

# Chapter 2

## Setting yourself up for success

### Work to a plan

Planning is the critical first step in managing gamba grass. While it's tempting to jump straight in, it's important to plan so you can monitor and track progress over time and achieve the best possible outcomes. A well thought-out plan can:

- make weed-management tasks more realistic and achievable
- reduce the off-target impact of your control
- prevent reinvasion in the long term
- save time, effort and money
- inspire others who see your success
- allow you to more easily adapt your management if circumstances change.

The planning stage is where you come up with a realistic, long-term plan of attack that also identifies yearly activities that work towards long-term outcomes. This plan should:

- consider what we know about gamba grass biology and ecology (Chapter 1 – 'Understanding gamba grass and its impacts')
- communicate why you're managing gamba grass and the management perspectives of all involved
- take stock of your situation and tailor an approach accordingly
- identify appropriate control techniques that you'll use
- track what you've achieved over time
- consider and align to any legal obligations relating to the management of gamba grass in your given area or situation.

Figure 2.1 outlines the main steps involved in planning for gamba grass management. These are expanded upon on the following pages. Initial



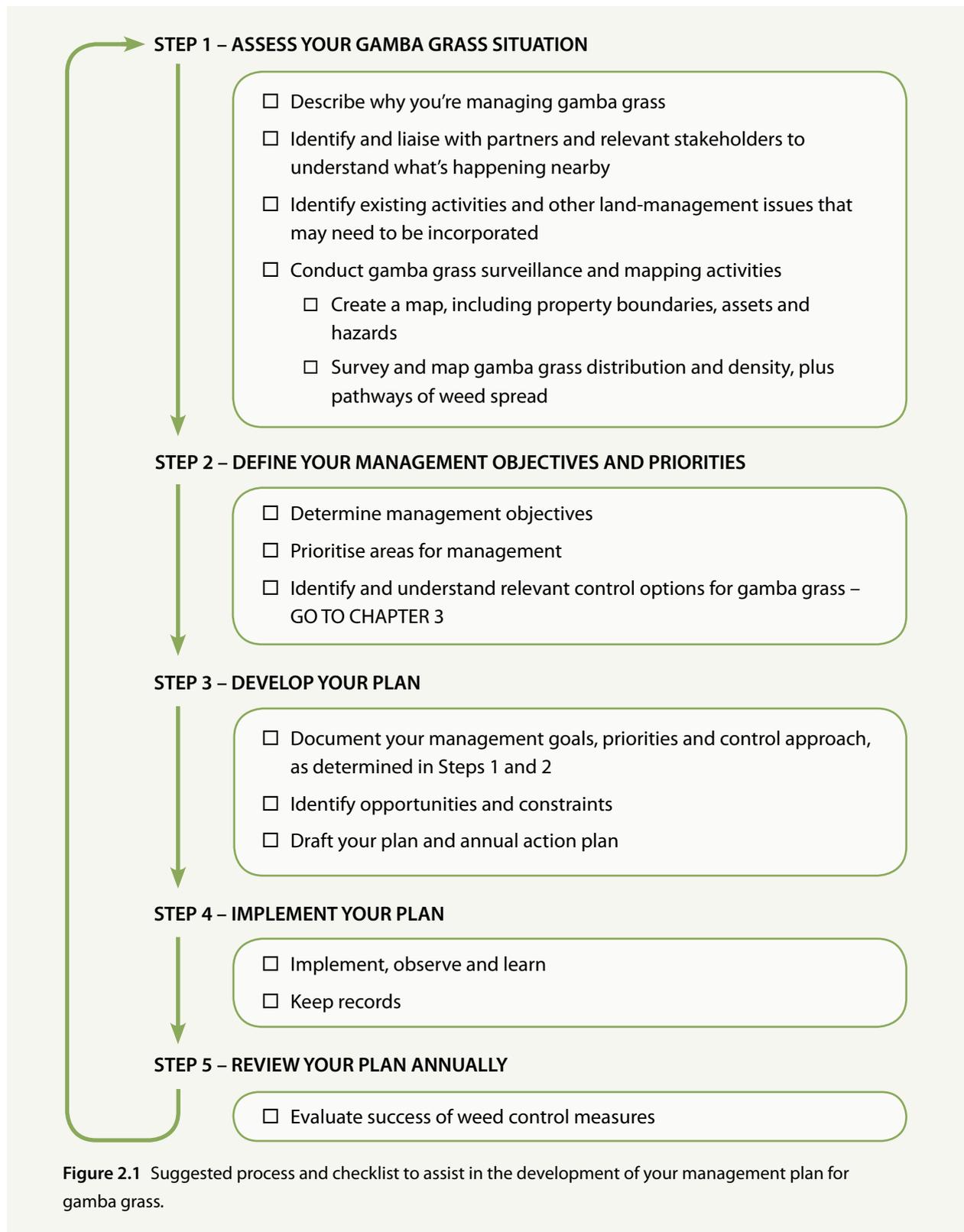
Matt Sheehan

*Preparing for a remote area control program to implement a carefully thought-out strategic plan to eradicate gamba grass from Mudginberri, Kakadu National Park.*

assessment of the weed situation (Step 1) and management options (Step 2) inform 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).

