

Chapter 3

Developing a weed management plan

'At a glance'

- Planning helps you prioritise what actions are needed to protect and develop your property.
- A property weed management plan determines priority actions to prevent new weeds and manage the spread and impacts of existing weeds.
- This chapter describes a simple way of developing a property weed management plan.
- The chapter also provides guidance on planning community-led and large (landscape-scale) weed management programs.

3.1 Introduction

Planning is one of the most important steps in weed management. Although it is tempting to jump straight in, having a planned approach to managing fireweed (and other weeds) on your property will help ensure what you do is effective, efficient and achievable. A planned approach keeps one eye on the big picture of what goals you have for your property, and the other on the detail of what priority actions you need to do and when – in order to work towards those goals. It helps you judge whether you are on track in reducing the impacts and spread of fireweed or whether you might need to change tactics.

Having a plan means your day-to-day activity is focused on achieving long-term outcomes.

Property planning can occur at various scales (Figure 3.1).



Figure 3.1 Three examples of property plans.

A **property management plan** or a farm business plan takes a holistic view of the economic, environmental and social aspects of running a property. It allows for a self-review of the property's resources (natural, financial, people, infrastructure, livestock), limitations to these resources, external influences, opportunities, and options for improvement. Property management plans are important for both commercial and lifestyle properties.

A **property biosecurity plan** focuses on minimising the threat posed to livestock, cropping and natural resources by new and established weeds, pests and diseases.

A subset of biosecurity planning is a **property weed management plan**, which is the main focus of this chapter.

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Preventing and/or controlling fireweed and other weeds requires a long-term commitment. Having a property weed management plan allows you to follow a strategic approach that:

- prioritises the use of limited resources
- identifies the best control methods and their timing, thereby increasing your chances of success
- coordinates activities with your neighbours
- meets your legal obligations (where applicable)
- incorporates weed management tasks into broader property planning
- undertakes monitoring to gauge success and revise the plan as needed.

Refer to Chapter 5 (Section 5.6) for weblinks to property, biosecurity and weed management planning information and tools.

While this manual is about fireweed, it is good practice to consider all weeds, and how to align their management, in the one property weed management plan. Focusing solely on fireweed risks missing actions required for other weeds of equivalent or even greater impact. This includes declared weeds for which a legal requirement to control may exist in your area.

Hence, the following information is about weeds in general, with some specific examples given for fireweed.

3.2 Developing a property weed management plan

Key information sources for this section: Sheehan and Potter (2017), CRC AWM (2004), LLS South East (2016).

A **property weed management plan** (hereafter 'weed plan') outlines priority actions needed to prevent new weeds and control the further spread and impacts of weeds that are established on the property. Components of a weed plan include:

- stocktake of weeds present on the property and possible future weed incursions
- map of weed locations, spread pathways and assets at risk on the property
- analysis of options to manage key weeds
- consideration of property goals and weed management constraints and opportunities
- plan of priority weed management actions to be performed throughout the year
- monitoring effort, cost and effectiveness of control methods
- annual review and revision of the plan.

A good weed plan is one that provides a clear path to your management goals, allowing for flexibility and refinement along the way. Consideration should be given to *why* you are managing these weeds, because this will inform your overall goal.

A weed plan does not need to be lengthy or complicated; rather, it should be realistic in terms of what you can feasibly achieve each year. Effective control of weed infestations can take many years, so the plan should be long term.

Box 3.1 summarises the steps involved in developing and implementing a weed plan, with a checklist for each step. Initial assessment of the weed situation (Step 1) and management options (Step 2) informs priority actions to go in the plan (Step 3). While implementing the plan (Step 4), make observations and keep records to inform an annual review of the plan (Step 5).

Box 3.1 Checklist to assist in the development of an annual property weed management plan.



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3.2.1 STEP 1. Assess the weed situation

The first step is to understand the scale of the weed problem on your property. Conduct a survey of weed distribution and density in paddocks and around infrastructure (e.g. farm tracks, sheds, stockyards, stock watering points, fence lines). Weeds present in areas surrounding the property should also be noted.

List the major weeds present on property and surrounds

Compile a list of what major weeds are present. These are weeds on the property that are currently causing, or have the potential to cause, serious economic, environmental and/or social impacts. Also list other major weeds present in the local area but not yet on your property. Talking to your local weed officer, neighbours, agronomist, Landcare officer or other sources of advice will help build your understanding of local and regional weed threats. Also consider weeds that may be brought to your property from long distances, through such pathways as purchased fodder, livestock or machinery.

Various online resources list and identify major weeds, including state departments of primary industries (e.g. NSW WeedWise weeds.dpi.nsw.gov.au/) and NRM regions (e.g. North Coast LLS 'Weeds of the North Coast of NSW' www.ils.nsw.gov.au/help-and-advice/pests,-weeds-and-diseases/weed-control/weed-identification-and-management/weeds-of-the-north-coast-of-nsw).

Map weed infestations, key assets and spread pathways

A map of weed distribution on your property should aim to show:

- location, extent and density of weed infestations
- property and paddock boundaries
- location and types of assets
- weed spread pathways, such as water courses, roads and stock camps
- any safety hazards.

