	Handgun application on active growth, before flowering.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL in 100 L of water	Apply from late spring to early autumn. Any regrowth and seedlings must be resprayed when 1 m high.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 60 L of diesel	Basal bark application.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Apply from late spring to early autumn. Any regrowth and seedlings must be resprayed when 1 m high.
	Triclopyr 600 g/L Garlon® 600	170 mL per 100 L of water	Retreat regrowth the next season.

Grey willow - *Salix cinerea*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	1.0 to 1.3 L in 100 L of water	Use higher rate for trees 1 to 2 m tall
	Glyphosate 360 g/L Roundup®	Undiluted	Stem injection
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1 L in 15 L of diesel	Cut stump application need to treat all stems

Ground asparagus - *Asparagus aethiopicus*

Non-chemical options: Mechanically remove rhizomes where possible.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL in 100 L of water	Spot spray application
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	Tank mix of up to 2 L glyphosate + 15 g metsulfuron-methyl per 100 L water.	Spot spray. Use a penetrant in coastal areas where the asparagus plants have a formed a waxy coating. For the treatment of this weed in areas of native vegetation, eg. subtropical rainforest remnants, littoral rainforest and other bushland reserves.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray application, best done between flowering and berries forming.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump/scrape stem.
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	1–2 g/10 L water plus non-ionic surfactant (0.1 % or 1 mL/L)	Spot spray application, best done between flowering and berries forming.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application

Groundsel bush - *Baccharis halimifolia*

Non-chemical options: Small plants can be manually removed, ensuring total root elimination.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L Affray 300®	100 mL in 10 L of water	Thorough even coverage of the plant is necessary
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL per 100 L of water	Thorough coverage required on active growth.
	2,4-D amine 625 g/L Amicide® 625	320 mL per 100 L of water	Spray actively growing bushes. Thorough coverage.
	Clopyralid 600 g/L Various products	165 - 250 mL per 100 L of water	Handgun application for active growth, lower rate on seedlings, higher rate on bushes over 2 m high.
	Glyphosate 360 g/L Roundup®	700 mL to 1.0 L per 100 L of water	Actively growing bushes. Do not apply during winter or summer drought stress.
	Glyphosate 360 g/L Roundup®	1 part per 9 parts water	Gas gun / Splatter gun application. Apply 2 x 2 mL doses per 0.5 m of bush height
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	250 or 350 mL in 100 L of water	Use lower rate on bushes 1–1.5 m high in spring and summer; use higher rate on bushes over 1.5 m high in the autumn.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 60 L of diesel	Basal bark/cut stump application.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	250 or 350 mL per 100 L of water	Use lower rate on bushes 1–1.5 m high in spring and summer; use higher rate on bushes over 1.5 m high in the autumn.
	Triclopyr 600 g/L Garlon® 600	160 mL per 100 L of water	Seedlings 1 to 2 m tall.
	Triclopyr 600 g/L Garlon® 600	320 mL per 100 L of water	Bushes over 2 m tall.

Harrisia cactus - *Harrisia* species

Non-chemical options: Small individual plants can be carefully manually removed.

	Chemical and Concentration	Rate	Comments
PER14553	Amitrole 250 g/L Amitrole T®	1 L in 25 L water	Handgun application
PER14553	Metsulfuron-methyl 660 g/L Various products	20 g in 100 L of water	Handgun application
PER14553	Triclopyr 200 g/L + Picloram 100 g/L + Aminopyralid 25 g/L Tordon™ Regrowthmaster™ Herbicide	2.5 L in 100 L of water	Handgun application
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL in 100 L water	Apply as a thorough foliar spray.
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L water	Apply when there is active phyllode (leaf) growth.

	Chemical and Concentration	Rate	Comments
PER14442	Triclopyr 600 g/L Garlon® 600	1.0 L per 75 L of distillate	Apply as a thorough foliar spray.
	Dichlorprop 600 g/L Lantana 600®	1.0 L per 60 L of water	Good soil moisture essential and spray at fruiting.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 60 L of diesel	Foliar application.

Hawkweeds - *Hieracium* species

Prohibited matter: if you find these plants call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER14558	Clopyralid 300 g/L Lontrel®	5 mL in 1 L of water	Spot spray application
PER14928	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	250-500 mL per 100 L plus BS 1000 or equivalent at 100 mL per 100 L	Foliar application
PER14928	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	250-500 mL per 100 L plus BS 1000 or equivalent at 100 mL per 100 L	Foliar application
PER14301	Picloram 20 g/kg Tordon® Granules	45 g/m ²	Granular application.

Hawthorn - *Crataegus monogyna*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 to 13 mL per liter of water	Knapsack or hand gun
	Glyphosate 360 g/L Roundup®	1 part product to 9 parts water	Low volume spraying
	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Could add glyphosate 360 at 200 mL per 100 L water
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Late spring to early autumn application

Heather - *Calluna vulgaris*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Hemlock - *Conium maculatum*

Non-chemical options: A toxic plant; avoid feeding animals fodder that may contain the plant.

Chemical and Concentration	Rate	Comments
MCPA 340 g/L + Dicamba 80 g/L Kamba® M	80 mL per 15 L of water	Knapsack spray.
MCPA 340 g/L + Dicamba 80 g/L Kamba® M	350 mL per 100 L of water	High volume spot spray.
MCPA 340 g/L + Dicamba 80 g/L Kamba® M	5.2 L/ha	Boom spray rate. Young active growth, repeat treatments may be necessary.

Hoary cress - *Lepidium draba*

Non-chemical options: Because of the plant's root system, cultivation only aids its spread.

Chemical and Concentration	Rate	Comments
2,4-D amine 625 g/L Amicide® 625	1.1–1.7 L/ha	Boom spray application, at rosettes to pre-flowering.
2,4-D LV ester 680g/L Estericide® Xtra	1.7 to 2.1 L/ha	Boom spray application, from late rosette to pre-flowering
Glyphosate 360 g/L Roundup®	500 mL per 100 L of water	Spot spray application.
Glyphosate 360 g/L Roundup®	1.5 L/ha	Boom spray. July to September, late rosette to flowering.

Holly fern - *Cyrtomium falcatum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
PER9907 Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907 Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907 Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907 Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907 Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907 Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907 Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Holly leaved senecio - *Senecio glastifolius*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
PER9907 Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907 Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907 Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907 Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 – 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Honey locust - *Gleditsia triacanthos*

Non-chemical options: Mechanical control is possible but will require follow up treatments.

	Chemical and Concentration	Rate	Comments
	Fluroxypyr 200 g/L Starane™	500 mL per 100L of water	Foliar application, up to 2 m in height.
	Fluroxypyr 200 g/L Starane™	1.5 L per 100 L of diesel	Basal bark application. Plants up to 10 cm basal diameter.
	Fluroxypyr 200 g/L Starane™	3 L per 100 L of diesel	Basal bark application. Plants 10–20 cm basal diameter.
	Fluroxypyr 200 g/L Starane™	5 L per 100 L of diesel	Basal bark application. Plants above 20 cm basal diameter.
	Fluroxypyr 200 g/L Starane™	5 L per 100 L of diesel	Cut stump application.
	Fluroxypyr 333 g/L Starane™ Advanced	300 mL per 100L of water	Foliar application, up to 2 m in height.
	Fluroxypyr 333 g/L Starane™ Advanced	900 mL per 100 L of diesel	Basal bark application. Plants up to 10 cm basal diameter.
	Fluroxypyr 333 g/L Starane™ Advanced	1.8 L per 100 L of diesel	Basal bark application. Plants 10–20 cm basal diameter.
	Fluroxypyr 333 g/L Starane™ Advanced	3 L per 100 L of diesel	Basal bark application. Plants above 20 cm basal diameter.
	Fluroxypyr 333 g/L Starane™ Advanced	3 L per 100 L of diesel	Cut stump application.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1 L per 60 L of diesel	Basal bark application for basal diameter less than 5 cm or cut stump application for above 5 cm.

Horehound - *Marrubium vulgare*

Non-chemical options: Cut, stack and burn small areas. Establish a vigorous pasture and use good grazing management.

	Chemical and Concentration	Rate	Comments
	2,4-D LV ester 680g/L Estericide® Xtra	1.7 to 3.3 L/ha	Boom spray application for seedlings from late autumn to early spring
	Dicamba 500 g/L Kamba® 500	80 mL in 100 L of water	High volume spot spray.
	Dicamba 500 g/L Kamba® 500	1.2 L/ha	Boom spray.
	MCPA 500 g/L Various products	3 L per Hectare	Boom spray application
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 mL in 100 L of water	Apply as foliar spray pre-flowering
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 mL in 100 L of water	Apply as a foliar spray pre-flowering.

Horsetails - *Equisetum* species

Non-chemical options: Physical removal is ineffective due to the deep root system.

	Chemical and Concentration	Rate	Comments
PER13917	Dichlobenil 67.5 g/kg Casoron G®	18 g /m ²	Spread granules evenly over the soil in area to be treated. Granules must be watered immediately after application. DO NOT apply to water which will be used for crop irrigation, for livestock watering, or for human consumption.

Hudson pear - *Cylindropuntia rosea*

Non-chemical options: Small plants can be carefully mechanically removed.

	Chemical and Concentration	Rate	Comments
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL per 100 L of water	Spot spray application, add 0.5 % Uptake spray oil.
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Spot spray application, add 0.5 % Uptake spray oil.
PER14442	Triclopyr 600 g/L Garlon® 600	1 L per 75 L of diesel	Spot spray application.
PER14442	Triclopyr 600 g/L Garlon® 600	3 L per 100 L of water	Add 0.5% Uptake® spray oil.

Hydrocotyl - *Hydrocotyle ranunculoides*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun

Hygrophila - *Hygrophila costata*

Non-chemical options: Small plants or infestations can be dug up, bagged and removed.

	Chemical and Concentration	Rate	Comments
PER14729	Glyphosate 360 g/L Only products registered for aquatic use	1.0 L per 100 L of water	Spray when plants are actively growing, re-treatments may be necessary. Do not spray directly onto waters surface or non-target species.
PER14729	Metsulfuron-methyl 600 g/kg Brush-off®	5–10g per 100 L of water	Minimise off target damage and water pollution by spraying towards the bank. Do not apply more than 3 times a year.

Hymenachne - *Hymenachne amplexicaulis* and hybrids

Non-chemical options: Physical removal of small or individual plants may be effective. Take care to remove all plant material and dispose of by deep burial or drying and burning.

	Chemical and Concentration	Rate	Comments
PER13921	Glyphosate 360 g/L Only products registered for aquatic use	14 L / hectare	Apply by boom, handgun or knapsack, a maximum of 4 times a year. Refer to permit for further comments.

Illyrian thistle - *Onopordum illyricum*

Non-chemical options: Establish a strong, perennial pasture. Grub single plants, removing 50 mm of the root. Biological control agents are available.