This chapter is based on the Introductory Weed Management Manual published by the Cooperative Research Centre for Australian Weed Management (CRAWM 2004).

# Chapter 2



## Step 1. Assess your gamba grass situation



Natalie Rossiter-Rachor

*Gamba grass invading high value savanna. Developing and following a well thought out plan in situations like this will increase the likelihood of long-term successes that address multiple management goals.*

The first step in developing a management plan is to understand the scale of your gamba grass problem and the opportunities and challenges that will influence its management. This information will provide background to the management plan (Step 3).



### **Understand why you're managing gamba grass**

There are many different reasons to manage gamba grass. Understanding your management reasons will inform an appropriate management response. Because gamba grass can spread long distances, your management success also depends on how gamba grass is managed elsewhere. Acknowledging other reasons for

managing gamba grass in surrounding areas and considering these where appropriate can help achieve consistent or complementary management outcomes at the landscape scale.

Table 2.1 summarises the range of common reasons for managing gamba grass. It identifies key impacts of gamba grass and provides a statement of what success looks like – what has to occur in broad terms to achieve outcomes. Listing all reasons and prioritising these will help in your planning. There may be more than one reason. For example, you may be managing primarily for protecting life and livelihoods, but the management area may also include cultural or biodiversity values which your management approach should also address.

# Chapter 2

**Table 2.1** Common reasons for managing gamba grass, key impacts and desired outcomes of management.

Reasons for management	Impact of gamba grass	Desired outcome of management
<b>Legal management requirements</b>	Refer to Box 2.1	
<b>Road safety</b> 	Reduces visibility and amenity value	Maintain visibility and amenity
<b>Life and livelihoods (including built assets)</b> 	Increases fuel loads and fire intensity, posing a threat to life and built assets	Reduce risk of damaging fires
<b>Cultural and natural asset protection</b> 	Increases fuel loads and fire intensity, posing a threat to cultural and natural assets  Displaces native species, changes ecosystem structure and function	Protect asset (from fire, competition and other impacts)
<b>Livestock production</b> 	Poses a risk to livestock and assets through increased fire risk and fire intensity  Provides a source of seed that spreads to other high-value areas	Maintain competitive pastures and protect livestock and livelihoods from damaging fires  Contain gamba grass to property by preventing seeding and seed spread

Regardless of the reasons for managing gamba grass, all desired outcomes can be achieved by considering three key principles in the development of a management plan.

- 1. Removing or reducing gamba grass biomass** reduces the risk of catastrophic fires, decreases competition on desirable vegetation and minimises habitat modification.
- 2. Reducing seed production** can bring gamba grass infestations under control within 3–5 years. Gamba grass seed is short-lived, so preventing or minimising seed production and killing mature plants can exhaust the seed bank.

- 3. Reducing seed spread** can prevent new infestations from establishing. Gamba grass is still in the early stages of invasion across northern Australia. Stopping seed spread can prevent infestation of areas that are currently free of gamba grass.

**Keep these principles in mind when developing your plan and when starting your control program. This will help keep you focused on achieving your desired management outcomes.**

## Box 2.1 Legal management requirements

You may be under legal obligations to manage gamba grass. Gamba grass is a declared weed in all states and territories. Management requirements vary from preventing the movement and sale of gamba grass through to an obligation to eradicate it.

In some areas, a zoned approach is taken, where a higher level of management is required if you live in an eradication zone, compared to if you live in a containment zone. As a minimum, your plan should reflect the legal management requirements for your region.

A guide to state and territory management requirements is provided in Chapter 5 ('Further information' on page 128). However, note that the legal status of weeds, and your associated obligations, may change over time. It's therefore important to check with weed authorities in your state or territory to ensure that you're fully aware of your legal obligations in relation to gamba grass and other weeds.



### Work together on gamba grass

For successful gamba grass management, you may have to involve other people. This may apply for the following reasons:

- Land is sometimes under joint management, so it's important to communicate your management intentions to all land managers and gain their support or cooperation.
- Gamba grass causes impacts at the landscape scale. What happens outside your management area may affect your management. Providing opportunities for adjacent land managers to be involved may be critical for your success.
- You may need permission if your proposed activities will be done on someone else's land.
- You may need to get permits or other permissions for some control approaches or associated activities.

- Support from external sources may be available to you (e.g. government grants). These could be cash or in kind. Funding agreements may stipulate required activities or outcomes that need to be reflected in your management plan.
- You may need to seek external advice. For example, identifying gamba grass or developing surveillance or mapping methodologies may require the involvement of experts.

You may learn new information while managing gamba grass. Sharing information and outcomes with others contributes to improved management at the landscape scale.

**When developing your plan (Step 3), list all stakeholders, how you'll communicate with them, and what role they'll play. Also identify the risk of not involving others.**

If multiple stakeholders are involved, decide if the arrangements between stakeholders will be informal or formal.

### Informal

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

- welcoming new landholder arrivals and providing them with information on local gamba grass (or other weed) problems
- organising property walks to discuss control methods
- sharing weed control equipment
- agreeing to let each other know if a gamba grass outbreak is observed
- having an in principle agreement that neighbours may control the occasional weed appearing just over the fence.



