

Section 01 : Developing a Weed Management Plan

This section has been developed as an introductory guide to creating a weed management plan for anyone who has an interest in managing Asparagus weeds. While this publication focuses on Asparagus species, the principles described can be applied to any weed in any patch.

Why plan?

Good weed management is about good land management. This is true whether you are dealing with environmental or agricultural weeds. Think in terms of restoring natural ecosystems, protecting remnant stands of vegetation, or increasing the productivity of agricultural land. In the long run this approach will reduce the damage done by weeds to our environment and economy, and will prevent the reinvasion of areas where time and valuable resources have already been expended.

Making landscapes resistant to weed invasion requires integrated weed management. The most effective control is achieved when a variety of methods are used to target vulnerable aspects of a weed, its lifecycle, or its environment.

Since weed management is a long-term exercise the most systematic and effective way to deal with a weed problem is by creating and implementing a plan. Developing and following a weed management plan is important because it will:

- be an essential information tool. Data that is gathered will become the basis from which informed decisions can be made, which will in turn increase the chances of successfully managing a weed problem.
- help identify the best time to control weeds and the best methods to use.
- help to prioritise the use of limited resources available to control weeds in the most effective manner.
- enable planners to monitor results, measure progress against objectives, adapt the plan according to changing conditions and to take advantage of any opportunities that occurs.
- provide documented evidence of the nature and extent of the problem. It will be very useful to support funding applications and will also provide a basis to report progress to funding bodies.

Developing a weed management plan requires time and strategic thought. It is also important to allow time to review what progress has been made against set objectives and explore ways to improve the overall success of a plan. The natural environment is not static and many factors change from month to month, season to season or year to year that impact on the effectiveness of weed management. The plan may require modifications over time to accommodate such fluctuations. However, it is important that changes are made based on evidence gained whilst monitoring the results of the work carried out.

The following are suggested steps to developing a weed management plan. These steps relate to developing a plan for a bushland site but the same principles can be applied to those looking to control weeds on private properties.

Step 1: carry out a site assessment.

Step 2: set objectives based on priorities and resources available.

Step 3: develop and implement an action plan to achieve objectives.

Step 4: monitor performance and change actions as necessary.

Prevention is better than cure. As a plan is developed and implemented, it is helpful to imagine that the weeds were never there in the first place! It is far more cost effective to prevent weed problems than to cure them. The majority of Australia's weeds were deliberately introduced from overseas, either as garden species or plants for agriculture.

Step 1: Site assessment

To carry out a site assessment, a prior understanding of weeds, local plants, birds and animals will be very useful. Do not underestimate the time needed to complete a site assessment. It will be time well spent, as a comprehensive collection of relevant information in the early stages will save considerable time down the track and help to avoid a range of potential problems.

A site assessment can be broken down into the following tasks:

- a) preparing a site information sheet.
- b) preparing a weed management map.
- c) establishing photo points.

a) Preparing a site information sheet

Develop a simple spreadsheet, which indicates the names of the weeds, their location with respect to the native vegetation and what resources are being used to control them. This can be tailored for each individual site. Together with a weed management map and photo point images, the site information sheet allows essential information to be recorded. The sheet can also provide useful information to others who may be involved in planning at local, regional, state or national levels.

Become familiar with the site

Before designing a site information sheet, take time to walk around and observe the site to gain an appreciation of which weeds, other vegetation and animals are present. Make notes on these and other aspects that may affect any work on the site. Such observations may include the presence of hazards (e.g. disused wells, dumps or feral bee hives) or weeds on neighbouring properties. It may take a few visits over several months to get to know the site, especially if it is an unfamiliar site. Plants will be much easier to identify when in flower, so visits should coincide with the range of flowering times of known weeds in the area and in nearby areas.