	Chemical and Concentration	Rate	Comments
	Dicamba 500 g/L Kamba® 500	40 mL per 100 L water	High volume spot spray.
	Dicamba 500 g/L Kamba® 500	600 mL/ha	Boom spray.
	Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL in 100 L of water	Hand gun application

Indian fig - *Opuntia ficus-indica*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL per 100 L of water	High volume application
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	50 mL per 10 L of water	Knapsack application
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	High volume application
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	50 mL per 10 L of water	Knapsack application
PER14442	Triclopyr 600 g/L Garlon® 600	1L per 75L of diesel	Spot spray
PER14442	Triclopyr 600 g/L Garlon® 600	3L per 100L of water	High volume application
PER14442	Triclopyr 600 g/L Garlon® 600	50mL per 10L of water	Knapsack application

Indian hawthorn - *Rhaphiolepis indica*

Non-chemical options: Small individual plants can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	400 mL of glyphosate in 600 mL of water	Cut stump application
PER9907	Glyphosate 360 g/L Roundup®	200 mL in 10 L of water	Spot spray application

Italian cocklebur - *Xanthium italicum*

Non-chemical options: Slash before flowering. There are a number of biological control agents that work in selected areas and situations.

	Chemical and Concentration	Rate	Comments
	2,4-D amine 625 g/L Amicide® 625	0.8 – 1.1 L/ha	Boom spray. Seedlings only.
	2,4-D LV ester 680g/L Estericide® Xtra	800 mL/ha	Boom spray application, from seedlings to pre-flowering. Use higher rates as plants mature

Japanese honeysuckle - *Lonicera japonica*

Non-chemical options: Small individual plants can be manually removed

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	400 mL in 600 mL of water	Cut stump application
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 – 20 g in 100 L of water	Spot spray application, add a surfactant

Japanese sunflower - *Tithonia diversifolia*

Non-chemical options: Seedlings and individual plants can be physically removed.

	Chemical and Concentration	Rate	Comments
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g in 100 L of water	Hand gun application.
	Metsulfuron-methyl 600 g/kg Brush-off®	10 g in 100 L of water	Apply to actively growing plants after full leaf expansion but before seed set. Add surfactant.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 mL in 100 L of water	Apply as foliar spray pre-flowering
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 mL in 100 L of water	Apply as a foliar spray pre-flowering.

Japanese walnut - *Juglans ailantifolia*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 glyphosate to water + 1 g metsulfuron to 1 L water	Stem injection
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection

Jasmine - *Jasminum polyanthum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 – 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Johnson grass - *Sorghum halepense*

Non-chemical options: Cultivation is ineffective because of rhizome segmentation. Digging out individual plants may be an option, taking care to remove all rhizome material.

Chemical and Concentration	Rate	Comments
Flupropanate 745 g/L Tussock®	200 mL per 15 L of water	Knapsack spray.
Flupropanate 745 g/L Tussock®	1.0 L per 100 L of water	High volume spot spray.
Flupropanate 745 g/L Tussock®	12 L/ha	Boom spray.
Glyphosate 360 g/L Roundup®	1.0 L per 100 L of water	Spot spray.
Glyphosate 360 g/L Roundup®	6.0 L/ha	Boom spray. Actively growing plants at early head stage.
Glyphosate 360 g/L Roundup®	1.0 L glyphosate per 2 L of water	Wiper equipment.
Haloxypyr 520 g/L Verdict®	200 - 400 mL/ha	Boom spray application
Imazapyr 750 g/kg Various products	2 kg/ha	Boom spray application
MSMA 720 g/L Armada 720 SL	1.1 L per 100 L of water	Spot spraying.
MSMA 720 g/L Armada 720 SL	11–13.3 L/ha in 500 L of water	Boom spraying.

Karoo thorn - *Vachellia karroo*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
PER9907 Fluroxypyr 200 g/L Starane™	35mL per L diesel/kerosene	Basal bark
PER9907 Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907 Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection
PER9907 Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 glyphosate to water + 1 g metsulfuron to 1 L water	Stem injection

Kei apple - *Dovyalis caffra*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
PER9907 Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907 Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907 Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 glyphosate to water + 1 g metsulfuron to 1 L water	Stem injection
PER9907 Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection

Khaki weed - *Alternanthera pungens*

Non-chemical options: Improve lawns and turf density to create competition, grub at least 50 mm of the root.

	Chemical and Concentration	Rate	Comments
PER12362	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	2.0 L/ha	Apply when secondary roots are present on the shown pasture. DO NOT spray tropical grasses before the early tillering stage. Apply when weeds are small and actively growing, preferably before flowering or vining. Legumes present at the time of spraying will be damaged. Refer to cautionary warning on product label.
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL in 100 L of water	Active growth in full leaf.
	2,4-D amine 625 g/L Amicide® 625	1.1 – 2.2 L/ha	Seedlings only.
	2,4-D LV ester 680g/L Estercide® Xtra	800 mL to 1.15 L per hectare	Boom spray application for young seedlings
	Amitrole 250 g/L + Ammonium thiocyanate 220 g/L Various products	1.1 L in 100 L of water	Spot spray. Actively growing plants.

Kidney-leaf mud plantain - *Heteranthera reniformis*

Non-chemical options: Small individual plants can be carefully manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	200 mL per 10 L of water	Foliar application
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Foliar application in terrestrial situations only.

Kochia - *Bassia scoparia*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray

Koster's curse - *Clidemia hirta*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Kudzu - *Pueraria lobata*

Non-chemical options: Continual grazing or cutting can kill the plant. Manual removal is difficult because of the existence of a large underground tuber.

	Chemical and Concentration	Rate	Comments
PER11604	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Foliar application from spring to autumn. For further information read the permit critical use comments.
PER11604	Tricopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Foliar application from spring to autumn. For further information read the permit critical use comments.

Lacy ragweed - *Ambrosia tenuifolia*

Non-chemical options: A perennial plant reproducing from seed and root, making physical removal impractical. In some situations, biological agents may give some control.

	Chemical and Concentration	Rate	Comments
	Dicamba 500 g/L Kamba® 500	600 mL per 100 L of water	High volume spot spray.
	Dicamba 500 g/L Kamba® 500	8.8 L/ha	Use a minimum of 1500 L/ha of water. Add a surfactant.

Lady-of-the-night - *Cestrum nocturnum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Lagarosiphon - *Lagarosiphon major*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Diquat 200 g/L Reglone®	5 L per megalitre water	Apply by stem injection below the surface or as a surface spray

Lantana - *Lantana camara*

Non-chemical options: Manual control can be effective by slashing, burning or manual removal, integrated together with pasture improvement. Biological control research is continuing.

Chemical and Concentration	Rate	Comments
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL per 100 L of water	High volume spot spray. Thoroughly wet foliage and soil around the base of plant during March to May.
2,4-D amine 625 g/L Amicide® 625	320 mL in a 100 L of water	Apply to actively growing bushes.
Dichlorprop 600 g/L Lantana 600®	1.0 L per 200 L of water	Spot spray application, completely wet all leaves and stems.
Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL per 100 L of water	Seedlings and regrowth 0.5–1.2 m height. Apply to actively growing plants.
Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	700 mL per 100 L of water	Mature plants and regrowth 1.2–2.0 m. Apply to actively growing plants.
Fluroxypyr 200 g/L Starane™	500 mL or 1.0 L per 100 L of water	Apply to actively growing bushes from October to April. Use lower rate on seedlings or bushes to 1.2 m high, higher rate on bushes over 1.2 m.
Fluroxypyr 333 g/L Starane™ Advanced	300 - 600 mL in 100 L of water	Apply to actively growing bushes from October to April. Use lower rate on seedlings or bushes to 1.2 m high, higher rate on bushes over 1.2 m.
Glyphosate 360 g/L Roundup®	1.0 L per 100 L of water	Actively growing with full foliage. Avoid summer stress.
Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	10 g metsulfuron-methyl plus 200 mL glyphosate per 100 L of water	Apply to bushes up to 2 m high. Thoroughly wet all foliage and stems. Add organosilicone penetrant.
Glyphosate 360 g/L Roundup®	1 part per 9 parts water	Gas gun / Splatter gun application. Apply 2 x 2 mL doses per 0.5 m of bush height
Glyphosate 835 g/kg + Metsulfuron-methyl 10 g/kg Trounce®	1 measured pack (173 g) per 100 L of water	Apply when actively growing, thoroughly wet all foliage and stems. Do not apply during stress periods.
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g in 100 L of water	Hand gun application.
Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Apply to bushes up to two metres tall. Spray to wet all foliage and stems. Re-treatment will be necessary.
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 - 500 mL in 100 L of water	Wet thoroughly, use higher rate on large bushes, 1–2 m tall. Low rates for bushes up to 1 m tall. Apply from summer to autumn.
Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 60 L of diesel	Basal bark or cut stump application.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 - 500 mL per 100 L of water	Wet thoroughly, use higher rate on large bushes, 1–2 m tall. Low rates for bushes up to 1 m tall. Apply from summer to autumn.
Triclopyr 600 g/L Garlon® 600	1.0 L per 60 L of diesel	Basal bark application for basal diameter less than 5 cm or cut stump application above 5 cm.

Laurel clock vine - *Thunbergia laurifolia*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Leaf cactus - *Pereskia aculeata*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL per 100 L of water	High volume application
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	50 mL per 10 L of water	Knapsack application
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	High volume application
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	50 mL per 10 L of water	Knapsack application
PER14442	Triclopyr 600 g/L Garlon® 600	1L per 75L of diesel	Spot spray
PER14442	Triclopyr 600 g/L Garlon® 600	3L per 100L of water	High volume application
PER14442	Triclopyr 600 g/L Garlon® 600	50mL per 10L of water	knapsack application

Leafy elodea - *Egeria densa*

Non-chemical options: Small infestations can be mechanically removed.

	Chemical and Concentration	Rate	Comments
	Diquat 200 g/L Reglone®	5 L /megalitre water	Apply by injection below the surface or as a surface spray.

Leucaena - *Leucaena leucocephala*

Non-chemical options: Small plants can be mechanically removed.

	Chemical and Concentration	Rate	Comments
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 60 L of diesel	Cut stump/basal bark application.

Lippia - *Phyla canescens*

Non-chemical options: Pasture improvement and grazing management.

	Chemical and Concentration	Rate	Comments
PER14197	2,4-D amine 625 g/L Amicide® 625	1.7–3.1 L/ha plus 1% crop oil	Pastoral land situation. Apply when Lippia is in a fresh condition, mid-flower, with good soil moisture present.
	Dichlorprop 600 g/L Lantana 600®	5 mL per 1 L of water	Knapsack rate. Completely wet plants.
	Dichlorprop 600 g/L Lantana 600®	1.0 L per 200 L of water or 5.0 L/ha	Boomspray using high water volumes. Minimum application of 100 L/ha. For best results spray at flowering when there is good soil moisture.