Obtain a map of your property, either as hard copy or in a digital format that you can add GPS locations to using a smartphone. Ideally, the map should have paddock boundaries and other property features clearly marked. A map does not need to be complex; the goal is to create a visual representation of the property and weed infestations so that everyone working on the property, now or in the future, can find their way around and follow a logical and strategic approach to weed management. A hand sketch can work for small properties, while a simple, computer-generated map may be better for larger properties.

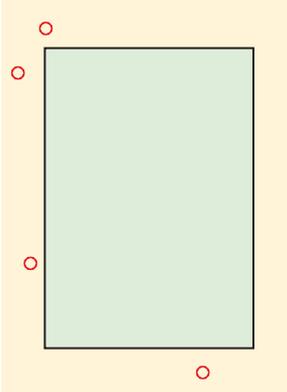
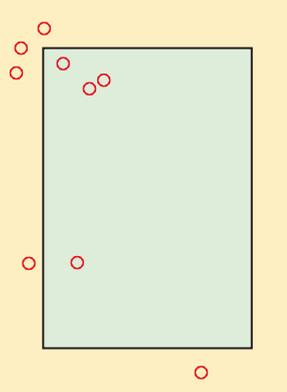
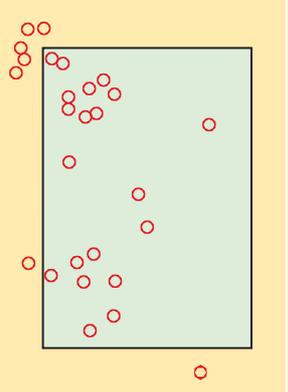
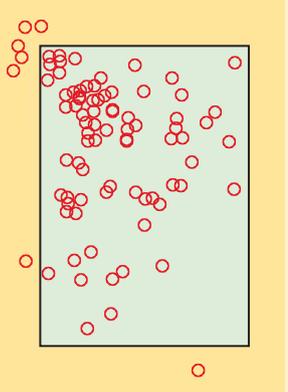
Walk or drive over your property and determine the presence of weeds in each paddock (or part thereof). Draw a 'mud map' for each paddock and record locations of weeds, transferring this to your property map later. Or take GPS readings to record the boundaries of patches of weeds or point locations of individual weeds.

Which weeds to record will be guided by your weed list; but also add any new weeds detected. Since different weeds are more obvious at different times of year, you should repeat this process seasonally to produce a thorough property weed map. For example, fireweed is easiest to detect when it has started to flower.

Record the locations of infestations of **weeds** as areas on the property map. Also record their density so you can judge in future years whether your weed plan is being successful. Typical categories for recording weed density are 'absent', 'rare', 'light', 'medium' or 'heavy'. These are described in Table 3.1 and further detail is given in McNaught et al. (2008).

Map property **assets** to help define management goals and areas that will benefit the most from weed prevention and control. Such assets may also require extra care when undertaking weed control to limit any off-target damage. Examples of higher value assets include the most productive paddocks, significant biodiversity areas, property infrastructure, and historical and cultural sites.

Table 3.1 Strategic management objectives and actions required for different stages of weed invasion.

				
Stage of invasion	<p>Absent</p> <ul style="list-style-type: none"> Absent: not known to be present on the property (but may be present in the local area) 	<p>Early stages of invasion</p> <ul style="list-style-type: none"> Rare (< 1%): isolated individual plants Low risk of reinfestation from neighbouring areas 	<p>Scattered to frequent</p> <ul style="list-style-type: none"> Light (1–10%): scattered patches and isolated plants Or medium (11–50%): frequent patches with isolated plants commonly interspersed Large areas of the property are still generally free of the weed 	<p>Widespread and dense</p> <ul style="list-style-type: none"> Heavy (> 50%): large, dense infestations Weed can be found across most of the property
Management objective	<p>PREVENT</p> <ul style="list-style-type: none"> Limit arrival onto the property to stop it becoming established 	<p>ERADICATE</p> <ul style="list-style-type: none"> Eliminate all plants, including propagules (seeds and vegetative) 	<p>CONTAIN AND REDUCE</p> <ul style="list-style-type: none"> Prevent further spread on the property by eliminating outlying infestations and reducing density of the core infestation/s 	<p>MANAGE IMPACTS</p> <ul style="list-style-type: none"> Reduce weed density to limit impacts on high-value assets
Management actions required	<p>Property biosecurity</p> <ul style="list-style-type: none"> Prevent new weeds arriving <p>‘Seek and destroy’</p> <ul style="list-style-type: none"> Ensure ongoing property surveillance for and response to new weed incursions Conduct coordinated control program across infested properties where a high impact weed is new to the district 	<p>Delimitation</p> <ul style="list-style-type: none"> Ensure frequent surveillance to map all known infestations <p>‘Seek and destroy’</p> <ul style="list-style-type: none"> Search for and remove all plants prior to reproduction <p>Property biosecurity</p> <ul style="list-style-type: none"> Implement hygiene practices to prevent spread across the property 	<p>Spread prevention</p> <ul style="list-style-type: none"> Implement hygiene protocols and other measures <p>Control</p> <ul style="list-style-type: none"> Conduct ongoing integrated control program to reduce density in areas where firmly established <p>‘Seek and destroy’</p> <ul style="list-style-type: none"> Search for and remove all plants prior to reproduction for outlying infestations 	<p>Spread prevention</p> <ul style="list-style-type: none"> Implement hygiene protocols and other measures to prevent spread off-property <p>Control</p> <ul style="list-style-type: none"> Conduct ongoing integrated control program to reduce density to keep impacts at an acceptable level Protect high-value assets at risk from weed impact

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Identify and map **pathways** for weed spread on the property, for example, roads and tracks, water courses, livestock yards and feeding areas, and linear easements such as stock routes and powerlines. With fireweed and other wind-dispersed weeds in mind, map **risk areas** where the prevailing winds and topography are likely to deposit weed seeds.