Rowena Eastick

*Planning meetings should involve all critical stakeholders and partners in setting management priorities.*

## Formal

A more formal approach is to form a weed-focused group. Recommendations on how to achieve this are detailed on page 39 by the Australian Centre for Culture, Environment, Society and Space, University of Wollongong. Formal arrangements could include:

- establishing an agreed, common goal for gamba grass in the local area and following a common plan
- defining the boundaries within which gamba grass will be tackled
- sharing the organisational and weed management load
- documenting and promoting what has been achieved
- establishing a formal entity (e.g. incorporated association) with a committee of management.



### **Identify existing land-management activities**

It's important to consider what activities are already occurring at the site, in relation to both gamba grass and other land-management issues. Consider if there has been past gamba grass management, what was done and how successful it was. This could help inform what you should (or shouldn't!) do in your new plan.

The site might be subject to other land-management activities, such as fire or pest animal control. These management activities could impact on gamba grass

control. It's important to integrate any proposed gamba grass management activity into existing land-management activities to try to meet all land-management objectives.



### **Map gamba grass infestations, key assets and pathways**

Maps can be used for planning and communication. Ideally, they should:

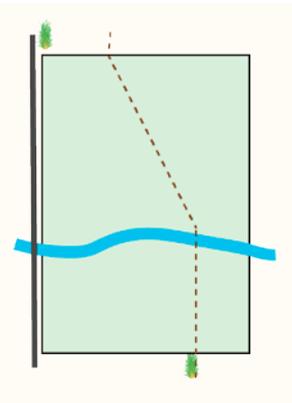
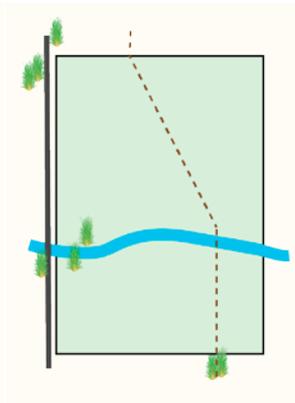
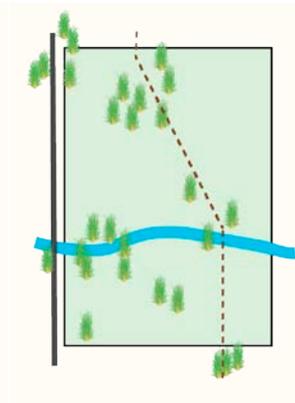
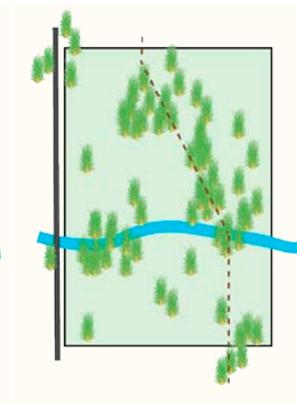
- communicate gamba grass locations and density levels, including changes over time
- identify management area boundaries and priority control areas (see Step 2)
- help you determine your management objectives (see Step 2)
- inform follow-up treatments (see Step 5)
- show assets, likely spread pathways and safety hazards (see 'What to map' section for more information).

Obtain a map of the management area or property, either as a hard copy or in a digital format to use on a tablet or smart phone. A map doesn't need to be complex. The goal is for people, now or in the future, to find their way around the management area and follow a logical and strategic approach to gamba grass management based on weed distribution, identified assets and access points. A hand sketch can work for small properties, while a computer-generated map may be better for larger properties.

Walk, drive or fly over the management area and determine the presence of gamba grass. Record infestations by hand and transfer this information to your management map later or use a data-capture device or purpose-built app (see Box 2.2).

It's also important to record weed density so you can assess in future years whether your efforts have been successful. Typical categories for recording weed density are described in Table 2.2, and further detail is given in McNaught et al. (2008).