Obtain background information

As part of the site assessment it will be useful to collect a range of background information about the site including:

- the exact location of the site using a map or Global positioning System (GPS) coordinates.
- land ownership. The landowner must give permission to access the site, and for any work, including weed mapping, to be undertaken. If it is public land, obtain permission from the appropriate authority. Ensure you know where all the property boundaries are located.
- what regulations exist that may affect the planned work, e.g. herbicide legislation, regulations regarding the use of fire, or laws protecting native vegetation.
- who else uses the area and what other people have an interest or association with the site. Determine if they need to be informed of the work to be undertaken or encouraged to avoid certain areas at given times.
- how the weeds invaded the area. The manner in which weeds came to be present on the site may be evident, e.g. from a neighbouring property, dumped garden waste, spread by recreational activity, established following ground works, or spread along stream banks. Knowing how the weed got there will enable the cause to be addressed to prevent reinfestation.
- fire history dating back over the last decade or two, the intensity and the area which was affected. Find out if the site is subject to periodic hazard reduction burning. This may help or hinder future weed management.
- disturbance history in general, e.g. previous land use, floods, or livestock grazing.
- safety risks, e.g. locations of wells, dumped metals, barbed wire, stinging insect nests, power lines, underground cables, cliffs, or loose rocky slopes. This knowledge will help

people to safely work on the site.

- logistical details such as site accessibility and the location of gates.
- locating any previous maps, photos or work that may have been undertaken on the site to gain further knowledge and avoid duplication of effort.

Note that if isolated occurrences of weeds are encountered at this stage, and the identity can be confirmed, it may be worthwhile to remove or treat them immediately before they spread and become more difficult to control. If there is any doubt as to the identity of a plant, or how to treat it, contact your local weed management authority. Each time the site is visited, check under tall trees where birds are likely to perch for signs of new bird-dispersed weeds. This is particularly relevant to Asparagus weeds.

b) Preparing a weed management map

A weed management map is more than a map of where weeds are located on a site. It should also be a record of what other features are present that will have an impact on planning.

Time spent mapping will provide valuable information in order to:

- accurately target weed control activities.
- budget costs and time required to implement control measures.
- monitor how well controls are working.
- highlight other important issues that will influence the restoration of the identified site.

Mapping helps to keep the planning ahead of the doing. Mapping will provide information regarding changes to conditions on a site over time. This information will help to identify if any management changes are required to the plan. It also provides the basis to effectively communicate progress and results to volunteers, contractors, funding bodies and other interested parties.

At a local level, and for the purposes of an individual site assessment, it is not necessary to develop elaborate maps. The idea is to keep it as simple as possible, but to still produce maps that are useful. There is no need to map every weed species that occurs on a site. It is a matter of deciding what are the priority weeds to manage in light of the threat they present and the resources available to do the work. For further information, see section headed "Determining weed priorities".

Keep things manageable and consider the following:

- nature of the identified weeds,
- size of the site,
- terrain variations,
- ease of access,
- how many helpers are available and their level of mapping experience.

All mapping exercises should be planned to minimise disturbance to native vegetation. Avoid trampling desirable vegetation, especially in sensitive bushland.

A case study

Figure 1 is an example of a simple sketch map incorporating basic information and using colour codes to identify weed location and extent. Areas containing native vegetation and a possible safety risk (an old dump) are also included in the example. The approximate scale for this map is 1:2000, so 25mm on the map represents 50m on the ground. The information contained within this map will be referred to throughout this section to help illustrate the weed management process.