When undertaking mapping and weed control, it is important to identify any **safety risks** to prevent potential injuries, for example, areas that are steep or have hidden ground hazards, rendering them unsuitable for driving across with a boom sprayer.

Figure 3.2 gives an example property weed map, which in turn is used to inform examples for other steps.

Establishing a baseline of current weed status

Using information collected on weed distribution and density at the planning stage, you can establish a baseline. You can use this baseline to record change and assess the effectiveness of management outcomes over time. Each time you produce an updated map and record weed density, you can compare it against your original baseline map.

You can also establish photopoints, where images are taken at the same spot at the same time each year. This ensures a long-term photographic record of change in weed distribution and density over time.

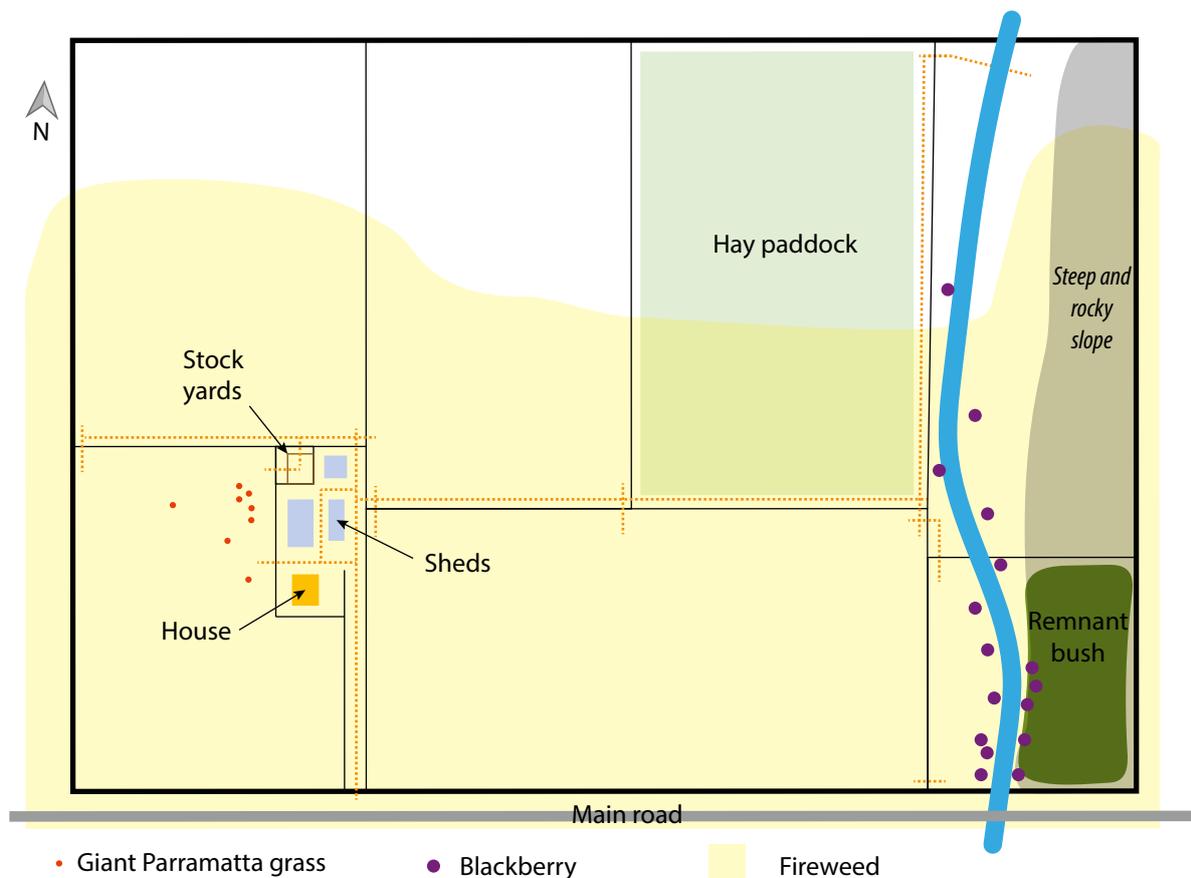


Figure 3.2 An example property weed map showing infestations of fireweed (widespread), giant Parramatta grass and blackberry.

3.2.2 STEP 2. Analyse weed management options

This step requires you to consider the weed control options and strategies available for different parts of your property, based on the weeds identified in Step 1.

Control options for weeds

Conduct some online research on the biology, impacts and management options for the major weeds identified in Step 1. A range of information is available from government (state, territory, local), NRM and farming websites. You should also seek advice from your local weed management authority. Describe the weeds' overall distribution on the property, likely impacts if not controlled and pathways of spread, as well as potential ways to prevent and control them.

It helps to 'think outside the box' in terms of what control options you could adopt. For example, for fireweed some property owners have decided to run sheep in preference to using herbicides. You should also be aware of the limitations of control options. These may include off-target effects on desirable plants, restricting livestock access to treated paddocks, lack of suitability for non-arable areas and expense. Table 2.1 in Chapter 2 compares the pros and cons of different prevention and control measures for fireweed.