**Table 2.2** Strategic management objectives and actions required for different stages of gamba grass invasion.

				
<b>Stage of invasion</b>	<p><b>Absent</b></p> <ul style="list-style-type: none"> <li>not known to be present in the management area (but may be present in the local area)</li> </ul>	<p><b>Early stages of invasion</b></p> <ul style="list-style-type: none"> <li>rare (&lt; 1%): isolated individual plants</li> <li>low risk of reinfestation from neighbouring areas</li> </ul>	<p><b>Scattered to frequent</b></p> <ul style="list-style-type: none"> <li>light (1–10%): scattered patches and isolated plants</li> <li>medium (11–50%): frequent patches interspersed with isolated plants</li> </ul>	<p><b>Widespread and dense</b></p> <ul style="list-style-type: none"> <li>large, dense infestations (&gt;50%)</li> <li>weeds found across most of the management area</li> </ul>
<b>Management objective</b>	<p><b>PREVENT</b></p> <p>Stop arrival and establishment</p>	<p><b>ERADICATE</b></p> <p>Eliminate all plants, including seeds</p>	<p><b>CONTAIN</b></p> <p>Prevent further spread beyond core infestations, reduce density of the core, and eliminate outlying infestations</p>	<p><b>PROTECT ASSETS</b></p> <p>Reduce impacts on high-value assets by reducing weed density and seed production</p>
<b>Management actions</b>	<p><b>Spread prevention</b></p> <ul style="list-style-type: none"> <li>implement hygiene protocols and other measures to prevent gamba grass from arriving and establishing</li> </ul> <p><b>Search</b></p> <ul style="list-style-type: none"> <li>ongoing surveillance for new gamba grass incursions</li> <li>education and awareness</li> </ul>	<p><b>Spread prevention</b></p> <ul style="list-style-type: none"> <li>implement hygiene protocols and other measures to prevent reinvansion</li> </ul> <p><b>Control</b></p> <ul style="list-style-type: none"> <li>remove all plants before they reproduce</li> </ul> <p><b>Delimitation</b></p> <ul style="list-style-type: none"> <li>monitor frequently to map extent of infestations</li> </ul>	<p><b>Spread prevention</b></p> <ul style="list-style-type: none"> <li>implement hygiene protocols and other measures</li> </ul> <p><b>Control</b></p> <ul style="list-style-type: none"> <li>implement an integrated control program to reduce density in core infestations</li> <li>for outlying infestation, search for and remove all plants before they reproduce</li> </ul>	<p><b>Spread prevention</b></p> <ul style="list-style-type: none"> <li>implement hygiene protocols and other measures</li> </ul> <p><b>Control</b></p> <ul style="list-style-type: none"> <li>implement an integrated control program</li> <li>protect high-value assets at risk from weed impact</li> </ul>

# Chapter 2

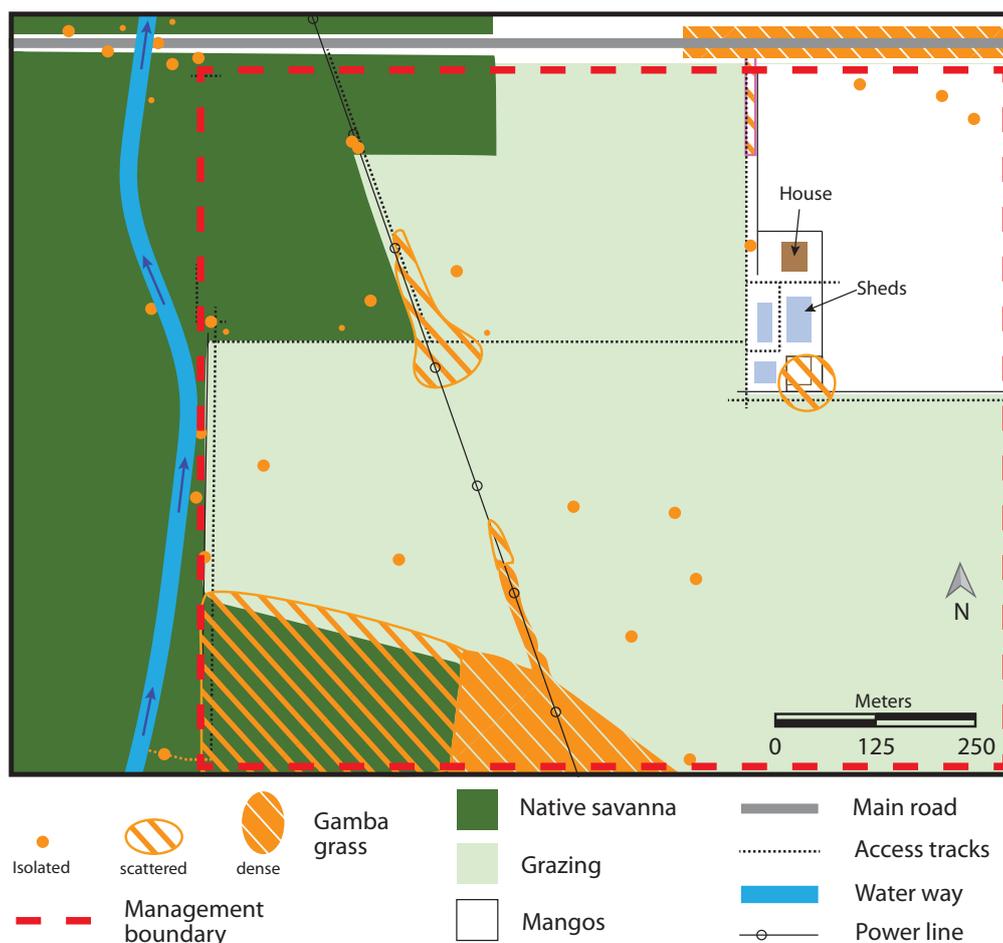
## What to map

Your base map should show gamba grass distribution and density, management area boundaries and priority control areas. You should also capture the following information:

- locations and types of **assets** (the things you're protecting) in your management area and, if possible, areas adjacent to it. This may include significant biodiversity areas, property infrastructure, and historical and cultural sites
- **pathways** for gamba grass spread. For example:
  - roads, tracks and other linear easements, such as stock routes and powerlines

- water courses
  - storage and stockpile areas
  - likely movements of stock and native and feral animals
  - prevailing winds and topography where wind-dispersed weeds are likely to be deposited
- any **safety hazards** to reduce the likelihood of accidents or injury. For example, areas that are steep or have hidden ground hazards that make them unsuitable for walking or driving across.