Blackberry & Gorse on next property

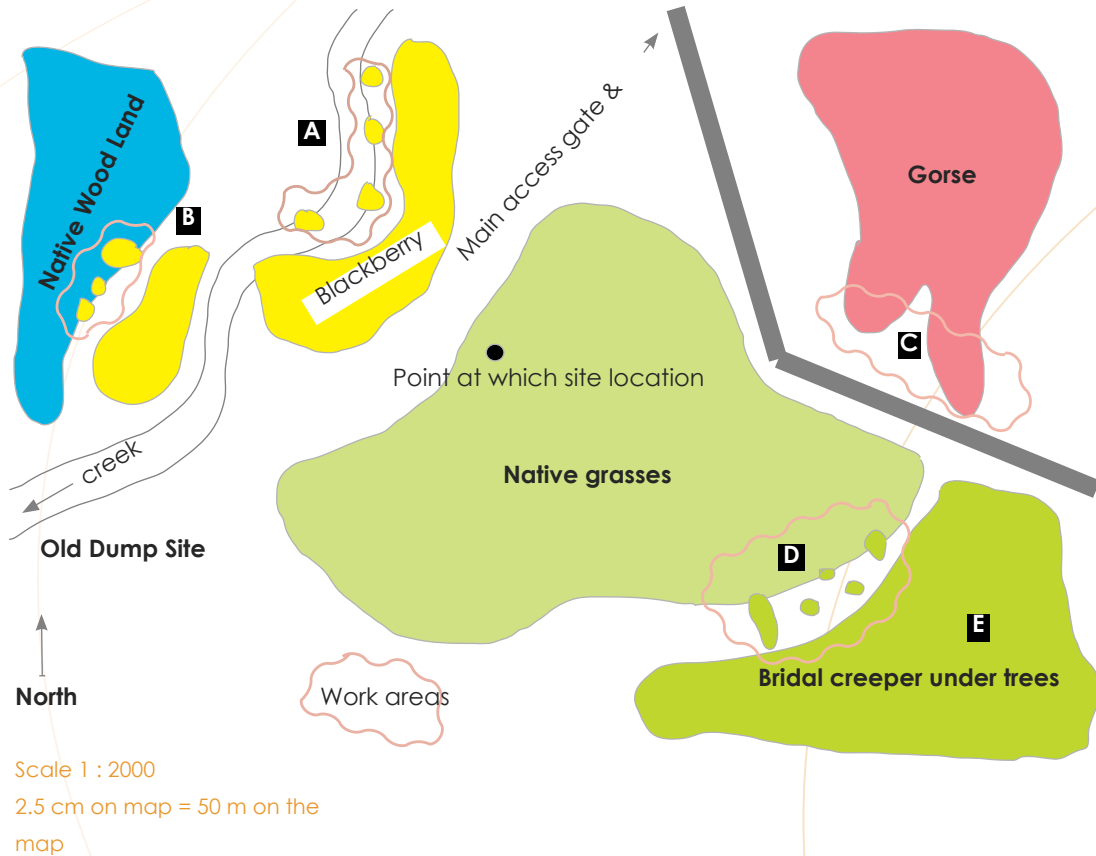


Figure 1: Sketch map example

Area infested with bridal veil	0.70ha
Area infested with gorse	0.44ha
Area infested with blackberry	0.67ha
Area of native grassland	2.1ha
Area of native woodland	0.71ha

Creating a map

To assist in the preparation of a weed management map, it is helpful to obtain a large-scale topographic map, i.e. a 1:10,000 or 1:5,000 scale, unless the area involved is extensive covering more than 100ha, in which case a 1:25,000 or smaller scale map may be needed. An aerial photograph of the site can also provide an excellent format on which to base a weed management map. Topographic maps and aerial photographs can be obtained from state or territory government departments or private suppliers. The idea, in either case, is to get an accurate representation of the identified site or property over which a clear transparency sheet can be placed. Information can then be recorded using coloured, permanent and waterproof marker pens. Numerous transparent overlays are useful when developing a map: one overlay could capture site features and another be devoted solely to weed infestations. The use of different overlays can make each section of the map easier to interpret and will also help determine management options.

It is vital that a site is correctly located on the map or aerial photo. Features such as rock piles, cliffs, gates etc on the ground must agree with those on the map or photo. If not then note the features that have changed since the map or photo was created.

If an appropriate topographic map or aerial photo is not available then the preparation of a hand drawn map can make an acceptable alternative. In order to produce a good quality, hand drawn map it will be necessary to:

- accurately locate the site on a smaller scale map (e.g. a 1:125,000 or 1:250,000 scale) or use a GPS.
- estimate and record the scale that has been used to prepare the weed map. For instance, what distance does 10mm on the map cover on the ground?
- record any key features of the site on the map so that they can be correctly orientated in the future.
- use a compass to establish a North arrow.
- Use graph paper, or divide a sheet of paper into even grids, to help accurately record features on the map. Once a scale has been established, details like the area of infestation, extent of native vegetation, and the length and position of roads can be accurately documented.