Lobed needle grass - *Nassella charruana*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	1.5 to 3 L per ha	Broadacre control
PER9792	Flupropanate 745 g/L Tussock®	100 to 300 mL per 100 L of water	Spot spray control
PER9792	Flupropanate 745 g/L Tussock®	500 mL per 10 L water	Wiper suppression
PER9792	Glyphosate 360 g/L Roundup®	3 L per ha	Broadacre control
PER9792	Glyphosate 360 g/L Roundup®	1 L per 100 L of water	Spot spray
PER9792	Glyphosate 360 g/L Roundup®	3.3 L per 10 L water	Wiper suppression

Long-leaf willow primrose - *Ludwigia longifolia*

Non-chemical options: Small plants may be manually removed, taking care not to spread seed.

	Chemical and Concentration	Rate	Comments
PER14731	Glyphosate 360 g/L Only products registered for aquatic use	1.0 L per 100 L of water	Spot spray application.

Long-style feather grass - *Pennisetum villosum*

Non-chemical options: Cultivate and establish pasture cover to provide competition and prevent invasion.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	300 mL per 100 L of water	Spot spray application
PER9792	Glyphosate 360 g/L Roundup®	335ml in 100 L of water	Spot spray application. Apply when plant is actively growing.

Ludwigia - *Ludwigia peruviana*

Non-chemical options: Small plants can be manually removed. Dense stands can be slashed and burnt. Take care not to spread the seed.

	Chemical and Concentration	Rate	Comments
PER10597	2,4-D amine 500 g/L Various products	125 mL in 100 L of water	Apply as direct application to foliage, minimising runoff from leaf surface. Do not apply as a broadcast spray over water.
	Glyphosate 360 g/L Only products registered for aquatic use	1 L in 100 L of water	Actively growing at or beyond the early bloom stage of growth but before autumn change of colour. Thorough coverage is necessary for best results.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Madeira vine - *Anredera cordifolia*

Non-chemical options: Small seedlings and tubers can be manually removed, bagged and composted.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	Undiluted glyphosate	Stem scraping application.
PER9907	Glyphosate 360 g/L Roundup®	100 mL glyphosate per 10 L of water	Spot spray for seedling control. Add a surfactant.
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL glyphosate plus 1.5 g metsulfuron-methyl in 10 L of water	Spot spray for seedling control.
PER13914	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	400 mL in 100 L of water	Handgun application
PER13914	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	400 mL in 100 L of water	Handgun application.
	Fluroxypyr 200 g/L Starane™	500 mL in 100 L of water	Apply at times of active growth. Avoid drift on to desirable plants.
	Fluroxypyr 333 g/L Starane™ Advanced	300 mL in 100 L of water	Apply at times of active growth. Avoid drift on to desirable plants.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .

Mahonia - *Berberis lomariifolia*

Non-chemical options: Small individual plants can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	400 mL of glyphosate in 600 mL of water	Cut stump application
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Mesquite - *Prosopis species*

Non-chemical options: Blade ploughing and fire on dense infestations. Grazing management and grubbing to prevent reinfestation.

	Chemical and Concentration	Rate	Comments
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 mL in 100 L of water	Controls seedlings, plants in full leaf and flowering before podding. Thoroughly wet all foliage, stems and soil around the base of the plants. Add a wetting agent to increase efficacy. Do not spray plants bearing pods.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 60 L of diesel	Basal bark application of plants up to 5 cm in diameter. Cut stump for plants over 5 cm.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 mL in 100 L of water	Controls seedlings, plants in full leaf and flowering before podding. Thoroughly wet all foliage, stems and soil around the base of the plants. Add a wetting agent to increase efficacy. Do not spray plants bearing pods.

Mexican feather grass - *Nassella tenuissima*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	1.5 to 3 L per ha	Broadacre control
PER9792	Flupropanate 745 g/L Tussock®	100 to 300 mL per 100 L of water	Spot spray control
PER9792	Flupropanate 745 g/L Tussock®	500 mL per 10 L water	Wiper suppression
PER9792	Glyphosate 360 g/L Roundup®	3 L per ha	Broadacre control
PER9792	Glyphosate 360 g/L Roundup®	1 L per 100 L of water	Spot spray
PER9792	Glyphosate 360 g/L Roundup®	3.3 L per 10 L water	Wiper suppression

Mexican poppy - *Argemone mexicana*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	2,4-D LV ester 680g/L Estericide® Xtra	800 mL to 1.15 L per ha	Pastures (non legumes), rights of way and industrial areas.

Miconia - *Miconia* species

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Physical removal gives best results.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate per 1.5 parts water	Cut stump or stem-scraping application.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Mikania vine - *Mikania micrantha*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut, scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves

	Chemical and Concentration	Rate	Comments
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Mimosa - *Mimosa pigra*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection.
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 glyphosate to water + 1 g metsulfuron to 1 L water	Stem injection

Mimosa bush - *Vachellia farnesiana*

Non-chemical options: Small plants can be mechanically removed.

	Chemical and Concentration	Rate	Comments
PER14929	Clopyralid 300 g/L Lontrel®	500 mL in 100 L of water	High volume foliar application. Apply to actively growing plants in full leaf. Add a surfactant.
PER13891	Tebuthiuron 200 g/kg Graslan®	2 g per square metre	Read and follow permit and label instructions thoroughly
	Fluroxypyr 333 g/L Starane™ Advanced	1 L in 55 L of diesel	Basal bark application
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 60 L of diesel	Cut stump/basal bark application.

Ming asparagus fern - *Asparagus macowanii* var. *zuluensis*

Non-chemical options: Mechanically remove rhizomes where possible.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate in 50 parts water	Spot spray application
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate in 1.5 parts water	Cut stump / scrape stem application
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	1 - 2g in 10 L of water, plus a non-ionic surfactant	Spot spray application
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application

Mintweed - *Salvia reflexa*

Non-chemical options: To prevent invasion, maintain a strong, competitive pasture.

	Chemical and Concentration	Rate	Comments
	2,4-D amine 625 g/L Amicide® 625	1.1 L/ha	Boom spray application
	Glyphosate 360 g/L Roundup®	500–700 mL per 100 L of water	High volume spot spray.
	Glyphosate 360 g/L Roundup®	2.0–3.0 L/ha	Boom spray. Apply to actively growing plants.
	MCPA 500 g/L Various products	2.0 L/ha	Boom spray application for actively growing seedlings.

Mirror bush - *Coprosma repens*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Mistflower - *Ageratina riparia*

Non-chemical options: Improved pastures and well-managed grazing will assist control.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL per 100 L of water	Actively growing bushes.
	Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	700mL per 100 L of water	Apply to actively growing plants from October to April.
	Fluroxypyr 200 g/L Starane™	500 mL per 100 L of water	Actively growing seedlings and young bushes before flowering.
	Fluroxypyr 333 g/L Starane™ Advanced	300 mL in 100 L of water	Apply to actively growing seedlings and young plants before flowering
	Glyphosate 360 g/L Roundup®	5 mL per 1 L of water	Actively growing bushes with full foliage.
	Glyphosate 360 g/L Roundup®	1.0 L per 9 L water (3 mL per m ²)	Low volume application.
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	10 g per 100 L of water	Hand gun application.
	Metsulfuron-methyl 600 g/kg Brush-off®	5 g per 100 L of water	Apply when bush is actively growing and before flowering.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 mL in 100 L of water	Foliar application from spring to autumn on actively growing bushes
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 mL per 100 L of water	Spring to autumn on actively growing bushes.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 10 L of water	Gas gun / Splatter gun application. Apply to actively growing bushes.

Monkey's comb - *Pithecoctenium crucigerum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut, scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Montbretia - *Crocasmia x crocosmiiflora*

Non-chemical options: A member of the bulb group of plants. Physical removal will be difficult because of the number of bulblets attached to the main bulb.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1.0 L in 50 L of water	Spray between flowering and fruiting.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate per 1 part water	Weed wand application.

Moonflower - *Ipomoea alba*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER11916	Glyphosate 360 g/L Roundup®	Undiluted	Scrape stem/cut stump: Urban bushland, forests and coastal reserves.
PER11916	Glyphosate 360 g/L Roundup®	1 part product to 50 parts water	Spot spray: Urban bushland, forests and coastal reserves.
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut, scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Morning glory - coastal - *Ipomoea cairica*

Non-chemical options: Small seedlings can be manually removed. Vines and runners can be collected and destroyed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL per 10 L of water	Spot-spray for seedling control.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate per 1.5 parts water	Stem scraping application.
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL glyphosate plus 1.5g of metsulfuron-methyl in 10 L water	Spot spray application
	Dichlorprop 600 g/L Lantana 600®	1 L in 200 L of water	Completely wet all leaves and stem of target plants
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Morning glory - common - *Ipomoea purpurea*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut, scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Morning glory - purple - *Ipomoea indica*

Non-chemical options: Small seedlings can be manually removed. Vines and runners can be collected and destroyed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL per 10 L of water	Spot-spray for seedling control.
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate per 1.5 parts water	Stem scraping application.
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL glyphosate plus 1.5g of metsulfuron-methyl in 10 L water	Spot spray application
	Dichlorprop 600 g/L Lantana 600®	1 L in 200 L of water	Completely wet all leaves and stem of target plants
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Mossman River grass - *Cenchrus echinatus*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	3 L per ha	Selective broadacre control
PER9792	Flupropanate 745 g/L Tussock®	300 mL in 100 L of water	Spot spray
PER9792	Flupropanate 745 g/L Tussock®	500 mL in 10 L of water	Wiper application
PER9792	Glyphosate 360 g/L Roundup®	6 L per ha	Non-selective broadacre control
PER9792	Glyphosate 360 g/L Roundup®	1 L in 100 L of water	Spot spray
PER9792	Glyphosate 360 g/L Roundup®	3.3 L in 10 L of water	Wiper application

Moth vine - *Araujia sericifera*

Non-chemical options: Physical removal of young plants; bag and remove any fruit.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL per 10 L of water	Treat seedling plants.
PER9907	Glyphosate 360 g/L Roundup®	1 part per 1.5 parts of water	Stem cut, scrape and paint application
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	2 L glyphosate plus 15g metsulfuron-methyl in 100L water	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10–20g per 100L of water	Spot spray
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II ®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .

Mother-of-millions - *Bryophyllum* species

Non-chemical options: For best results maintain strong pasture competition.