Weed management strategic objectives

Strategic weed management objectives relate to the stages of invasion of the weed being controlled and comprise the following: **prevent, eradicate, contain and reduce** and **manage impacts**. These objectives are described in Table 3.1, including the general actions needed to achieve them.

To decide on a feasible management strategy for each weed, consider:

- the distribution of major weeds on the property (from the mapping)

- how they can be cost-effectively prevented and/or controlled
- potential impacts of the weed on property assets.

Eradication – is it feasible?

Note that eradication is a term often used but rarely achieved in practice for weeds. Successful eradication requires the elimination of every individual plant and propagules (e.g. seeds, bulbs) in a defined area, plus no further reintroduction from outside the area. This is extremely difficult to achieve. Generally, eradication is only possible where the weed is a recent incursion.

Factors required for successful weed eradication on a property:

- Weed distribution and density is rare across the property.
- All infested areas are known.
- The chance of reinvasion from surrounding areas is unlikely.
- Newly emerged plants are easily detected before they set seed (and/or vegetative propagules, for some types of weeds).
- Individual plants are easy to kill, including those that regenerate vegetatively.
- The weed has not been there for many years and therefore has not formed a large soil seedbank.
- Seeds do not persist in the soil for many years.
- Sufficient 'people power' is available for regular searching (e.g. fortnightly to monthly) to find and remove all plants before flowering.
- This 'seek and destroy' effort can be maintained each year for many years until there is no more emergence from the soil seedbank.

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Priority control areas

The number and extent of weeds on your property is often too much to tackle all at once. In general, it is best to prioritise new, small or outlying infestations, then areas with high risk of spread, then protection of high-value assets (Table 3.2).

Table 3.2 General order of priority for where to control weeds.

PRIORITY 1	New, small or outlying weed infestations These should be intensively controlled (and eradicated where feasible) to stop them becoming large infestations with persistent seedbanks.
PRIORITY 2	Areas with high risk of weed spread Areas such as farm tracks, parking and visitor areas, stockyards, dams, troughs, gateways and watercourses should be targeted for weed control to reduce the risk of weed spread causing new infestations on the property. Also consider weeds within paddocks that present a high risk of further spread on the property by such means as livestock, machinery or conserved fodder.
PRIORITY 3	High-value assets Where weeds are widely established, focus on reducing current and future impacts on important assets. For example, look after the most productive paddocks and the best patches of bush. Maintain access to and functioning of property infrastructure such as fences and dams.

However, you need to weigh up addressing the immediate impacts from widely established weeds versus preventing the potential impacts of new or emerging weeds. For example, fireweed may be widespread across your grazing paddocks, and you will need to undertake broadscale control to keep its density low.

It is important not to take on too much from the start, particularly if you lack experience in weed control or in managing a particular weed. Choose a small area that can be regularly observed to gauge whether your control technique is working satisfactorily; consider ways to achieve an even better result and build confidence for taking on larger infestations.

Table 3.3 provides an example of how the information and analysis from Steps 1 and 2 can be combined to decide on the management approach to be adopted for each priority weed.

Table 3.3 Example approach to analysing weed management options on a property.

	FIREWEED <i>(Senecio madagascariensis)</i>	GIANT PARRAMATTA GRASS <i>(Sporobolus fertilis)</i>	BLACKBERRY <i>(Rubus fruticosus)</i>	
CURRENT STATUS	<i>Light cover in most paddocks.</i>	<i>Rare – found spotting across house paddock. Likely recent incursion from hay.</i>	<i>Light – scattered along creek and creeping into remnant scrub.</i>	
RISK OF IMPACT	<i>If dense, then risk of cattle poisoning and pasture among fireweed not being eaten. Risk of contaminating hay (seed and toxicity).</i>	<i>Risk of making seed contaminated hay. Can become dominant over palatable pasture grasses.</i>	<i>Reduces access, amenity and biodiversity. Potential to invade lower pastures.</i>	
ASSETS AT RISK	<i>Already in hay paddock.</i>	<i>Hay paddock. Grazing paddocks in general.</i>	<i>Creek line, scrub and steep grazing paddock.</i>	
PATHWAY RISKS	<i>Wind-blown seed from south-west. Spread by mowing if in flower.</i>	<i>Hay. Cattle movement onto and across property. Spread by mowing if in flower.</i>	<i>Birds, floods, foxes.</i>	
PREVENTION AND CONTROL OPTIONS	Spread prevention	<i>Windbreaks, machinery hygiene, control around sheds and tracks.</i>	<i>Clean down vehicles and machinery. Restrict cattle movement.</i>	<i>Difficult to stop seed spread.</i>
	Competition	<i>Establish and maintain competitive pasture.</i>	<i>Establish and maintain competitive pasture.</i>	<i>Establish and maintain competitive pasture and riparian native plants.</i>
	Grazing	<i>Don't overgraze pasture. Introduce a 'weeder' mob of sheep.</i>	<i>Don't overgraze pasture.</i>	<i>Consider goats as a temporary measure if gets out of hand.</i>
	Herbicide	<i>Boom spray early in season. Spot spray isolated flowering plants.</i>	<i>Spot spray (though risks missing small plants compared with boom spray).</i>	<i>Spot spray Roundup Biactive near creek when is actively growing, but likely to need several follow-up sprays.</i>
	Manual removal	<i>Hand pull before seed set.</i>	<i>Chip out and bag.</i>	<i>Difficult as get regrowth from roots.</i>
	Cultivation	<i>Risk of stimulating germination and soil erosion.</i>	<i>Risks damage to pasture.</i>	<i>Not applicable.</i>
	Mowing/mulching	<i>Risk of seed spread if flowering.</i>	<i>Risk of seed spread if flowering and poor control achieved.</i>	<i>Not applicable.</i>
	Biological control	<i>None available.</i>	<i>Nigrospora crown rot if weed becomes widespread.</i>	<i>Rust doesn't kill plants.</i>
Other	<i>General biosecurity obligation.</i>	<i>General biosecurity obligation.</i>	<i>General biosecurity obligation.</i>	