Figure 2.2 provides an example of a simple map of gamba grass occurrence and density.



**Figure 2.2** Example of a simple mud map showing weed occurrence, density, assets, spread pathways and access points.

## Box 2.2 New gamba grass mapping and monitoring tools to support best-practice management

Natalie Rossiter-Rachor and Samantha Setterfield

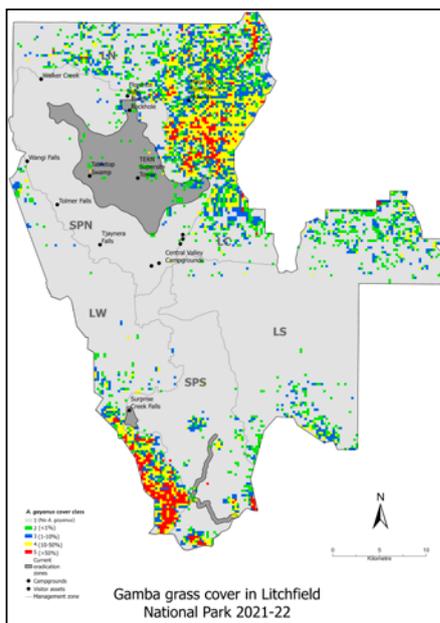
National Environmental Science Program (NESP) researchers are developing user-friendly gamba grass mapping and monitoring tools through a collaborative project with weed managers.

The new survey tools include an aerial survey map and drone-based mapping (still in development). These tools will help managers to:

- visualise gamba grass distribution
- examine landscape-scale patterns of gamba spread
- identify priority areas for control
- monitor and report progress.

The gamba grass aerial survey app will be available on [tern.org.au](http://tern.org.au)

**For further information:** search 'NESP Resilient Landscapes Hub- Project 3' using your preferred search engine.



Output of the new mapping tool data from Litchfield National Park in 2021–22. Survey data shows gamba grass cover in grid cells (250 × 250 m) in five gamba grass cover classes (Rossiter-Rachor et al. 2023).

### When to map

The best time to survey and map gamba grass will depend on three factors: the time of year, the mapping or surveying methodology you use, and what other land-management activities are occurring at the site.

### Time of year

Gamba grass can be identified year-round, but it's easiest to identify in the dry season when it's in flower or seed. Ground-based surveying when gamba grass is seeding (between May and August) risks spreading seed, so make sure you take hygiene and spread prevention measures (see Chapter 3 – 'Managing gamba grass'). Mapping in the early dry season (March/April), after most native grasses have browned off and gamba grass remains green and hasn't yet set seed, is another good time to map gamba grass. If you're unsure whether you have a gamba grass infestation, contact a weed officer in your state or territory or send a specimen or good-quality images to your local herbarium (see Chapter 5 – 'Further information').

### Mapping method and site attributes

Ideal timing may depend on your mapping method and the site. If it's a ground-based survey, it needs to be dry enough to access the area. If you're mapping using aerial or remote-sensing techniques (e.g. satellite imagery), you might have a bigger time window.

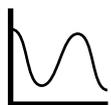
### Other land-management activities

Other land-management activities may impact your ability to search for, detect and map gamba grass. For example, mapping immediately after burning or slashing may reduce your ability to accurately detect gamba grass plants.

Communicate your mapping intention to relevant land managers to coordinate land-management activities and minimise timing conflicts.

# Chapter 2

Remember: mapping isn't a one-off activity. It should be done initially to delimit the infestation and repeated periodically (every 2–3 years) to capture any changes in distribution and density. These changes will help determine if your control is being effective.



## Establish a baseline of current gamba grass status

Information collected on weed distribution and density can be used to establish a baseline, 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 fixed photo points, where images are taken at the same spot and time each year. This ensures a long-term photographic record of change in weed distribution and density over time.

## Step 2. Define your management objectives and priorities

This step requires you to consider the gamba grass strategies and control options available for your management area, based on the information collected in Step 1.



## Identify strategic management objectives

Strategic weed-management objectives relate to the level of weed invasion. They are: **prevent**, **eradicate**, **contain**, and **protect assets**. Table 2.2 describes these objectives and the general actions needed to achieve them.

Decide on a feasible management strategy for your management area by considering:

- the distribution and density of gamba grass (including in the surrounding area)