	Chemical and Concentration	Rate	Comments
PER14877	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	10 g metsulfuron-methyl plus 200 mL glyphosate in 100 L of water	Apply just prior to flowering, add a surfactant.
	2,4-D 300 g/L Affray 300®	70 mL in 10 L of water	Thorough even coverage of leaves
	2,4-D amine 625 g/L Amicide® 625	400 mL per 100 L of water	Thorough, even coverage of leaves and plantlets is necessary. Add a wetting agent.
	Fluroxypyr 200 g/L Starane™	600 mL per 100 L of water	Actively growing seedlings and young plants before flowering.
	Fluroxypyr 333 g/L Starane™ Advanced	360 mL in 100 L of water	Apply to actively growing seedlings and young plants before flowering
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL in 100 L of water	Apply at flowering, add a surfactant.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Apply at flowering, add a surfactant.

Murraya - *Murraya paniculata*

Non-chemical options: Seedlings may be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL per 10 L of water	Foliar application for seedlings/ coppice shoots.
PER9907	Glyphosate 360 g/L Roundup®	1 part per 1.5 parts of water	Stem injection / cut stump application, saplings to large shrubs.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Mysore thorn - *Caesalpinia decapetala*

Non-chemical options: Physical removal of small seedling plants.

	Chemical and Concentration	Rate	Comments
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g per 100 L of water	Hand gun application.
	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Spray to thoroughly wet all foliage, but not to cause run off. Apply to actively growing plants before flowering. Add wetting agent.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Nodding thistle - *Carduus nutans* subsp. *nutans*

Non-chemical options: Good perennial pastures with sound grazing management.

	Chemical and Concentration	Rate	Comments
	2,4-D LV ester 680g/L Estericide® Xtra	1.15 to 17 L per hectare	Boom spray application, rosette to preflowering
	Clopyralid 300 g/L Lontrel®	250 mL per 100 L of water	Spray at rosette to pre-flowering.
	Clopyralid 300 g/L with MCPA 500 g/L Various products	50-70 mL clopyralid plus 1.0–1.5 L MCPA /ha	Boom spray. Spray at rosette to pre-flowering.
	Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL in 100 L of water	Hand gun application
	MCPA 500 g/L Various products	250 mL per 150 L of water	Spot spray application
	MCPA 500 g/L Various products	2.5 L/ha	Boom spray application, at early rosette stage, re-treatment is required.

Noogoora burr - *Xanthium occidentale*

Non-chemical options: Noogoora burr in the seedling form is toxic to livestock. Hoeing, chipping or slashing will give control.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	1.0 L/ha	Boom spray application
	2,4-D amine 625 g/L Amicide® 625	800 mL–1.1 L/ha	Seedlings only.
	2,4-D LV ester 680g/L Estericide® Xtra	1.7 to 3.3 L per hectare	Boom spray application from seedlings to preflowering
	Fluroxypyr 200 g/L Starane™	75 mL per 100 L of water	Apply to actively growing plants. Seedlings and young plants to 40 cm high.

	Chemical and Concentration	Rate	Comments
	Fluroxypyr 333 g/L Starane™ Advanced	45 mL in 100 L of water	Apply to actively growing plants. Seedlings and young plants to 40 cm high.
	MCPA 500 g/L Various products	1.0–2.0 L/ha	Spray young seedlings only.
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	14 g per 100 L of water	Hand gun application.
	Metsulfuron-methyl 600 g/kg Brush-off®	7.5 g per 100 L of water	Apply to actively growing plants. Do not apply to plants under stress.

Ochna - *Ochna serrulata*

Non-chemical options: Small seedlings can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL glyphosate per 10 L of water	Spot spray. Apply to seedlings/ coppice shoots and shrubs.
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL glyphosate plus 1.5g metsulfuron-methyl per 10 L of water	Spot spray application.
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	1 part glyphosate per 1.5 parts of water	Scrape stem, cut, and paint. Cut stump saplings. Stem injection large trees and shrubs.
	Fluroxypyr 333 g/L Starane™ Advanced	600 mL in 100 L of water	Spot spray, Apply to plants up to 2 m tall
	Fluroxypyr 333 g/L Starane™ Advanced	300 mL per 10 L of water	Gas gun application to plants up to 1 m.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .

Oleander - *Nerium oleander*

Non-chemical options: Manually remove plants with care, as all parts are highly toxic to both humans and livestock.

	Chemical and Concentration	Rate	Comments
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 60 L of diesel	Basal bark application plants up to 5 cm basal diameter. Cut stump application plants over 5 cm.

Onion weed - *Asphodelus fistulosus*

Non-chemical options: Good pasture management will combat invasion by onion weed.

	Chemical and Concentration	Rate	Comments
	Amitrole 250 g/L + Ammonium thiocyanate 220 g/L Various products	1.1 L per 100 L of water	Active growth before flowering. Repeat treatments will be required.

Ox-eye daisy - *Leucanthemum vulgare*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Dicamba 500 g/L Kamba® 500	8.8 L per ha	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	600 mL in 100 L of water	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	130 mL in 15 L of water	Non-crop situation: Spray prior to flowering

Palm grass - *Setaria palmifolia*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	3 L per ha	Selective broadacre control
PER9792	Flupropanate 745 g/L Tussock®	300 mL in 100 L of water	Spot spray
PER9792	Flupropanate 745 g/L Tussock®	500 mL in 10 L of water	Wiper application
PER9792	Glyphosate 360 g/L Roundup®	6 L per ha	Non-selective broadacre control
PER9792	Glyphosate 360 g/L Roundup®	1 L in 100 L of water	Spot spray
PER9792	Glyphosate 360 g/L Roundup®	3.3 L in 10 L of water	Wiper application

Pampas grass - *Cortaderia species*

Non-chemical options: Mechanical removal, wherever possible, is best.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	1.0 or 1.3 L per 100 L of water	Actively growing plants, before flowering, spring to autumn. Use higher rate on plants over 1 m high.

Pampas lily of the valley - *Salpichroa organifolia*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Paper mulberry - *Broussonetia papyrifera*

Non-chemical options: Small individual plants can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	400 mL of glyphosate in 600 mL of water	Cut stump application
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply a 5 mm layer on stems above 20 mm.

Parkinsonia - *Parkinsonia aculeata*

Non-chemical options: Mechanical removal or grubbing gives effective control.

	Chemical and Concentration	Rate	Comments
	Hexazinone 250 g/L Velpar® L	4 mL per spot	One spot per bush up to 5 m tall.
	Hexazinone 250 g/L Velpar® L	1 mL per spot	One spot per bush up to 1 m tall. Do not use near desirable plants.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 60 L of diesel	Basal bark or cut stump application.

Parrot's feather - *Myriophyllum aquaticum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Dichlobenil 40 g/kg Casoron 4G Herbicide	2.9 to 3.9 kg per 10m ²	Exposed soil. DO NOT apply to water which will be used for crop irrigation, for livestock watering, or for human consumption.
	Dichlobenil 40 g/kg Casoron 4G Herbicide	287 to 388 kg per ha or 2.87 to 3.88 kg per 100m ²	Water less than 1m deep. Apply when weeds are dormant. DO NOT apply to water which will be used for crop irrigation, for livestock watering, or for human consumption.
	Dichlobenil 40 g/kg Casoron 4G Herbicide	388 to 574 kg per ha or 3.88 to 5.74 kg per 100m ²	Water more than 1 m deep. Apply when weeds are dormant. DO NOT apply to water which will be used for crop irrigation, for livestock watering, or for human consumption.

Parthenium weed - *Parthenium hysterophorus*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Clean all vehicles and machinery. Maintain competitive crops and pastures. Do not spread the seed if removing by hand.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	125 mL per 100 L of water	Spot spray. Rosette stage when plants are actively growing.
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	3.0 L/ha	Boom application.
	Atrazine 900 g/kg Various products	3.3 L/ha	Protects against emerging seedlings.
	Dicamba 500 g/L Kamba® 500	40 mL per 100 L of water	Spot spray.
	Dicamba 500 g/L Kamba® 500	600 mL/ha	Boom spray. Apply to young, actively growing plants.

Chemical and Concentration	Rate	Comments
Hexazinone 250 g/L Velpar® L	70 mL per 100 L of water	Apply uniformly over the area. When spraying single plants treat soil for 1 m around. Do not use near desirable trees.
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	10 g per 100 L of water	Hand gun application.
Metsulfuron-methyl 600 g/kg Brush-off®	5 g per 100 L of water	Thoroughly wet all foliage to the point of run-off.

Paterson's curse - *Echium plantagineum*

Non-chemical options: Control can be achieved by using spray graze, pasture improvement and good grazing management practices and by the use of biological control agents.

Chemical and Concentration	Rate	Comments
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	150 mL in 100 L of water	Spot spray. Rosettes to pre-flowering.
2,4-D amine 625 g/L Amicide® 625	170–220 mL in 150 L of water	Spot spray. Young rosettes.
2,4-D amine 625 g/L Amicide® 625	1.7–2.2 L/ha	Boom spray.
Dicamba 500 g/L Kamba® 500	280 mL per 100 l of water.	Spot spray.
Dicamba 500 g/L Kamba® 500	4.0 L/ha	Boom spray. Apply prior to flowering. Add wetting agent.
Glyphosate 360 g/L Roundup®	500–700 mL in 100 L of water	Spot spray. Actively growing plants.
Glyphosate 360 g/L Roundup®	2.0–3.0 L/ha	Boom application
MCPA 500 g/L Various products	1.0–1.5 L/ha	Apply at early rosette stage
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	10 g per 100 L of water	Hand gun application.
Metsulfuron-methyl 600 g/kg Brush-off®	5 g in 100 L of water	Apply to rosettes after full leaf expansion but before head emergence. Do not spray after emergence of first flowers, as seed set has occurred.
Metsulfuron-methyl 600 g/kg Brush-off®	15 g/ha	Apply to rosettes after full leaf expansion but before head emergence. Do not spray after emergence of first flowers, as seed set has occurred.
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	250 mL in 100 L of water	Spot spray from rosette to flowering plants

Pellitory - *Parietaria judaica*

Non-chemical options: Hand removal before flowering. Flowering plants can cause respiratory problems in humans.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	1.0 L in 100 L of water	Apply to actively growing plants before flowering. Re-treatments may be required to control seedlings.

Peppercorn - *Schinus species*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray

Perennial ground cherry - *Physalis longifolia*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Dicamba 500 g/L Kamba® 500	8.8 L per ha	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	600 mL in 100 L of water	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	130 mL in 15 L of water	Non-crop situation: Spray prior to flowering

Perennial ragweed - *Ambrosia psilostachya*

Non-chemical options: Physical removal is not totally effective because of the root system.

	Chemical and Concentration	Rate	Comments
	Dicamba 500 g/L Kamba® 500	600 mL in 100 L of water	Spot spray. Active growth, small rosettes.
	Dicamba 500 g/L Kamba® 500	8.8 L/ha	Boom application.