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MANAGEMENT OBJECTIVE	MANAGE IMPACTS <ul style="list-style-type: none"> control 	ERADICATE <ul style="list-style-type: none"> delimitation seek & destroy property biosecurity 	CONTAIN & REDUCE <ul style="list-style-type: none"> contain further spread seek & destroy new plants control
CONTROL AREAS	Stockyards, holding paddock, hay paddock.	All known infestations. Monitor farm tracks, fence lines, all paddocks (!), roadside and remove any plants found.	Creek line. Look out for spread in pasture and scrub.
MANAGEMENT APPROACH	Present across the property and in district. Keep density at a light level through competitive pasture, grazing management and use of herbicides. Need high intensity control in hay paddock. If density increases, then may need to consider introducing sheep.	Spreads easily on stock and machinery so must remove plants prior to flowering. Spot spray and chipping. Regular searching of other paddocks – especially hay paddock. Buy certified-free hay. If found in more paddocks then will have to shift strategy to ‘Contain & Reduce’.	If glyphosate not giving level of kill needed, then talk to weeds officer about other herbicide options for riparian areas.

3.2.3 STEP 3. Develop a property weed management plan

This step brings together the priority actions for the weed plan and aligns them with your long-term property goals and available resources. Table 3.4 provides an example of a simple annual property weed management plan.

Property goals

What are the long-term goals for your property? For a commercial farm, the focus is often on ensuring productivity, sustainable use of natural resources and market access for products. For a lifestyle property it may be more about the amenity of living in a rural landscape, the ability to run a few grazing animals, and valuing and restoring the local environment.

Setting a long-term goal highlights what you value most about your property. In turn, this influences your weed management priorities – whether they are economic, environmental and/or social impacts that you wish to prevent and manage.

Constraints

What constraints will limit or direct what you can do to prevent and manage weeds on your property? Consider such things as finances, people, infrastructure, equipment, natural resources and business. Examples of possible constraints include:

- funds to spend on weed control
- cost of individual control options
- time available when weed control needs to occur
- skills and knowledge

- availability of equipment
- availability of labour
- accessibility of areas of your property
- work health and safety considerations
- physical ability to use certain control methods
- preferences on using herbicides
- legal requirements to control regionally declared weeds
- avoiding unintended damage (e.g. risks of herbicide drift, contamination of waterways, soil erosion)
- community expectations to control certain weeds
- lack of feasible control measures available
- natural dispersal of weeds onto the property.

Opportunities

Are there ways you can make weed prevention and control more efficient or effective? It may be possible to share equipment with a neighbour or split the cost of hiring a spray contractor. There may be multiple weeds that can be controlled by the same method. Opportunities may exist to apply for grant funding to undertake an initial ('primary') control of a weed infestation, helping to protect regional biodiversity or productivity. Joining a local Landcare group may help you share the load and provide access to expertise and equipment. Other forms of assistance may be available through your weed management authority, local council or NRM organisation.

Annual plan of action

Reviewed annually, the weed plan provides a way to record what you need to do to tackle your highest priority weeds. At its simplest, a weed plan can be a calendar of actions required at certain times of the year. It also indicates where on the property these actions need to be done.

Consider your long-term goals for the property, analysis of the weed situation and management options, the constraints you are working under and the opportunities to address these. Draft a calendar of actions you can feasibly undertake to address your priority weeds in specified areas of the property.

Think about the timing of these actions in relation to each other and other property activities. Are there conflicts? Are there further efficiencies you can implement to save costs or time? The plan does not need to be perfect; it can continue to be refined until you achieve something workable for the year.

Seek advice and input from weed management experts (e.g. local weeds officer, farm advisor, Landcare officer) and neighbours to ensure that your priority setting is sound and will align, if needed, with others' weed control activities.

While this is an annual plan, it is important to think ahead to what you will need to do in the following years to progress further in reducing your weeds. Weed management is a long-term investment and cannot be achieved in one year only.

A plan is a guide, and you still need to be flexible with your timing to adapt to unforeseen circumstances such as drought, floods or other extreme weather events. You may also need to alter timing of weed management activities based on other factors, such as varying seasonal conditions or other urgent property management needs that could arise.

Table 3.4 An example annual property weed management plan. In order to save space, this example focuses largely on fireweed and includes only those months that require actions.