Rowena Eastick



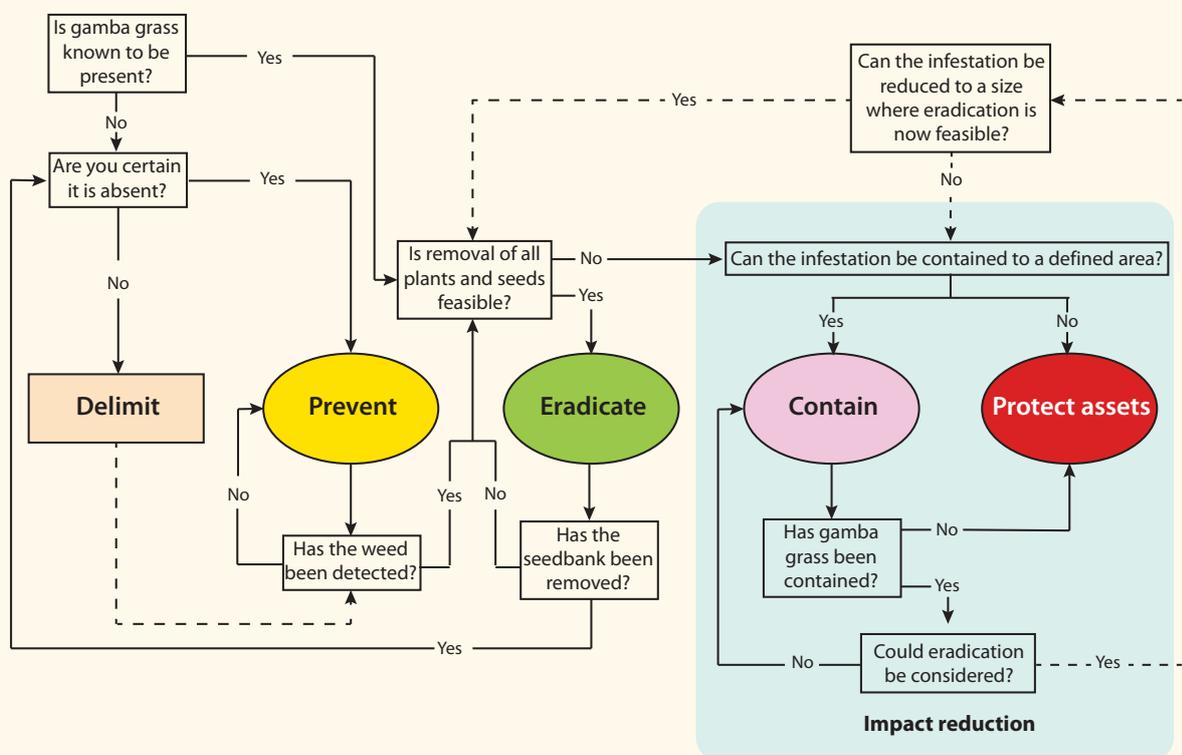
Rowena Eastick

Photo monitoring provides a quick, inexpensive and reliable way of recording change at a site over time.

- the extent to which you can identify and manage spread pathways
- whether gamba grass can be cost-effectively prevented or controlled
- the potential impacts of gamba grass.

The decision support tool in Figure 2.3 can assist with choosing the most appropriate management objective, and ensuring it's achievable through periodic review (based on monitoring). In summary:

- If you don't have gamba grass, your management objective is **prevention**. This should be confirmed over time with regular surveys to ensure that gamba grass remains absent.
- If gamba grass is detected, it's important to consider its density and distribution. If it's feasible to remove all plants and the seedbank, the management objective should be **eradication**. See Box 2.3 for more information.
- If infestations are beyond eradication, consider if you can **contain** it to a part of the management area and keep other areas clean.
- If gamba grass is widespread across your management area and the broader landscape, and can't be eradicated or contained, management efforts are best spent **protecting assets** from its impacts.



**Figure 2.3** Decision-support tool for choosing and reviewing management objectives, adapted from the Gamba Grass Management Plan – Cape York Peninsula and Far North Queensland 2012.

### Box 2.3 Eradication – is it feasible?

Note that ‘eradication’ is a term often used but rarely achieved for weeds. Successful eradication requires the elimination of every single plant and propagule (both seeds and vegetative plant parts) in a defined area plus no further reintroductions from outside the area. This is extremely difficult to achieve. Generally, successful eradication is more likely where the weed is new to an area or property, when distribution and density of the weed is low. Fortunately, gamba grass has relatively short-lived seed, which makes eradication theoretically more achievable.

### Factors required for successful gamba grass eradication:

- All infested areas are known.
- The chance of reinvasion from surrounding areas is low.
- All plants can be detected and treated before they set seed.
- This ‘search and destroy’ effort is maintained each year until the seedbank is exhausted.

See Chapter 4 (‘Case studies’) for examples of active gamba grass eradication programs.



# Chapter 2

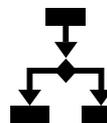


## **Prioritise sites**

Regardless of the management objective you choose, your approach should prioritise all of the following that apply to your management area:

- new, small or outlying weed infestations
  - These should be intensively controlled (and eradicated where feasible) to stop them spreading further.
- areas with high risk of weed spread and areas of significant source of weed seed
  - Targeting known point sources of infestations is a strategic management priority that may benefit you as well as neighbouring lands that don't have gamba grass.
  - For example, roadsides, around gateways and other infrastructure, parking and visitor areas, stockyards, dams, troughs and watercourses should be targeted for weed control to limit further spread and reduce the risk of new infestations establishing.
- high-value assets
  - Where infestations are widely established, focus on reducing current and future impacts on important assets. For example, look after the best patches of bush, cultural heritage sites, infrastructure and livestock.

Seek advice and input from weed-management experts and neighbours to ensure that your priority-setting is sound and will be supported by those around you.



## **Choose control options**

Understanding the full range of gamba grass control options will help you decide what will work best for your situation.

A successful control option needs to effectively kill gamba grass, but it also needs to be practical and align with your resources and experience, now and into the future.