Perennial thistle - *Cirsium arvense*

Non-chemical options: Cultivation is ineffective in controlling this plant because of the perennial root system.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL per 100 L of water	Spot spray. Spray at budding stage.
	2,4-D amine 625 g/L Amicide® 625	320–380 mL per 100 L of water	Spot spray.
	2,4-D amine 625 g/L Amicide® 625	3.2–3.8 L/ha	Boom spray. Rosettes to early budding stage.
	Dicamba 500 g/L Kamba® 500	280 mL per 100 L of water	Spot spray. Young, actively growing plants.
	Dicamba 500 g/L Kamba® 500	4 L/ha	Boom spray.
	Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL in 100 L of water	Hand gun application.

Pond apple - *Annona glabra*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray. Do not treat plants growing in a body of water.
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray. Do not treat plants growing in a body of water.
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves. Do not treat plants growing in a body of water.
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray. Do not treat plants growing in a body of water.
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves
	Fluroxypyr 333 g/L Starane™ Advanced	900 mL per 100 L of diesel	Basal bark: Plants up to 20 cm basal diameter. Do not treat plants growing in a body of water.

Prairie ground cherry - *Physalis hederifolia*

Non-chemical options: Cultivation is ineffective because of the perennial root system.

	Chemical and Concentration	Rate	Comments
	Amitrole 250 g/L + Ammonium thiocyanate 220 g/L Various products	1.1 L in 100 L of water	Spot spray. Active growth before flowering.
	Dicamba 500 g/L Kamba® 500	4 L per ha	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	280 mL in 100 L of water	Non-crop situation: Spray prior to flowering
	Dicamba 500 g/L Kamba® 500	60 mL in 15 L of water	Non-crop situation: Spray prior to flowering

Praxelis - *Praxelis clematidea*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Prickly acacia - *Vachellia nilotica*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Mechanical or chain removal in both directions.

Chemical and Concentration	Rate	Comments
Fluroxypyr 333 g/L Starane™ Advanced	450 mL in 100 L of water	Spot spray, seedlings and young plants up to 2 m tall
Fluroxypyr 333 g/L Starane™ Advanced	900 mL per 100 L of diesel	Basal bark cut stump application
Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II ®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 60 L of diesel	Basal bark/cut stump application.
Triclopyr 600 g/L Garlon® 600	1.0 L in 120 L of diesel	Basal bark/cut stump application.

Privet - broad-leaf - *Ligustrum lucidum*

Non-chemical options: Small plants and seedlings can be manually controlled.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	Undiluted (1–2 mL per cut)	Stem injection technique, as per label.
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g per 100 L of water	Hand gun application.
Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Apply to bushes up to 3 m high; complete coverage is essential.
Metsulfuron-methyl 600 g/kg Brush-off®	1 g/L + organosilicone penetrant	Gas gun / Splatter gun application. Apply only to bushes up to 3 m high when in full leaf and actively growing. Thorough coverage is essential.
Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II ®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 30 L of diesel	Basal bark/cut stump application.
Triclopyr 600 g/L Garlon® 600	1.0 L per 12 L of diesel	Basal bark/cut stump application.

Privet - European - *Ligustrum vulgare*

Non-chemical options: Small plants and seedlings can be manually controlled.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	Undiluted (1–2 mL per cut)	Stem injection technique, as per label.
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g per 100 L of water	Hand gun application.
Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Apply to bushes up to 3 m high; complete coverage is essential.
Metsulfuron-methyl 600 g/kg Brush-off®	1 g/L + organosilicone penetrant	Gas gun / Splatter gun application. Apply only to bushes up to 3 m high when in full leaf and actively growing. Thorough coverage is essential.
Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II ®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 30 L of diesel	Basal bark/cut stump application.
Triclopyr 600 g/L Garlon® 600	1.0 L per 12 L of diesel	Basal bark/cut stump application.

Privet - narrow-leaf - *Ligustrum sinense*

Non-chemical options: Small plants and seedlings can be manually controlled.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	Undiluted (1–2 mL per cut)	Stem injection technique, as per label.
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20 g per 100 L of water	Hand gun application.
Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Apply to bushes up to 3 m high; complete coverage is essential.
Metsulfuron-methyl 600 g/kg Brush-off®	1 g/L + organosilicone penetrant	Gas gun / Splatter gun application. Apply only to bushes up to 3 m high when in full leaf and actively growing. Thorough coverage is essential.
Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 30 L of diesel	Basal bark/cut stump application.
Triclopyr 600 g/L Garlon® 600	1.0 L per 12 L of diesel	Basal bark/cut stump application.

Ragwort - *Senecio jacobaea*

Non-chemical options: Physically remove individual plants.

Chemical and Concentration	Rate	Comments
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	300 mL per 100 L of water	Spot spray application.
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	3.5 L/ha	Boom application, rosettes to cabbage stage.
Dicamba 500 g/L Kamba® 500	280 mL per 100 L of water	Spot spray application.
Dicamba 500 g/L Kamba® 500	4.0 L/ha	Boom application, actively growing rosettes.
MCPA 340 g/L + Dicamba 80 g/L Kamba® M	190–270 mL per 100 L of water	Spot spray.
MCPA 340 g/L + Dicamba 80 g/L Kamba® M	2.8–4.0 L/ha	Boom spray. Apply at the young growth stage.
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	10 g per 100 L of water	Hand gun application.
Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	10g per 100 L water	Handgun application
Metsulfuron-methyl 600 g/kg Brush-off®	5 g per 100 L of water	Spot spray application.
Metsulfuron-methyl 600 g/kg Brush-off®	15 g/ha	Boom application, actively growing rosettes to cabbage stage.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 or 500 mL per 100 L of water	Spot spray. Apply to actively growing plants.

Rattlepod - *Crotalaria lunata*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Red ludwigia - *Ludwigia repens*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun

Red rice - *Oryza rufipogon*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun

Rhizomatous bamboo - *Phyllostachys* species

Non-chemical options: Physical removal will give best results.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL per 10 L of water	Spot spray application.
PER9907	Glyphosate 360 g/L Roundup®	1 part per 1.5 parts of water	Cut stump application.

Rhus tree - *Toxicodendron succedaneum*

Non-chemical options: When manually removing this tree avoid contact with the sap. Do not mulch or chip for garden use.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	Undiluted (1–2 mL per cut)	Stem injection technique, as per label.
	Glyphosate 360 g/L Roundup®	1 part glyphosate to 1 part water	Cut stump application.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Rice paper plant - *Tetrapanax papyrifer*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut scrape and paint
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Rope pear - *Cylindropuntia imbricata*

Non-chemical options: Small plants can be carefully mechanically removed.

	Chemical and Concentration	Rate	Comments
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL per 100 L of water	Spot spray application, add 0.5 % Uptake spray oil.
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Spot spray application, add 0.5 % Uptake spray oil.
PER14442	Triclopyr 600 g/L Garlon® 600	1 L per 75 L of diesel	Spot spray application.
PER14442	Triclopyr 600 g/L Garlon® 600	3 L per 100 L of water	Add 0.5% Uptake® spray oil.

Rosewood - *Tipuana tipu*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 glyphosate to water + 1 g metsulfuron to 1 L water	Stem injection

Rubber vine - *Cryptostegia grandiflora*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Seedling plants may be manually removed.

	Chemical and Concentration	Rate	Comments
	Metsulfuron-methyl 600 g/kg Brush-off®	15 g per 100 L of water	Hand gun application. Do not apply to bushes more than 3 m tall. Apply October to April, ensuring thorough spray coverage of all foliage.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 or 500 mL in 100 L of water	Hand gun application
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 60 L of diesel	Basal bark and cut stump application.
	Triclopyr 600 g/L Garlon® 600	1.0 L per 60 L of diesel	Basal bark and cut stump application.

Saffron thistle - *Carthamus lanatus*

Non-chemical options: Control can be enhanced by slashing or pasture improvement.

Chemical and Concentration	Rate	Comments
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	300 mL/ha	Boom spray application for young rosette or seedling plants.
2,4-D amine 625 g/L Amicide® 625	110–170 mL per 150 L of water	Spot spray application.
2,4-D amine 625 g/L Amicide® 625	1.1–1.7 L/ha	Boom application, apply when in rosette stage.
2,4-D LV ester 680g/L Estercide® Xtra	800 mL to 2.5 L per ha	Boom spray application up to rosette stage
Clopyralid 300 g/L Lontrel®	250 mL per 100 L water	Spot spray.
Clopyralid 300 g/L with MCPA 500 g/L Various products	50–70 mL clopyralid plus 1.0–1.5 L MCPA per ha	Boom spray. Actively growing rosettes; use higher rate on mature plants.
Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL in 100 L water	Hand gun application on actively growing plants
MCPA 500 g/L Various products	100–200 mL in 150 L water	Spot spray.
MCPA 500 g/L Various products	1–2 L/ha	Boom spray. Apply when in rosette stage. Use higher rate for larger weeds.

Sagittaria - *Sagittaria platyphylla*

Non-chemical options: Isolated plants can be manually removed.

Chemical and Concentration	Rate	Comments
PER11856 Glyphosate 360 g/L Only products registered for aquatic use	10 L per 100 L of water	Spot spray application. Direct spray onto weed mats in infested areas. Do not broadcast spray over the water.
PER14549 Glyphosate 360 g/L Only products registered for aquatic use	10 L per 100 L of water	Spot spray application. Direct spray onto weed mats in infested areas. Do not broadcast spray over the water.

Salvinia - *Salvinia molesta*

Non-chemical options: Physical removal of small infestations, the use of biological control agents where appropriate, and reduction of nutrient inflows will all help with control.

Chemical and Concentration	Rate	Comments
PER83083 Carfentrazone-ethyl 240 g/L Shark™ Aquatic Herbicide	933 mL of product per ha	DO NOT apply more than two (2) applications per year with a minimum re-treatment interval of 90 days between consecutive treatments.
PER14327 Glyphosate 360 g/L Only products registered for aquatic use	1 L in 100 L of water	Hand gun application, follow directions on the permit
PER84767 Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L (plus wetter at 200 mL per 100 L)	May only be applied in enclosed water bodies, and not within 400 m of potable water supply uptakes. WARNING: very toxic to aquatic plants and algae. Apply a maximum of 3 applications per year at minimum intervals of 90 days.
Diquat 200 g/L Reglone®	400 mL per 100 L of water	Spot spray to wet all foliage thoroughly, add Agral 600. Observe withholding period.
Diquat 200 g/L Reglone®	5.0–10.0 L/ha	Boom spray to wet all foliage thoroughly, add Agral 600. Observe withholding period.
Orange oil 55.2 g/kg Water Clear®	1.0 L per 100 L of water	Spray on to free-floating plants.