It is best to map a site one section at a time, mapping all the target weeds that occur in that section. This reduces the amount of walking needed over the area, minimising impacts, which is particularly important for bushland sites. If several people are involved then each individual should be allocated a clearly defined area to map. Each individual map must be labelled with the date and a section identification number to avoid confusion later.

It is important to keep a balance between trying to make an accurate map, the time needed to prepare it and the needs of the people who will use it. The goal is to have a map that is accurate enough to allow progress to be monitored and for others working on the site to find their way around and identify the locations of weeds and relevant features. Given the size of the example site in Figure 1, a simple hand drawn map is sufficient. However, for larger scale situations that include numerous infestations on many properties, a more elaborate map may be required. In these more complex situations mapping may need to be carried out with appropriate local or state/territory authorities and/or private contractors.

When to map

The targeted weed species will determine the best time to map. For Asparagus weeds, such as bridal creeper and bridal veil, this will be in mid-winter to mid-spring when growth is vigorous. Mid-summer will see these weeds retreat below ground, making mapping impossible. Ground and climbing Asparagus may be mapped as late as mid-summer if sufficient rains have been received. Larger woody weeds, trees and shrubs that are easy to identify can be mapped at any time. For smaller shrubs, herbs and grasses that are more difficult to distinguish it may be easier to map when the weeds are in flower, or at other distinctive stages of their life cycle.

As with all weed work remember safety first. Consider prevailing weather conditions, safety of site access (e.g. roads not too wet or boggy) and note the position of potential hazards before commencing work.

Surveying the site for weeds

Start at one edge of the site and walk across it at regular, parallel intervals. The intervals may be 10 to 50m apart **depending** on the vegetation type and visibility. A compass or hand held GPS unit are useful to help maintain an accurate position. Where there are obstructions across the grid path, observations should be made from the best available position.

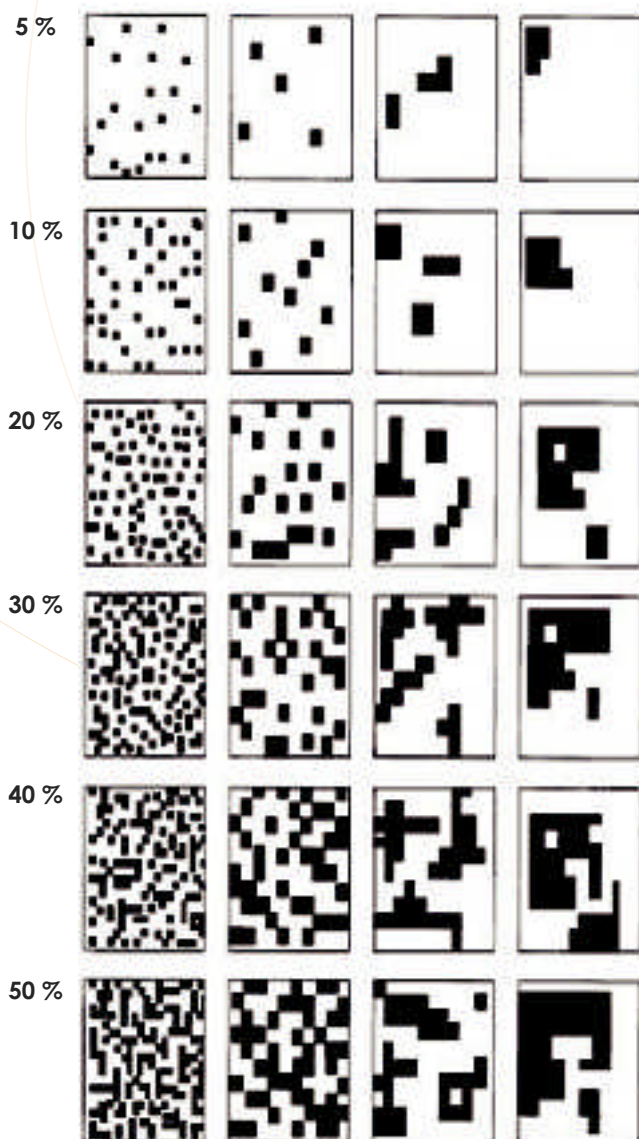
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Weeds may occur in discrete clumps, in which case their location should be marked on the site or sketch map. It might also be useful to provide explanatory notes of where to find small infestations (even a single plant). For example, a brief comment might be; 'go north past the dump for about 20m then look to the western side of river red gum'. This will help others to locate small occurrences. In Figure 1, small outlier infestations of blackberry and bridal creeper are identified by dotted lines. Where a species dominates it is more appropriate to mark the boundaries of the infestation. This has been done with the large blackberry, bridal creeper patches and all of the gorse on the map.