Gathering information on gamba grass and how to manage it will allow you to choose the best option. Refer to:

- Chapter 1 ('Understanding gamba grass and its impacts') to understand biology and impacts
- Chapter 3 ('Managing gamba grass') to explore management options
- Chapter 5 ('Further information'), for useful additional information and links to external resources (e.g. publications, legal management requirements, useful websites, etc.)

It helps to think 'outside the box' in terms of what control options you could adopt. You should also be aware of the limitations of control options. These may include off-target effects on desirable plants, time required to achieve effective control, and expense. Table 3.1 in Chapter 3 ('Managing gamba grass') compares the pros and cons of prevention and control methods for gamba grass.

## Step 3. Develop your plan

This step brings together all the information you've gathered in steps 1 and 2. It also aligns your priority actions for the weed plan with your long-term goals for your management area and available resources.



### ***Set goals for your management area***

Think about your reasons for managing gamba grass (Table 2.1) and what you hope to achieve. Describe your long-term goals. Setting long-term goals highlights what you value most about your management area, property or asset. In turn, this influences your weed-management priorities – whether those are economic, environmental, social or cultural impacts that you wish to prevent or manage.



### ***Identify opportunities to work smarter***

Identify any ways you can make gamba grass prevention and control more efficient or effective. You might be able to share equipment with a neighbour or split the cost of hiring a spray contractor. There may be multiple weeds that you can control by the same method. There might be opportunities to apply for grant funding to undertake weed control. Other forms of assistance may be available through your local weed authority or natural resource management organisation.

Use the information you gathered in Step 1 ('Work together on gamba grass') to determine opportunities. Working in a coordinated or collaborative way may enhance your knowledge, improve your outcomes, and expand the pool of available resources.



### ***Consider any constraints***

Consider and plan for any constraints that may limit or direct what you can do to prevent or manage gamba grass in the management

area. Consider finances, people, infrastructure, equipment and competing priorities. Examples of possible constraints or considerations include:

- funds to spend on weed control and the cost of individual control options
- availability to conduct weed control when it needs to occur
- skills and knowledge
- availability of equipment or labour
- seasonal variability and other access restrictions
- workplace health and safety considerations
- natural dispersal of gamba grass
- timing of burning (planned or bushfire)
- suitability of available control techniques
- preferences regarding herbicide use
- legal requirements to control declared weeds
- avoiding unintended damage (e.g. risks of herbicide drift, contamination of waterways, off-target damage to desirable vegetation).

### ***Draft your plan***



Your plan doesn't have to be overly complicated, but it's good to have something in writing that, as a minimum, describes your decision-making, outlines your strategic long-term plan, and details your yearly control activities. You can refer to it as a reminder and use it to communicate to others. An example of the type of headings and content to include in your plan is captured in Chapter 5 ('Further information').

### ***Develop an annual plan of action***

As well as providing a 3–5-year overview of your goals and objectives, your plan should include annual activities, detailing what you need to do each year to work towards your long-term management objectives. At its simplest, a weed plan can be a calendar of actions required at certain times of the year.

# Chapter 2

Consider your long-term goals for the management area, analysis of the weed situation and management options, the constraints you're working under, and the opportunities to address these. Draft a calendar of actions you can feasibly undertake to address gamba grass in specified areas of the management area.

Think about the timing of these actions in relation to each other and other land-management activities. Are there conflicts? Can you implement further efficiencies to save costs or time? The plan doesn't need to be perfect. It can be refined until you achieve something workable for the year.

Seek advice and input from weed management experts (e.g. local biosecurity officer, farm advisor, Landcare officer) and neighbours to ensure that your management approach is sound and will align, if needed, with the weed-control activities of others.

Remember: gamba grass management can't be achieved in one year, so the yearly plan must support and work towards your long-term management objective.

## Step 4. Implement your plan

Refer to your plan regularly as you implement your weed-management program and use it as a guide and a communication tool to all others involved. You could program actions into an electronic diary (such as your smartphone) so you get pop-up reminders. Use your plan to keep on track, stay motivated and remind you of why you're managing gamba grass. Remember that the plan is a high-level summary of what you're aiming to do, and that each action will likely need further division into tasks.

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



### *Learn from doing*

Use the implementation of your weed plan as an opportunity to observe the effectiveness of your actions, so that you can make improvements to your plan and methods of weed management. Treat it as a continuous learning exercise and challenge yourself on how it could be done better. For weed-control actions, consider the following questions:

- Did it cost more or take more time than expected?
- Did you achieve a satisfactory level of weed kill?
- Did you experience scheduling clashes between weed management and other important activities and needs?

Make diary notes throughout the year on what you've observed and learned. Failures are just as important to record as successes, because this is how a plan can be improved over time.

### *Keep good records*

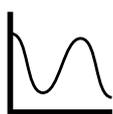


In line with the 'learn from doing' approach, log your activities as you undertake them. Keep records of:

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

## Step 5. Review your plan annually

Review your weed plan annually to inform what changes you need to implement the following year. Gamba grass requires multiple years of follow-up control so 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 gamba grass, you may shift your focus to other weeds of lower priority or other land-management needs.