Scotch broom - *Cytisus scoparius* subsp. *scoparius*

Non-chemical options: The use of goats as a grazing management tool or the use of biological control agents offers other means of control.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	100–130 mL per 10 L of water	Foliar spot spray application.
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	250 or 350 mL in 100 L of water	Lower rate when actively growing mid-summer to pod formation. Higher rate for autumn-winter treatment.
Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	250 or 350 mL per 100 L of water	Lower rate when actively growing mid-summer to pod formation. Higher rate for autumn-winter treatment.
Triclopyr 600 g/L Garlon® 600	170 mL per 100 L of water	Late spring to early autumn. Actively growing bushes.

Scotch thistle - *Onopordum acanthium*

Non-chemical options: Establish a strong, perennial, grass-based pasture. Grub single plants, removing at least 50 mm of root. There are also biological control agents available.

Chemical and Concentration	Rate	Comments
Clopyralid 300 g/L Lontrel®	250 mL in 100 L of water	Handgun application
Dicamba 500 g/L Kamba® 500	80 mL in 100 L of water	Handgun application

Sea spurge - *Euphorbia paralias*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
PER9907 Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907 Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907 Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray

Seeded banana - *Musa* species

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

Chemical and Concentration	Rate	Comments
PER9907 Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907 Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907 Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907 Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907 Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907 Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907 Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Senegal tea plant - *Gymnocoronis spilanthoides*

Non-chemical options: Do not attempt control on your own, as it can spread very easily from dislodged fragments.

	Chemical and Concentration	Rate	Comments
PER14729	Glyphosate 360 g/L Only products registered for aquatic use	1 L per 100 L of water	Refer to permit for critical use comments
PER14729	Metsulfuron-methyl 600 g/kg Brush-off®	5–10 g per 100 L of water	Spot spray application. Do not spray directly onto water or non-target species.

Serrated tussock - *Nassella trichotoma*

Non-chemical options: The establishment of perennial pasture together with good grazing management will assist control. Grub out single plants.

	Chemical and Concentration	Rate	Comments
PER9792	Glyphosate 360 g/L Roundup®	1 L per 2 L of water	Wick wiping application.
	Flupropanate 745 g/L Tussock®	1.5–2.0 L/ha	Boom and aerial application. June to August inclusive. Four-month withholding period for blanket application.
	Flupropanate 745 g/L Tussock®	100–200 mL per 100 L of water	Spot spray from September to May. Four month withholding period for blanket application.
	Glyphosate 360 g/L Roundup®	0.7–1.3 L to 100 L of water	Spot spray application.
	Glyphosate 360 g/L Roundup®	4.0–6.0 L/ha	Boom spray. Apply to actively growing, stress-free plants.
	Glyphosate 360 g/L Roundup®	0.75–1.25 L/ha	Spray topping application. Apply to actively growing, stress-free plants.

Shoebutt ardisia - *Ardisia elliptica*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Siam weed - *Chromolaena odorata*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Mechanical removal of isolated plants.

	Chemical and Concentration	Rate	Comments
	Fluroxypyr 333 g/L Starane™ Advanced	210 ml in 100L of water	Handgun application
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .

Sicilian sea lavender - *Limonium hyblaenum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Sicklethorn - *Asparagus falcatus*

Non-chemical options: Mechanically remove rhizomes where possible.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate in 50 parts water	Spot spray application
PER9907	Glyphosate 360 g/L Roundup®	1 part glyphosate in 1.5 parts water	Cut stump /scrape stem application
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	1 - 2g in 10 L of water, plus a non-ionic surfactant	Spot spray application
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application

Sifton bush - *Cassinia sifton*

Non-chemical options: Slashing, physical removal and chaining will aid control. Soil disturbance adds to the spread of sifton bush.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	1.0 or 1.3 L in 100 L of water	Apply when actively growing. Ensure complete coverage; use higher rate on bushes over 1 m high.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL in 100 L of water	Foliar application, plants need to be actively growing for optimal effect
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL in 100 L of water	Bushes need to be actively growing for optimum effect.

Silk forage sorghum - *Sorghum* species hybrid cultivar "Silk"

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Silverleaf nightshade - *Solanum elaeagnifolium*

Non-chemical options: The use of strong, competitive crops or pastures will give some control. Quarantine the infestation and prevent seeding. Cultivation is ineffective as it aids the spread from root pieces. Sheep can carry the seed in their digestive tract for periods of 7 days or more without affecting the germination capability.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL in 100 L of water	Spot spray. Spray to wet thoroughly. Extend treated areas beyond the last plant for 1 m.
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	15.0 L/ha	Boom spray. Apply at early flowering before berry set.
	Fluroxypyr 333 g/L Starane™ Advanced	300 mL in 100 L of water	Delay applications till majority of shoots have emerged. Follow-up treatment will be required
	Glyphosate 360 g/L Roundup®	2.0 L in 100 L of water	Apply at early flowering to berry set stage, spray thoroughly to wet. Use only with good soil moisture conditions.

Singapore daisy - *Sphagneticola trilobata*

Non-chemical options: Small infestations can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL glyphosate plus 1.5 g metsulfuron-methyl per 10 L water	Spot spray application.
	Glyphosate 360 g/L Roundup®	200 mL per 10 L of water	Spot spray. Foliar application.

Siratro - *Macroptilium atropurpureum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER11916	Glyphosate 360 g/L Roundup®	1 part product to 100 parts water	Spot spray: Urban bushland, forests and coastal reserves.
PER11916	Glyphosate 360 g/L Roundup®	1 part product to 1.5 parts water	Scrape stems: Urban bushland, forests and coastal reserves.
	Glufosinate-ammonium 200 g/L Basta®	1 to 3L per Ha	Boom or directed sprayer. Commercial and industrial areas, rights of way and non-agricultural areas.
	Glufosinate-ammonium 200 g/L Basta®	300 mL to 100 L of water	Hand gun application. Commercial and industrial areas, rights of way and non-agricultural areas.
	Glufosinate-ammonium 200 g/L Basta®	45 mL to 15 L of water	Knapsack application. Commercial and industrial areas, rights of way and non-agricultural areas.

Skunk vine - *Paederia foetida*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut scrape and paint

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Smooth tree pear - *Opuntia monacantha*

Non-chemical options: The use of Cochineal and Cactoblastis biological control agents suited to the variety of pear is the best management practice, where appropriate.

	Chemical and Concentration	Rate	Comments
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL in 100 L of water	Apply as a thorough foliar spray
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Common pear and smooth tree pear, with active phyllode (leaf) growth.
PER14442	Triclopyr 600 g/L Garlon® 600	1.0 L per 75 L of distillate	Apply thoroughly as a foliar spray.

Smooth-stemmed turnip - *Brassica barrelieri* subsp. *oxyrrhina*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Snakefeather - *Asparagus scandens*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Soldier thistle - *Picnomon acarna*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

South American burr - *Xanthium cavanillesii*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Spanish broom - *Spartium junceum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Spanish heath - *Erica lusitanica*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Spear thistle - *Cirsium vulgare*

Non-chemical options: Hoe or chip to remove small infestations.

Chemical and Concentration	Rate	Comments
2,4-D amine 625 g/L Amicide® 625	1.1–1.6 L/ha	Boom spray. For pastures not containing legumes. Spray young rosettes.
2,4-D LV ester 680g/L Estericide® Xtra	1.15 to 2.1 L per hectare	Boom spray application, from seedling to rosette stage
Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL in 100 L of water	Hand gun application to actively growing plants
MCPA 500 g/L Various products	1.5–2.0 L/ha	Boom spray. Apply to rosettes actively growing; use higher rate on larger plants.
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	150 mL in 100 L of water	Foliar application from rosette to flowering plants

Spiny burrgrass - *longispinus* - *Cenchrus longispinus*

Non-chemical options: A strong, competitive summer pasture will give assist with effective control. Ensure equipment hygiene is used to prevent seed dispersal and also quarantine the infestation.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	500–700 mL in 100 L of water	High volume spot spray. Apply to actively growing plants before seeding. Glyphosate is non-selective. Apply in non-crop areas and roadsides.
Glyphosate 360 g/L Roundup®	2.0–3.0 L/ha	Boom spray. Apply to actively growing plants before seeding. Glyphosate is non-selective. Apply in non-crop areas and roadsides.
MSMA 720 g/L Armada 720 SL	1.0 L in 100 L of water	Spot spray application. Do not cut or graze effected area for 5 weeks.

Spiny burrgrass - *spinifex* - *Cenchrus spinifex*

Non-chemical options: A strong, competitive summer pasture will give assist with effective control. Ensure equipment hygiene is used to prevent seed dispersal and also quarantine the infestation.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	500–700 mL in 100 L of water	High volume spot spray. Apply to actively growing plants before seeding. Glyphosate is non-selective. Apply in non-crop areas and roadsides.
Glyphosate 360 g/L Roundup®	2.0–3.0 L/ha	Boom spray. Apply to actively growing plants before seeding. Glyphosate is non-selective. Apply in non-crop areas and roadsides.
MSMA 720 g/L Armada 720 SL	1.0 L in 100 L of water	Spot spray application. Do not cut or graze effected area for 5 weeks.

Spiny emex - *Emex australis*

Non-chemical options: An autumn/winter growing plant mainly associated with winter crops; dig out single plants or encourage a dense, winter-based pasture for competition.

Chemical and Concentration	Rate	Comments
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	300 mL per 100 L of water	Spot spray. For use in grass pastures.
Glyphosate 360 g/L Roundup®	500–700 mL per 100 L of water	Spot spray.
Glyphosate 360 g/L Roundup®	2.0–3.0 L/ha	Boom spray. Young, actively growing plants.

Spongeplant - *Limnobium spongia*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
	Diquat 200 g/L Reglone®	5 L of product per megalitre of water	Apply by injection below the surface or as a surface spray.

Spotted golden thistle - *Scolymus maculatus*

Non-chemical options: Encourage a dense, improved pasture.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	300 mL in 100 L of water	Spot spray.
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	3.5 L/ha	Boom spray. Apply to seedling and rosette stages.
	Dicamba 500 g/L Kamba® 500	80 mL in 100 L of water	Hand gun application
	Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL in 100 L of water	Hand gun application

Spotted knapweed - *Centaurea stoebe* subsp. *micranthos*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

St. Barnaby's thistle - *Centaurea solstitialis*

Non-chemical options: Encourage strong, legume-based pasture to provide competition. Slashing, if timed right, is effective.

	Chemical and Concentration	Rate	Comments
	2,4-D LV ester 680g/L Estericide® Xtra	1.15 - 1.7 L per Hectare	Boom spray application
	Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL in 100 L of water	Hand gun application
	Glufosinate-ammonium 200 g/L Basta®	500 mL in 100 L of water	Hand gun application
	Glufosinate-ammonium 200 g/L Basta®	1.5–5.0 L/ha	Boom spray. Actively growing rosettes.

St. John's wort - *Hypericum perforatum*

Non-chemical options: The use of perennial pastures and grazing management, together with the use of biological control agents, will offer some control.