Determining weed density

Weed density describes what proportion of the area of each infestation is covered by which weed species. This is usually expressed as a percentage of the area of infestation. There are a number of ways that weed density may be determined, each with advantages and disadvantages. Much like weed mapping, weed density needs to be determined with sufficient accuracy to be useful, but without exhausting available resources. For the purposes of community-based or local scale weed work, a visual assessment of density will suffice. It should be noted that the results would not be as accurate as scientific quadrat or transect sampling.

Knowing the density of weeds on a site helps prioritise weed control efforts and assess how well they have worked. Being able to measure weed density enables accurate objectives to be set.



Visual assessment is the simplest way to determine weed density. It is quick and easy and useful for smaller sites and most species. To improve the accuracy of visual assessments please refer to Figure 2, which illustrates how different weed densities, as a percentage of ground cover, may look.

Figure 2: A guide for the visual assessment of weed infestation as a percentage of ground cover.

Bayley, D (2001) Efficient Weed Management. NSW Agriculture Paterson NSW.

Establishing photo points

Periodically take pictures of the site to record changes in vegetation over time. This will be useful to assess regeneration of the site as well as changes in weed populations. Photographs should be taken using clearly marked photo points.

Establishing photo points involves marking out reference points on the ground so that photos can be taken of the same area over the seasons and years to determine changes in vegetation.

Some tips for setting up and using photo points are as follows:

- mark the location of each photo point. This can be done with a star dropper or a tin lid fixed securely into the ground.
- use a 'camera post', 1.4 -1.6m high, to rest the camera on. This may be the location marker. What is important is that the height is the same for each photo.
- place a second marker 10m from the camera post in the direction of the photo area. Each time a photo is taken place a sighter pole (e.g. a star dropper) at this point and affix a label with sufficiently large writing on it that it will be clear in the resulting photo (keep the label to file with the photo). Create an identification number and date the photo to avoid confusion as to where and when the photo was taken.
- where possible, align the photo in a north-south direction to avoid excessive sun or shadow.
- if possible avoid steep terrain.
- take photos as frequently as necessary to reflect changes in vegetation but make sure that photos are taken at the same time each year to allow comparisons to be made.
- establish enough photo points to get good sample coverage of the site, the vegetation on it and the particular weed species of concern.

Step 2: Setting objectives

Analysing the weed map, together with information collected on the site information sheet, helps determine weed priorities and develop objectives and actions to address them.

Determining weed priorities

The decision on what weeds take highest management priority should be based on an assessment of two main factors, namely: what degree of impact does each weed have on the site, and the feasibility of their control. The matrix outlined in Table 1 will help the decision making process:

Table 1: Determining weed management priorities

	Weed threat	
	Low	High
Feasibility of control		
Difficult	4th Priority	2nd Priority
Easy	3rd Priority	1st Priority

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Whether a weed represents a low or high threat, is dependant upon a number of factors that relate to its invasiveness and impacts, for example:

- its ability to establish amongst existing vegetation,
- its competitiveness when established,
- the likelihood of long distance dispersal (e.g. by birds, stock, wind, water, or by machinery),
- the extent of reduction in desired vegetation caused by the weed,
- the change the weed causes to natural ecosystems.

To make an informed decision, prior knowledge of weeds and the problems they represent is required. Consult weed control agencies, local governments, regional Natural Resource Management Board or Catchment Management Authority local Landcare groups, Friends of Parks or nurseries in your state or territory for assistance.