PROPERTY GOAL/S		<i>To have a profitable cattle enterprise to supplement off-farm income. To keep the property in good condition as an asset.</i>		
Implications for weed priorities:		<i>Focus on protecting pastures for cattle production. Avoid new weeds becoming established. Manage established weeds so they don't become dominant. Work with neighbours on shared weed issues. Look after the remnant bush and creek habitat.</i>		
CONSTRAINTS:		<ul style="list-style-type: none"> ▪ <i>Time: working full time off-farm so limited to weekends and after hours.</i> ▪ <i>Some steep, rocky areas difficult to access for spraying, and pasture grows poorly so more vulnerable to weeds.</i> ▪ <i>Withholding periods after weed spraying for cattle.</i> ▪ <i>Risk of weeds blowing or washing in from next door.</i> ▪ <i>Need to be careful with herbicides around the remnant bush.</i> ▪ <i>Can get very wet in lower paddocks after rain periods, making vehicle access difficult.</i> 		
OPPORTUNITIES:		<ul style="list-style-type: none"> ▪ <i>Agist cattle next door (on non-weedy pastures) during withholding period for sprayed paddocks.</i> ▪ <i>Potential grant funding to fence off, control weeds and revegetate creek – so less weedy in long term.</i> 		
Month	Weed/s	Action/s	Priority control areas	Notes
Jan	Fireweed	<i>Rotate grazing to keep pasture dense into autumn.</i>	<i>Paddock 6 (steep and shallower soil so more prone to bare patches).</i>	<i>Keep up rotational grazing late summer into autumn to maintain groundcover.</i>
Mar	Fireweed	<i>Monitor in pastures for germination flushes. Get quotes from spray contractors.</i>		
Apr	Fireweed	<i>Spray seedlings (bromoxynil).</i>	<i>All pasture paddocks and hay paddock.</i>	<i>8 week withholding period so need to agist cattle – if can't then skip 2 least infested paddocks.</i>
Jun	Fireweed	<i>2nd spray.</i>	<i>Hay paddock (needs to be clean). Consider any paddocks missed in April.</i>	
Aug	Pasture weeds	<i>Fertilise pastures so competitive growth in spring.</i>	<i>Soil test to see which paddocks need.</i>	
Sep	Fireweed	<i>Spot spray.</i>	<i>Hay paddock (needs to be clean).</i>	
Oct	Pasture weeds	<i>Decide which paddocks will need pasture improvement next year. Start planning for weed control needed to aid pasture establishment.</i>	<i>Maybe paddock 6? House paddock also if off-target damage from controlling giant Parramatta grass?</i>	<i>Do an assessment of pasture health in all paddocks.</i>
Year round	New weeds	<i>Property biosecurity plan – prevention, hygiene, seek and destroy new weeds</i>	<i>Vehicle and machinery entry. Around sheds, tracks, hay feeding areas etc.</i>	<i>Constant vigilance!</i>
Next year		<i>Need to weigh up cost of spray contractor versus purchasing equipment (if I have time to do the spraying?).</i>		

3.2.4 STEP 4. Implement the plan

Refer to your plan regularly as you implement your annual weed management program. You could program actions into an electronic diary (e.g. on your smartphone) to enable pop-up reminders. Use your plan to keep on track, stay motivated and remind you why you are managing weeds. Remember that the plan is a high-level summary of what you are aiming to do and that each action will likely need further division into tasks.

Learning from doing

Use the implementation of your weed plan as an opportunity to observe the cost-effectiveness of your

actions, so that you can make future improvements to your plan and methods of weed management. Treat it as a continuous learning exercise and challenge yourself regarding how it could be done better. Consider the following for an action taken:

- Did it cost more or take more time than expected?
- Did you achieve a satisfactory level of weed kill? (see Box 3.2)
- Did you have scheduling clashes between weed management and other important property activities and needs?

Make diary notes throughout the year on what you have observed and learned. Failures are just as important to record as successes.

Box 3.2 A simple way of measuring weed kill

1. Go to the parts of a paddock where the weed has been dense.
2. Looking in from the edge of the treated area, choose a point in the distance that you will walk towards in a straight line transect.
3. Every five steps (or more if the weed is sparse) examine the weed closest to your leading foot.
4. Score the individual weed for level of kill (e.g. dead = 5, stunted/yellowing/burnt off = 3, healthy = 1).
5. Do this for 10 weeds along the transect.
6. Repeat with 4 more transects at least 10 m apart.
7. Average the 50 weed scores.

Time this exercise according to how long you expect the weed control method would normally take to kill the target weed, at that time of year. If the level of kill is less than expected, then repeat your assessment in a fortnight to assess whether the result was due simply to a delay in the treatment working. This approach can also be used to examine off-target damage in desirable plants (e.g. pasture plants).



Assessing herbicide kill

John Virtue

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Establishing photo monitoring points at selected locations throughout the treated area can assist in visually recording changes over time and the impact of your weed control efforts. Photopoints tend to be more useful for larger, perennial weeds that are more obvious in photographs than annual weeds. Various factsheets are available on how to set up photopoint monitoring (e.g. NRM South (nrmsouth.org.au/wp-content/uploads/2014/08/Photo-Monitoring-Fact-Sheet-NRM-South.pdf), Eyre Peninsula Landscape Board (cdn.environment.sa.gov.au/landscape/docs/ep/eplb_photopoint_monitoring_factsheet.pdf)).

Record keeping

In line with the 'learning from doing' approach, log your activities as you undertake them. Keep records of:

- all costs
- time taken
- weed locations
- control methods
- areas treated and their size
- equipment and supplies used (e.g. herbicide volume)
- weather conditions at time of control
- level of weed control achieved.