	Chemical and Concentration	Rate	Comments
	2,4-D LV ester 680g/L Estericide® Xtra	3.3–4.7 L/ha	For use in grass pastures, before flowering, when the plants are less than 40 cm high.
	Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	700 mL in 100 L of water	Foliar application from flowering to early seed set
	Fluroxypyr 200 g/L Starane™	500 mL in 100 L of water	Spring to mid summer application.

Chemical and Concentration	Rate	Comments
Fluroxypyr 200 g/L Starane™	3.0 L/ha	Boom application. Observe withholding period.
Fluroxypyr 333 g/L Starane™ Advanced	300 mL in 100 L of water	Foliar application from flowering to early seed set. Observe withholding period.
Glyphosate 360 g/L Roundup®	3.0 L/ha	Apply November to May, flowering to post-flowering.
Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	200 mL glyphosate plus 10g metsulfuron-methyl in 100 L of water	Spray to wet, but not to cause run-off.
Glyphosate 835 g/kg + Metsulfuron-methyl 10 g/kg Trounce®	1 measured pack (173 g) in 100 L of water	Actively growing from spring to summer.
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL in 100 L of water	Foliar application from late spring to early summer, during flowering to early seed set
Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	2.0–4.0 L/ha	Boom spray
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL in 100 L of water	Late spring to early summer, during flowering to early seed set.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	2.0–4.0 L/ha	Boom spray.
Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 10 L of water	Gas gun / Splatter gun application. Apply to actively growing bushes.

Star thistle - *Centaurea calcitrapa*

Non-chemical options: Hoe or chip, removing at least 50 mm of the root; improve the pasture stand.

Chemical and Concentration	Rate	Comments
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	300–500 mL in 100 L of water	Spot spray. Seedling to rosette stage. Use higher rate on older rosettes.
2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	3.5–7.5 L/ha	Boom spray application. Use higher rate on older rosettes.
2,4-D LV ester 680g/L Estericide® Xtra	1.15 to 1.7 L per hectare	Boom spray application, seedling to rosette stage
Dicamba 500 g/L Kamba® 500	100 mL in 100 L of water	Spot spray. Seedlings to young, mature rosettes.
Dicamba 500 g/L Kamba® 500	1.6 L/ha	Boom application.
Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL in 100 L of water	Hand gun application

Stemless thistle - *Onopordum acaulon*

Non-chemical options: Establish a strong, perennial, grass-based pasture. Grub single plants, removing 50 mm of root. There are also biological control agents available.

Chemical and Concentration	Rate	Comments
2,4-D LV ester 680g/L Estericide® Xtra	2.5 to 3.3 L per hectare	Boom spray application rosette stage to flowering
Dicamba 500 g/L Kamba® 500	80 mL in 100 L of water	Spot spray. Seedlings to young mature plants; use lower rate on seedlings and higher rate on young, mature plants.
Dicamba 500 g/L Kamba® 500	1.2 L/ha	Boom application.
Fluroxypyr 140 g/L + Aminopyralid 10 g/L Hot Shot™	500 mL in 100 L of water	Hand gun application

Subterranean cape sedge - *Trianoptiles solitaria*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves

Sweet briar - *Rosa rubiginosa*

Non-chemical options: The use of mechanical removal, grubbing or grazing with goats gives control.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL in 100 L of water	Full leaf as an overall spray.
	Glyphosate 360 g/L Roundup®	1.5–2.0 L in 100 L of water	Spray to wet all foliage, from late flowering to leaf fall. Use higher rate on bushes over 1.5 m high.
	Glyphosate 360 g/L Roundup®	1 part per 9 parts water	Gas gun / Splatter gun application. Apply 2 by 5 mL doses per 0.5 m of bush height.
	Glyphosate 835 g/kg + Metsulfuron-methyl 10 g/kg Trounce®	1 measured pack (173 g) in 100 L of water	Apply as close to the flowering period as possible.
	Hexazinone 250 g/L Velpar® L	Undiluted (4 mL per spot)	One spot per metre of height. Do not apply near desirable trees.
	Metsulfuron-methyl 300 g/kg + Aminopyralid 375 g/kg Stinger™	20g in 100 L of water	Hand gun application
	Metsulfuron-methyl 600 g/kg Brush-off®	10 g in 100 L of water	Apply to actively growing bushes to point of run. Do not apply after end of February.
	Metsulfuron-methyl 600 g/kg Brush-off®	1 g/L + organosilicone penetrant	Gas gun / Splatter gun application. Apply during the flowering period. Ensure thorough coverage of all leaves and stems.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 or 500 mL in 100 L of water	Foliar application for plants up 1.5m tall
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 60 L of diesel	Basal bark/cut stump application.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	500 mL per 10 L of water	Gas gun / Splatter gun application. Apply to actively growing bushes.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 or 500 mL in 100 L of water	Full-leaf to ripe fruit prior to leaf fall. Use higher rate on bushes over 1.5 m high.
	Triclopyr 600 g/L Garlon® 600	1.0 L in 30 L of diesel	Basal bark/cut stump application

Sweet pittosporum - *Pittosporum undulatum*

Non-chemical options: Physical removal is best.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL in 10 L of water	Foliar seedling treatment.
PER9907	Glyphosate 360 g/L Roundup®	1 part per 1.5 parts of water	Cut stump/basal bark application.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.

Taiwan lily - *Lilium formosanum*

Non-chemical options: Physical removal will be difficult because of bulb-like underground parts of the plant.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	2 L glyphosate plus 15 g metsulfuron-methyl per 100 L of water	Spot spray application between flowering and fruiting.
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10-20 g metsulfuron-methyl in 100 L of water plus surfactant	Spot spray application between flowering and fruiting.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel across the cut surface on the rhizome.

Taurian thistle - *Onopordum tauricum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Texas blueweed - *Helianthus ciliaris*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Tiger pear - *Opuntia aurantiaca*

Non-chemical options: The use of Cochineal and Cactoblastis biological control agents suited to the variety of pear is the best management practice, where appropriate.

	Chemical and Concentration	Rate	Comments
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL in 100 L of water	Apply as a thorough foliar spray
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Apply as a thorough foliar spray
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L per 60 L of diesel	Apply thoroughly as a foliar spray.
	Triclopyr 600 g/L Garlon® 600	3.0 L per 100 L of water	Apply thoroughly as a foliar spray.
	Triclopyr 600 g/L Garlon® 600	1.0 L per 75 L of distillate	Apply thoroughly as a foliar spray.

Tobacco bush - *Solanum mauritianum*

Non-chemical options: Seedlings can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL glyphosate per 10 L of water	Foliar application for seedlings.
PER9907	Glyphosate 360 g/L Roundup®	1 part per 1.5 parts of water	Cut stump/injection application.
	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 mL in 100 L of water	Foliar application from spring to autumn for plants up to 2m tall
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 60 L of diesel	Cut stump application.
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	350 mL in 100 L of water	Foliar application from spring to autumn for plants up to 2m tall
	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 10 L of water	Gas gun / Splatter gun application. Apply to actively growing bushes.

Tobacco weed - *Elephantopus mollis*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Trad - *Tradescantia fluminensis*

Non-chemical options: Small infestations can be manually removed and composted.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL per 10 L of water	Treat in winter or early spring. For best results, add a surfactant. Apply two sprays, 6–8 weeks apart. Repeat treatments are essential.
	Fluroxypyr 200 g/L Starane™	1.5 L in 100 L of water	Foliar application. Re-treatment necessary. Young plants up to and including flowering.
	Fluroxypyr 333 g/L Starane™ Advanced	900 mL in 100 L of water	Foliar application. Re-treatment necessary. Young plants up to and including flowering.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted (16 g /m ²)	Use a long-handled paint roller or similar making sure the foliage has been completely flattened during application.

Tree-of-heaven - *Ailanthus altissima*

Non-chemical options: Mechanical removal of mature trees, unless wet, will cause suckering from the broken roots.

	Chemical and Concentration	Rate	Comments
	2,4-D 300 g/L + Picloram 75 g/L Tordon® 75-D	650 mL in 100 L of water	Foliar application, apply at full leaf.
	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	10 g metsulfuron-methyl plus 200 mL glyphosate in 100 L of water	Apply to actively growing trees to point of run. Ensure all daughter plants are controlled.
	Hexazinone 250 g/L Velpar® L	4 mL per spot, one spot per metre of height	For use on bushes up to 3 m tall. Do not apply near desirable trees.
	Metsulfuron-methyl 600 g/kg Brush-off®	10 g in 100 L of water	Apply to actively growing trees. Avoid spraying when stressed, when leaf fall has commenced, or after the end of February.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 60 L of diesel	Basal bark/cut stump application. Dormant species, not to be treated in winter.
	Triclopyr 600 g/L Garlon® 600	1.0 L in 60 L of diesel	Basal/bark, cut-stump application.

Tropical soda apple - *Solanum viarum*

Non-chemical options: Seedlings can be manually controlled taking care to remove all plant and root fragments.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL in 10 L of water	Spot spray application
PER9907	Glyphosate 360 g/L Roundup®	1 part per 1.5 parts of water	Cut stump application
PER12942	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Only products registered for aquatic use	2 L glyphosate plus 10g of metsulfuron in 100 L of water	A wetter must be used at a rate of 500 mL per 100 L. Apply a maximum of 2 times per year at a minimal interval of 60 days. Ensure spray covers all foliage and stems as incomplete application will result in regrowth.
PER12942	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	350 to 500 mL in 100 L of water	A wetter must be used at a rate of 500 mL per 100 L. Apply a maximum of 2 times per year at a minimal interval of 60 days. DO NOT use products containing picloram and triclopyr within 5 m of a waterway. Ensure spray covers all foliage and stems as incomplete application will result in regrowth.
PER12942	Triclopyr 300 g/L + Picloram 100 g/L with Metsulfuron-methyl 600 g/kg Various products	350 to 500 mL plus 10g metsulfuron in 100 L of water	A wetter must be used at a rate of 500 mL per 100 L. Apply a maximum of 2 times per year at a minimal interval of 60 days. DO NOT use products containing picloram and triclopyr within 5 m of a waterway. Ensure spray covers all foliage and stems as incomplete application will result in regrowth.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3-5 mm layer of gel for stems less than 20 mm. Apply a 5 mm layer on stems above 20 mm.

Turkey rhubarb - *Acetosa sagittata*

Non-chemical options: Grub out single plants, prevent plants from seeding.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	200 mL in 10 L of water	Spot spray application
PER9907	Glyphosate 360 g/L Roundup®	1 part per 1.5 parts of water	Scrape stem application

Tussock paspalum - *Paspalum quadrifarium*

Non-chemical options: Grub out single tussocks, slash to prevent seeding.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	500 mL in 100 L of water	Hand gun application
	Glyphosate 360 g/L Roundup®	1.0 L per 100 L of water	Spot spray application

Tutsan - *Hypericum androsaemum*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Umbrella tree - *Schefflera actinophylla*

Non-chemical options: Seedlings can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1 part per 1.5 parts of water	Stem injection/cut stump application.
PER9907	Glyphosate 360 g/L Roundup®	200 mL per 10 L of water	Foliar application for seedlings
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .

Uruguayan rice grass - *Piptochaetium montevidense*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	1.5 to 3 L per ha	Broadacre control
PER9792	Flupropanate 745 g/L Tussock®	100 to 300 mL per 100 L of water	Spot spray control

	Chemical and Concentration	Rate	Comments
PER9792	Flupropanate 745 g/L Tussock®	500 mL per 10 L water	Wiper suppression
PER9792	Glyphosate 360 g/L Roundup®	3 L per ha	Broadacre control
PER9792	Glyphosate 360 g/L Roundup®	1 L per 100 L of water	Spot spray
PER9792	Glyphosate 360 g/L Roundup®	3.3 L per 10 L water	Wiper suppression

Velvety tree pear - *Opuntia tomentosa*

Non-chemical options: The use of Cochineal and Cactoblastis biological control agents suited to the variety of pear is the best management practice, where appropriate.

	Chemical and Concentration	Rate	Comments
PER14442	Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L Grazon Extra®	500 mL in 100 L of water	Apply as a thorough foliar spray
PER14442	Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS	500 mL per 100 L of water	Apply as a thorough foliar spray
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1 L per 60 L of diesel	Apply thoroughly as a foliar spray.

Viper's bugloss - *Echium vulgare*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Water caltrop - *Trapa species*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
	Diquat 200 g/L Reglone®	5 L of product per megalitre of water	Apply by injection below the surface or as a surface spray.

Water hyacinth - *Eichhornia crassipes*

Non-chemical options: If practicable, small infestations can be manually removed. Care needs to be taken not to spread the weed further.

	Chemical and Concentration	Rate	Comments
PER84767	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L water plus a wetter at 200 mL per 100 L water	May only be applied in enclosed water bodies, and not within 400 m of potable water supply uptakes. WARNING: very toxic to aquatic plants and algae. Apply a maximum of 3 applications per year at minimum intervals of 90 days.
	2,4-D 300 g/L Affray 300®	1.0 L in 200 L of water	Avoid causing submersion of sprayed plants.
	Amitrole 250 g/L Amitrole T®	280 mL to 100 L of water	Apply prior to flowering.
	Diquat 200 g/L Reglone®	400 mL per 100 L of water	Add Agral 600 wetter; use clean water for best results. Observe withholding period.
	Diquat 200 g/L Reglone®	5.0 to 10.0 L/ha	Add Agral 600 wetter; use clean water for best results. Observe withholding period.
	Glyphosate 360 g/L Only products registered for aquatic use	1.0–1.3 L in 100 L of water	Apply when actively growing, at or beyond the early bloom stage. Use higher rate on dense infestations.
	Glyphosate 360 g/L Only products registered for aquatic use	6.0–9.0 L/ha	Apply when actively growing, at or beyond the early bloom stage. Use higher rate on dense infestations.

Water lettuce - *Pistia stratiotes*

Non-chemical options: Physical removal of small infestations can be effective.

	Chemical and Concentration	Rate	Comments
PER83083	Carfentrazone-ethyl 240 g/L Shark™ Aquatic Herbicide	933 mL of product per ha	DO NOT apply more than two (2) applications per year with a minimum re-treatment interval of 90 days between consecutive treatments.
PER83083	Carfentrazone-ethyl 240 g/L Shark™ Aquatic Herbicide	933 mL of product per ha	DO NOT apply more than two (2) applications per year with a minimum re-treatment interval of 90 days between consecutive treatments.
PER84767	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L water plus a wetter at 200 mL per 100 L water	May only be applied in enclosed water bodies, and not within 400 m of potable water supply uptakes. WARNING: very toxic to aquatic plants and algae. Apply a maximum of 3 applications per year at minimum intervals of 90 days.
	2,4-D 300 g/L Affray 300®	1.0 L in 200 L of water	Avoid causing submersion of sprayed plants. Coverage: 200 L spray solution per 1000 square metres.
	Diquat 200 g/L Reglone®	400 mL per 100 L of water	Add Agral 600 wetter, use clean water for best results. Observe withholding period.
	Diquat 200 g/L Reglone®	5.0–10.0 L/ha	Add Agral 600 wetter, use clean water for best results. Observe withholding period.
	Glyphosate 360 g/L Only products registered for aquatic use	1.0–1.3 L in 100 L of water	Best results are obtained from mid-summer through to winter. Use higher rate on dense infestations.

Water lilies - *Nymphaea* species

Non-chemical options: Small infestations can be manually removed.

	Chemical and Concentration	Rate	Comments
	Diquat 20 g/L Watrol®	4.0 L per 100 L of water	Apply as an overall spray. Thoroughly wet foliage. Best if clean water is used; higher rate if dense weed or dirty water. Observe withholding period.
	Diquat 20 g/L Watrol®	50–100 L/ha	Apply as an overall spray. Thoroughly wet foliage. Best if clean water is used; higher rate if dense weed or dirty water. Observe withholding period.
	Diquat 200 g/L Reglone®	400 mL per 100 L of water	Add Agral 600 wetter; use clean water for best results. Observe withholding period.
	Diquat 200 g/L Reglone®	5.0–10.0 L/ha	Add Agral 600 wetter; use clean water for best results. Observe withholding period.
	Glyphosate 360 g/L Only products registered for aquatic use	1 L to 100 L of water	Re-treat unaffected plants.

Water mimosa - *Neptunia oleracea*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 9 parts water	Splatter gun

Water poppy - *Hydrocleys nymphoides*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 9 parts water	Splatter gun

Water soldier - *Stratiotes aloides*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 9 parts water	Splatter gun

Water star grass - *Heteranthera zosterifolia*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	One part product to 9 parts water	Splatter gun

White blackberry - *Rubus niveus*

Non-chemical options: Small individual plants can be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	2L of Glyphosate plus 15 g of Brush-off in 100 L of water	Spot spray application, plus add a wetter.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3-5 mm layer of gel for stems less than 20 mm. Apply a 5 mm layer on stems above 20 mm.

White Spanish broom - *Cytisus multiflorus*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

White weeping broom - *Retama raetam*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Wild radish - *Raphanus raphanistrum*

Non-chemical options: Maintain a well-balanced pasture with good grazing management.

	Chemical and Concentration	Rate	Comments
	2,4-D amine 625 g/L Amicide® 625	800 mL–1.1 L/ha	Apply to rosettes before flowering.
	2,4-D LV ester 680g/L Estericide® Xtra	800 mL per ha	Boom spray application, up to rosette stage
	MCPA 500 g/L Various products	1.0 L/ha	Apply to rosettes before flowering.

Willow rhus - *Searsia lancea*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 1.5 parts water	Cut stump, drill, frill axe or injection
PER9907	Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Various products	1:1.5 glyphosate to water + 1 g metsulfuron to 1 L water	Stem injection

Willows - *Salix* species

Non-chemical options: Mechanical removal is best, ensuring that all of the root system is removed.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	1.0–1.3 L in 100 L of water	Spray to wet all foliage. Use the higher rate for trees 1–2 m high.
	Glyphosate 360 g/L Roundup®	Undiluted	Stem injection.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 15 L of diesel	Cut stump application. Need to treat all stems.

Winter senna - *Senna septemtrionalis*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 200 g/L Starane™	35 mL per L diesel/kerosene	Basal bark
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	21 mL per L diesel/kerosene	Basal bark
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves

	Chemical and Concentration	Rate	Comments
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Witchweeds - *Striga* species

Non-chemical options: Witchweeds are inaccessible until they emerge, by which time it is usually too late to prevent yield losses. Rotations with trap crops that stimulate germination can be beneficial. Contact your local council weeds officer for assistance if you suspect you have found witchweed.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL in 100 L of water	Spot spray application

Yellow bells - *Tecoma stans*

Non-chemical options: Small trees and seedlings may be manually removed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	1.0 L in 50 L of water	Spray seedlings.
PER9907	Glyphosate 360 g/L Roundup®	1 part per 1.5 parts of water	Stem injection or cut stem application.
	Picloram 44.7 g/kg + Aminopyralid 4.47 g/L Vigilant II®	Undiluted	Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm.
	Triclopyr 240 g/L + Picloram 120 g/L Access™	1.0 L in 60 L of diesel	Basal bark/cut stump application.

Yellow burrhead - *Limncharis flava*

Prohibited matter: if you find this plant call the NSW Invasive Plants & Animals Hotline on 1800 680 244.

Non-chemical options: Plants can be manually removed and carefully disposed.

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Only products registered for aquatic use	Up to 200 mL in 10 L of water	Spot spray application

Yellow nutgrass - *Cyperus esculentus*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L water	Spot spray

Yellow soldier - *Lachenalia reflexa*

Non-chemical options: Please refer to NSW WeedWise at weeds.dpi.nsw.gov.au for further control information as it becomes available.

	Chemical and Concentration	Rate	Comments
PER9907	Fluroxypyr 200 g/L Starane™	500 mL to 1 L per 100 L water	Spot spray
PER9907	Fluroxypyr 333 g/L Starane™ Advanced	300 to 600 mL per 100 L water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 50 parts water	Spot spray
PER9907	Glyphosate 360 g/L Roundup®	One part product to 9 parts water	Splatter gun

	Chemical and Concentration	Rate	Comments
PER9907	Glyphosate 360 g/L Roundup®	One part product to 20 parts water	Wipe onto leaves
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 - 20 g per 100 L water plus surfactant	Spot spray
PER9907	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 1 L of water plus surfactant	Wipe onto leaves

Biosecurity Act 2015

By law biosecurity is everybody's business. Weeds threaten our biosecurity and come under the new Biosecurity Act in NSW

Every person and organisation needs to do their bit to protect the economy, environment and community from the risks posed by weeds. This is now part of your "general biosecurity duty"

WHAT CAN YOU DO?

- use NSW WeedWise to find out about the biosecurity duties for weeds in your area (go to weeds.dpi.nsw.gov.au or get the app)
- talk to your local council weeds officer about weeds on your property
- control and prevent weeds spreading on and from your property

For more information about the *Biosecurity Act 2015* visit www.dpi.nsw.gov.au/biosecuritylegislation or email biosecuritylegislation@dpi.nsw.gov.au



“So glad we reported it!”

We noticed these plants covering the lake that weren't there before...

...we called Council and it turned out to be frogbit, a new weed that ruins waterways! They acted fast and our call helped save the lake.”

Always contact your local council weeds officer if you notice unusual plants, or call the NSW Invasive Plants and Animals Enquiry Line **1800 680 244**

For more information search 'frogbit' in NSW WeedWise at **weeds.dpi.nsw.gov.au**

NSWWeedWise