Setting objectives

Objectives are statements of intended outcomes that should be achieved within set timeframes and can be measured. It can be useful to set objectives for the short term, i.e. 1 to 2 years, and then over the medium to longer term, i.e. up to 5 to 10 years or beyond.

Objectives should reflect what has been earmarked for protection or restoration, rather than on simply weed management alone, for example:

- a near-term objective for the example site in Figure 1 may be to protect the remnant native woodland and grassland from weed invasion. To achieve this priority, weed species that occur within the native vegetation will need to be treated first.
- medium to long-term objectives may be to reduce the extent of gorse, blackberry and bridal creeper by 50 per cent; re-establishing native species in the treated area; and to reduce by half the amount of time needed for ongoing control work.
- a long-term objective may be to completely restore the site with appropriate indigenous native vegetation and stop the site being a source of gorse, blackberry and bridal creeper spread downstream and onto neighbouring properties.

Objectives should be chosen that would bring satisfaction to those involved. Unachievable objectives will only produce exhaustion and disillusionment.

Management approaches

When determining the objectives also consider the main management approaches available, particularly eradication and containment.

Eradication of the identified weed at the site area, whilst desirable, may not be realistic. For a weed to be eradicated the following conditions need to be present:

- the weed occupies only a small area and will not reinvade from adjoining areas.
- all of the infested area is known.
- the weed is obvious and easy to find at very low density.
- the control method used will kill all plants before maturity.
- the weed seed does not remain dormant in the soil, or newly germinated plants are detected and killed before new seeds are released.
- if the plant has produced seeds they have not been dispersed.
- the available resources must enable initial treatment, regular surveys and control for the lifespan of the seed bank.

Weeds that are in the early stages of invasion may be candidates for eradication. If this can be done, ongoing vigilance will still be required to identify any new occurrence.

Containment of weed species, to prevent and control new infestations, is likely to be a more realistic management approach if the weeds are widespread and well established. Containment is a worthwhile exercise as it protects areas of native vegetation, reduces new weed infestations and reduces the need for future control by limiting the extent and severity of infestations.

The key to containment programs is to focus on treating isolated satellite infestations, rather than core infestations. The objective is to prevent weed populations extending beyond the perimeter of the core infestation.

Weed management is important for the success of native vegetation regeneration or revegetation work but it is not the only factor. Consult with local experts to determine the best ways to encourage regeneration or improve the success of revegetation.

Containment also involves the restoration of treated areas through regeneration of native vegetation or revegetation of the area where weeds have been removed. Preferably this is done with local provenance native plants (species that are native specifically to the identified area), or the establishment of other desirable species. The restoration of the site will limit opportunities for weeds to reinvade.

If working in a group, discuss the weed priorities and management approaches together to reach consensus. If the entire group is involved in setting the objectives then all members are more likely to feel motivated to achieve the outcomes. Keep in mind that some level of weed infestation is likely to be a fact of life. The main objective will usually be to keep infestations to a manageable level so that the threat to the natural ecology of the site is reduced.

Step 3: Developing and implementing the action plan

The next step in creating a weed management plan involves creating a list of action points and allocating time, people and resources to each objective. A simple action plan is included in this section, which records actions for the example site in Figure 1. The following principles of weed management were considered when devising the action points for the example plan:

- always work from the least weed infested areas to the worst.
- minimise soil disturbance.
- if restoring natural bushland let native plant regeneration or revegetation establishment dictate the rate of weed removal.

Consideration should also be given to drainage patterns on the site. It is best to 'start at the top' as many weeds can spread by movement of their seed or other plant parts down watercourses and slopes. By starting at the top the risk of weeds reinfesting treated sites downstream or down slope is reduced. However, a lot of control work can be undone as a result of reinfestation by seeds or other propagules from weeds on neighbouring properties. This highlights the importance of coordinating efforts with those responsible for neighbouring properties.

The action plan needs to be written with the following questions in mind:

- what weeds and what locations are the highest priorities?
- what resources are available?

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- what management options will be most effective, minimise environmental damage and make the site more resilient to weed invasion?