3.2.5 STEP 5. Annual review of progress

An annual review of the weed plan is recommended to inform what changes are needed for the following year. For each weed targeted in your plan, ask yourself broad evaluation questions such as those outlined in Table 3.5. Draw on the monitoring undertaken in Step 1 to measure these questions against a baseline.

Given most weeds require multiple years of follow-up control, you may not be making major changes to your plan initially (unless a control method is clearly not working). When substantial gains have been made against target weeds, usually after at least several years, you can shift your focus to other weeds that had been lower priorities.

If weed control has been poor, then you need to determine why. Seek professional advice on what changes are needed to your control techniques and your broad management approach. Weed management is a long-term undertaking, and you want to be confident that the time and money invested will give you effective results.

Follow-up

As fireweed is an annual weed emerging from the soil seedbank, follow-up control will generally be a repetition of the same control actions year to year.

For other weeds, such as large woody weeds, the first year of 'primary' control is usually the most intense. Seedlings or regrowth in successive years will still require follow-up control, but this could employ different methods, and less time might be required. This should be factored into the next and subsequent years' weed plans.

Table 3.5 Example annual review questions.

Review questions	Monitoring techniques that can address questions
Has the extent (area) of the weed infestation increased or reduced?	Update the property map to record any changes in weed distribution or any new weeds.
Has the density of the weed increased or reduced?	Check against categories in Table 3.1.
Are desirable plants recovering?	Key pasture species can also be assessed using the categories in Table 3.1.
Which control methods have been most successful?	Measure and compare weed kill according to the method in Box 3.2.
How much is control costing?	Calculate costs/ha from your record keeping, including cost for your time.

3.2.6 Repeating the annual planning cycle

The second and subsequent repetitions of the annual planning cycle should become progressively quicker to write. Step 5 in the previous cycle will have informed any updates that need to be made to describing the property's weed situation (Step 1). Any new information on weed control techniques, plus observations on how well the methods worked in the previous year, will inform an update to the analysis of weed management options (Step 2). The previous year's plan will provide a template for drafting the revised plan (Step 3).

Every 3–5 years it is valuable to spend more time assessing the current state of weed prevention and management on your property. Question whether you are truly on track and making substantial progress. Involve others in the process to act as peers and provide new insights and observations.

If the planning process is working well for you, then inform and encourage others to do the same and make broader district gains on weed management. The next section provides tips on how to achieve a coordinated approach to weed management across neighbouring properties.

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3.3 Working together on weeds

Weeds do not respect property boundaries, and a coordinated approach with neighbours can make for more effective control programs. Approaches can be implemented at different scales (local, landscape) and informally or formally.

Local – informal

This can be a grass roots approach in which a rural neighbourhood chooses to work together on a common weed problem. Such cooperation can be quite informal, for example:

- welcoming new landholder arrivals and providing them with information on local weed problems
- organising paddock walks to discuss control methods
- sharing weed control equipment
- agreeing to let each other know if you observe a weed outbreak on your neighbour's property
- having an in principle agreement that neighbours may hand pull the occasional weed appearing just over the fence.

Local – formal

A more formal approach is to form a weed-focused community group. Recommendations on how to achieve this are detailed below by the Australian Centre for Culture, Environment, Society & Space (ACCESS), University of Wollongong.

Key points are:

- establishing an agreed, common goal for the weed in the local area
- defining the boundaries within which the weed will be tackled
- creating an achievable workplan
- sharing the organisational and weed management load
- documenting and promoting what has been achieved.

Regional

The next level of collaboration is a district coordinated control program run by a weeds officer to tackle a regional priority weed. Understanding and developing social relationships is vital for planning and implementing such a program. Guidance to help establish the social context is provided by ACCESS below.

Key points are to:

- tap into existing networks to reach land managers
- understand community diversity, capacity and views concerning weed management
- build community support for viewing the weed's control as a priority
- document where the weed is and where it could spread to – who is affected now and who is at risk?
- establish what has been successful regarding timing and methods of control
- draft a regional weed management plan that includes both social and technical considerations
- establish a steering committee to oversee the plan's implementation.

Better together: building networks and shared objectives to achieve landscape scale control



This section provides tips for property managers and weed management professionals to leverage and coordinate communities to achieve landscape control.

Tips for property managers

There are many examples across Australia of property managers successfully working together across properties to reduce their shared weed burden. These tips come from observing community groups working with a diverse range of weeds.

- 1. Identify a group of people** concerned about the target weed and passionate about working together. Locate them through a community meeting, social barbeque, Facebook group etc.
- 2. Develop a common goal** e.g. prevent the weed from going to seed, reduce local spread, local eradication.
- 3. Define a clearly bounded area** to work together on weed control, e.g. a river corridor, small valley, several adjoining properties, or a rural residential estate. Define an area consistent with the amount of time and resources you have to invest in weed management; too large an area can mean results take too long to see, and motivation can wane.

- 4. Develop a plan to prioritise your efforts** within the clearly bounded area. This may involve focusing on the lightest infestations and the outliers, and then working in towards the densest infestation. Include:

- the activities the group will use to address the weed, e.g. working bees, individuals looking after specific sections, employing a contractor to reach difficult-to-access areas or to manage particularly dense infestations
- the frequency (e.g. weekly, monthly) and timing (e.g. Tuesdays) of any group work
- whether there are any native animals or plants currently benefiting from the weed – this ensures your management activities are undertaken sensitively

Ensure you have all landowner's permission (and involvement) before commencing planning and work.

- 5. Ensure a social component to activities** – keep motivation going through social activities, e.g. sharing afternoon tea at the end of a working bee. This enables groups to reflect on what they have achieved together, beyond what they could have achieved alone; determine their plan's effectiveness; and whether the clearly bounded area is too big or small.

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6. Share the load – organising working bees, contractors and other weed control activities can become an administrative burden that undermines the group's longevity. Assign group roles based on experience, expertise and interest in key areas such as:

- communications – for sharing information about group activities on social media or via email
- recruitment – for inviting and welcoming new people to the group
- grant writing – to apply for funding to support group activities
- plant identification – to teach members to identify the target weed(s) and other plants.

Also share the weed control load. Groups of neighbours might rotate work on each other's properties, finishing each rotation with a barbecue or other social activity.

7. Document your journey e.g. photos or brief written accounts of weed management impacts, to showcase your successes; develop a collective sense of achievement; and attract new recruits. Recording lessons learned may also be useful for other groups.

8. Connect with others – make connections with groups addressing the same, or similar, weeds in neighbouring areas or further afield. Share your knowledge and resources and the activities and decisions that have (and haven't) worked. Link with local, state government and non-government organisations for potential funding and grants, resources and support.

Tips for weed professionals

The following points guide professional weed control and project officers in understanding and working with their local communities to develop coordinated weed management programs for priority regional weeds.

1. Know who – identify, understand and encourage social relationships

Identify existing land manager networks.

Networks, including those that are not weed specific, may be leveraged for communicating weed-related messages and events, e.g.

- Farming networks – producer groups, sustainable farming, restorative agriculture
- Volunteer networks – Landcare groups, community associations, Rural Fire Services
- Agronomist and other advisor networks
- Local government
- Regional NRM bodies (e.g. Local Land Services), regional managers of reserves (e.g. conservation, water) and existing cross-agency bodies (e.g. roadside environment committees).

Understand the local community.

Understanding the composition, capacities and perspectives of the community will help to determine weed control priorities, preferred control methods, underlying issues related to weeds and weed control, and where tensions are likely to emerge. Consider:

- the proportion of land managers that are Indigenous land managers, production farmers, hobby farmers/life-stylers, government or corporate (e.g. forestry)?

- how these proportions have changed over time
- which land managers and weed management experts people currently turn to for advice
- who may be most interested in building their capacity to manage weeds.

Build trust.

Encourage formation of positive relationships among land managers and other stakeholders.

Consider:

- bringing together land managers who may not know one another early on
- prioritising weed management along private and public boundaries to demonstrate commitment to being a good neighbour
- developing relationships with other relevant stakeholders with land management aspirations – e.g. Indigenous organisations and community groups – to broaden the weed management knowledge base and practice.

2. Know what and know why – prioritise your target weed relative to other weeds and land management issues

Establish the community's priority weeds.

Where does your target weed fit in relation to the list of weeds that are declared for control? What are the other key weeds of community concern? These may be different from locally declared weeds or other formal priorities. Are some segments of the community more concerned about your target weed than others?

Establish your target weed's community impacts. What are the motivating factors that drive people in the community to control the weed? Are they to do with protecting livestock? Being a good neighbour? Caring for nature? Having a tidy-looking property?

Identify the benefits of controlling your target weed.

This includes not only reduced weed density and spread but also environmental, economic and social benefits resulting from working together on weeds.

3. Know where – where is your target weed located and most likely to spread?

Map the weed extent.

Establish where the core and outlying infestations are. The weed may be widespread in some areas, but emerging in others. Knowing its extent and density will be important to develop a plan for where to prioritise on-ground works; how to allocate resources; and to identify stakeholders in adjoining areas who could benefit from joining the initiative.

Consider any boundaries the weed crosses.

Any land tenure boundaries the target weed crosses will have management implications that will need to be considered.

- Does the target weed spread across private land or public land?
- Does it spread along corridors, such as rivers, roadsides, travelling stock routes or irrigation channels?
- Do opportunities exist to coordinate the timing of management along corridors or across boundaries for more effective management?

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- Are there stakeholders whose jurisdiction spans similar boundaries to the weed who could facilitate coordinated responses?
4. **Know how – what approaches have been used to control your target weed locally?** Identifying and examining stories of previous target weed control success, failure and experimentation provides for collective learning and insights into the time and approaches needed to achieve success. Were there any weaknesses inherent in unsuccessful past efforts where land managers had given up? And how long did any successful effort take to achieve?
 5. **Know when – identify the most effective time to control your target weed.** Timing is critical to successful weed control. Consider how the optimum weed control time fits with other community commitments such as sowing, harvesting, summer holidays. Will land managers have the capacity to control the target weed at certain times of year or during periods of seasonal difficulty such as floods and drought?

6. **Bringing it all together – develop a weed management plan.** Develop a landscape-scale weed management plan that brings together your understanding of both the weed and the local community. This is fundamental to leading an effective weed management program. Consider establishing a steering committee to help develop the plan, engage with diverse stakeholders, and oversee its implementation. Follow the five steps at the beginning of this chapter.

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