Blackberry and gorse are both invasive species that can threaten natural ecosystems. On the example site, the blackberry may be a higher priority than gorse as it is starting to invade the native woodland and it is growing along the stream. Keep in mind that both the blackberry and the gorse may be providing habitat for native fauna. If so, their removal needs to be staged gradually to allow native vegetation to regenerate, or revegetation to establish, so that an alternate habitat is available.

Having decided what priorities are the most important, the following decisions need to be made:

- what control methods will be applied to each weed?
- when and how often they will be applied?
- who will do the work?
- what monitoring needs to take place to measure the impacts of the methods used?

Assessing the resources required

People: This is the most important resource in any weed work. Making sure that all people undertaking a weed management project are properly trained and motivated is the key to long-term success. Think about the following 'people' aspects when developing an action plan:

- what skills and experience do people bring to the project? What training and advice is available to give people the skills they need? Allow time for this to occur.
- if working with a group, be aware that individuals will have varying amounts of time to commit to the project and this needs to be accommodated.
- ensure people are aware of safety issues and understand the risks associated with weed work, e.g. safe herbicide handling, use and clean up; insect and snake bites; sunburn; correct lifting procedures for heavy items; and use of sharp tools. In the example map, everyone working on the site should be informed of the old dump. Make sure that well-equipped first aid kits are on hand and that people know how to use them.
- ensure people know what they are expected to do on the site during each session and who to go to for help and advice.
- assess if people need to be covered by insurance and if so ensure the policy covers appropriate risks.
- avoid burnout. This is the biggest problem that groups and individuals encounter with weed projects. It is essential therefore that action plans set realistic tasks that can be carried out in a reasonable timeframe and that plans are made to enjoy the process. Celebrate milestones, share experiences and pat each other on the back every now and then!

Finance: A financial plan should be prepared to allocate funds available to the costs associated with implementing the plan. It is important to budget for the long term and to allow for a sustained effort and ongoing follow-up work. When dealing with well-established infestations it is preferable to use resources to contain the infestations and remove weed threats from the best native vegetation and carry out ongoing follow-up. Do not spend all the available resources in one season to attack a major infestation leaving nothing for follow-up. This will only create disturbance, encouraging reinfestation or new infestations by other weed species.

Many costs are self evident, such as the purchase of chemicals if required, or the purchase or rental of machinery and equipment. Some costs may be less apparent and may include the following:

- safe lockable storage in which to store chemicals.

- purchasing protective clothing, safety equipment and a first aid kit.
- carting and dumping costs for any weed material removed from the site.
- fencing to protect revegetation.
- purchasing of aerial photographs or other maps to help with mapping work.
- fee-based training courses for people involved in the weed management program.

Carefully think through all the likely costs that may be involved. To save costs, check what equipment and supplies are available for loan, or at reduced cost through various groups, such as Landcare or Catchment groups. For further assistance with developing a financial plan for weed management contact the local state or territory weed control authority.

Funding: There may be a number of sources of funding to assist with weed management work. Over recent years the Australian Government's Natural Heritage Trust and Envirofund have been major sources of funding for projects. Applications for funding need to demonstrate that a clear plan exists to meet objectives that are in line with those of the funding provider. Applications also need to show how progress will be monitored and success will be measured. Developing a weed plan, which includes clear objectives, budgeted actions to achieve the objectives, and monitoring activities to evaluate progress, will help meet a funding providers' need for information. Weed control contacts in each state or territory will be able to assist with more information on sources of funding.

Time: Allow enough. Learn from experience: the time taken to carry out tasks in the first instance will provide a guide for future planning. Be aware that seasonal changes will impact on the plan. Favourable conditions will not always be available to carry out control activities. Wetter or drier years will impact on weed populations and factors such as site regeneration. These impacts need to be recognised and schedules adjusted accordingly. It is necessary to inform funding providers of any changes to the plan and why they are necessary.

Selecting control options

Each control method has its own advantages and disadvantages and these need to be considered in light of the requirements of the identified site and the objectives that have been set.

Integrated weed management

In many cases the most cost effective and sustainable way to control weeds is to combine or integrate a number of different control methods. Each method chosen needs to target weed species when they are most vulnerable. Knowledge of the life cycle of each targeted species is essential to determine the timing of different treatments.

A sample plan

Table 2 is a simple example of a first year action plan based on the fictional site in Figure 1.

Table 2: Example action plan. Year 1

Month	Blackberry	Gorse	Bridal creeper	Location	Who
Site assessment, mapping and photo point establishment completed in spring of the previous year					
JAN	Spray			A	Joe Bloggs
FEB	Spray			A	Jane Doe
MAR					
APR	Cut & Paint			B	
MAY	Cut & Paint		Map and take photos	B	
JUNE			Dig isolated plants	D	
JUL			Release biocontrols	D	
AUG				C	
SEP			Apply Herbicides	C	
OCT	Map & Take photos	Map & Take photos	Spray boundary of large infestation	All	
NOV	Spray			A	
DEC	Spray			A	
Note: This calendar is a simple example only, actual method used and timing of application will depend on local conditions. Seek advice from appropriate authorities.					

Using the map references from Figure 1, the blackberry treatments have been divided into two areas: Area A, where the infestation is away from native vegetation, and Area B where isolated plants occur near or in native vegetation. Note that Area A includes an isolated patch to the south of the main infestation. In this example, spraying the blackberry has only been planned for infestations away from native vegetation. Because of the proximity to native vegetation, considerable care will be needed to avoid spray drift and off- target damage. The herbicide used will need to be registered for use near waterways as the infestation is near a stream. This is a common location for blackberry.

As herbicides are unlikely to completely kill blackberry in one application, follow-up work is included in the plan. For Area B, cut and paint applications have been planned to minimise risk to native vegetation. This is a labour intensive method and blackberry plants are not the easiest to work with due to their prickly nature, so protective clothing, heavy gloves, and thick clothing and footwear will be required.

Each activity is scheduled so that the method used will be most effective relative to the weed's growth stage.

Step 4: Monitoring performance and making changes

Monitoring is often the most neglected area of weed management, yet it is a vital part of the weed management cycle. Monitoring progress will help identify the following factors:

- how well control measures are working.
- the rate of spread of weeds or the establishment of desirable vegetation.
- new threats to native vegetation.
- any issues that have arisen that will affect site restoration.

By gathering and monitoring fresh information, the weed management plan can be altered as needed to improve results and respond to changes in the environment.

Monitoring involves mapping the site at regular intervals, taking photos at selected photo points and revisiting site information to check if any data needs updating. Monitoring activity should focus on:

- changes in the extent of weed populations, i.e. is more or less area covered
- changes in the density of weed cover.
- occurrences of other weed species.
- unexpected impacts of weed control activity, e.g. off-target damage, erosion or invasion by other species.
- changes in the extent and condition of native vegetation or other desirable vegetation.
- changes in any conditions which will impact on site restoration work.

Ongoing mapping needs to take place at a similar time to when the original map was created to allow valid comparisons. By creating successive site maps and making a fresh assessments of weed density each time, a useful comparison can be made over time showing changes to natural vegetation and weed spread. Comparing successive photographs taken from the same photo points will help to identify changes. Whilst photographs can effectively portray change, the reasons for change may not always be evident in the images.

Observations need to be made about seasonal conditions or other factors that may impact on the results. For example, if the season that has passed was particularly dry, weed populations may have declined due to water stress rather than from control work. Unexpected site disturbances, such as fire and vehicle impacts, also need to be considered when monitoring results and setting or readjusting plans for the following seasons.

Recording

Accurately recording of information on both the site information sheet and the weed map is essential if a detailed understanding of how a site is changing over time is to be achieved. Reviewing the various photographs, maps and information sheets will enable informed management decisions to be made. By following this process, any changes that are made will be based on documented results and can be substantiated.

The information presented in this section has been adapted from module 1 of the Introductory weed management manual produced by the Weed CRC. The manual consists of four modules, which cover the following areas:

Module 1 - Developing and implementing a weed management plan

Module 2 - Weed Control methods for community groups

Module 3 - Collecting and preparing plant specimens for identification

Module 4 - Presentation of information to small groups

All four modules are available online from

www.weeds.crc.org.au/publications/weed_man_guides.html

or telephone (08) 8303 6590