### **Monitor and evaluate your plan**

Monitoring approaches range from simple to complex and, at a minimum, should include:

- maps that document expansion or reduction of infestations against the maps you prepared at the start of the program (Step 1)
- photo monitoring to:
  - provide an easy 'visual' method of assessing progress over time
  - document the size and condition of gamba grass at the time of control
- a log of activities, dates, climatic and environmental factors to help determine why some methods may have worked one year but not in another (see 'Treatment Record Sheet' in Chapter 5 ('Further information'), page 131)
- an assessment of costs through records of expenditure and revenue
- records of herbicides used and their efficacy
- quadrats or transects to quantify changes in weed densities or the response of native plants
- a record of failures as well as successes to ensure ongoing improvement and development of your management practices.

Based on the findings of your monitoring, review your program and assess if your management activities are meeting goals and objectives. Where management outcomes weren't as successful as expected, determine why and, where possible, adjust management to overcome barriers to success. You may want or need to share your review with others to get their feedback and perspective. Perhaps they'll see opportunities to improve your plan where you can't. Sharing your review with others can motivate yourself and others and contribute to a shared sense of responsibility for complex management issues.

To review gamba grass control, ask yourself broad questions such as those outlined in Table 2.3. Draw on the monitoring undertaken in Step 1 to measure these questions against a baseline. If weed control has been poor, then you need to determine why. Seek professional advice on what changes you should make to your control techniques and your broad management approach. Weed management is a long-term undertaking, and you need to be confident that the time and money invested will give you effective results.

**Table 2.3** Example annual review questions.

Review questions	Monitoring techniques that can address questions
Has the extent (area) of the weed infestation increased or decreased?	Update the property map to record any changes in weed distribution or any new weeds.
Has the density of the weed increased or decreased?	Check against categories in Table 2.2.
Are desirable plants recovering?	Desirable vegetation can also be assessed using the categories in Table 2.2.
Which control methods have been most successful?	Measure and compare weed kill.
How much is control costing?	Calculate costs per hectare from your record-keeping, including cost for your time.

# Chapter 2



## Follow up

The key to successful gamba grass management is a commitment to an appropriate follow-up program.

Follow-up is essential because:

- Seeds in the soil may keep germinating for 1–2 years.
- Seeds may continue to arrive at the site from other areas and form new infestations.
- Large, dense infestations may take many years to contain.
- Gamba grass tussocks are large, and it's common for some plants to survive initial control efforts.

You'll need to determine how often you'll follow up. The most important consideration is that your follow-up is implemented often enough to stop new seed production and reduce spread. If you have dense infestations at the start of your control program, you should (where practicable) follow up as soon as a few weeks or a month after treatment to mop up any plants that were missed or not completely killed. After that, a minimum of one treatment per year will be required.



## Repeat the annual planning cycle

Updating your plan should become quicker each year. Reviewing progress (Step 5) from the previous year informs any updates needed to assess the situation (Step 1). Any new information on weed-control techniques, plus observations on how well the methods worked in the previous year, will inform 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, spend more time assessing the current state of gamba grass prevention and management on your property. Ask yourself whether you're 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 landscape gains on weed management. The next section provides tips on how to achieve a coordinated approach to weed management across neighbouring properties.



Darryn Higgins

Foliar spraying gamba grass on Cape York.

## Better together: build networks and shared objectives to achieve landscape-scale control

Coordinated control of gamba grass provides many benefits to land managers, from building neighbourly relationships and support networks, through to reducing the spread and impact of the weed itself. Making connections with others may provide motivation, knowledge and friendships and help ease the burden of weed control. Working together can be especially beneficial in breaking the back of established gamba grass infestations.

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

### *Tips for land managers*

There are many examples across Australia of land 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 gamba grass and passionate about working together. Locate them through a community meeting, social barbeque, social media group, etc.
- 2. Develop a common goal** – e.g. to prevent gamba grass 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 outliers, then working in towards the densest infestation. Include:
  - the activities the group will use to address gamba grass, 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 gamba grass – where practical, this needs to be considered so that management activities can be undertaken to ensure gamba grass is controlled while minimising impacts to other species.

Ensure you have the permission (and involvement) of all landholders 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've achieved together

# Chapter 2

beyond what they could have achieved alone, determine their plan's effectiveness, and whether the clearly bounded area is too big or small.

**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:

- communication – for sharing information about group activities on social media or 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 gamba grass 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 barbeque 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 gamba grass in neighbouring areas or further afield. Share your knowledge and resources and identify the activities and decisions that have (and haven't) worked. Link with local and state government and non-government organisations for potential funding, resources and support.

## *Tips for weed professionals*

The following points guide professional weed-control officers 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 aren't weed specific, may be leveraged for communicating weed-related messages and events. For example:

- First Nations people and Traditional Owner organisations
- 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 natural resource management bodies, 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 First Nations people or organisations, land managers, production farmers, hobby

farmers, 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 gamba grass.

#### *Build trust*

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

- bringing together – early on – land managers who may not know one another
- 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. First Nations people/organisations and community groups – to broaden the weed-management knowledge base and practice.

2. **Know what and know why** – prioritise gamba grass relative to other weeds and land-management issues.

#### *Establish the community's priority weeds*

Where does gamba grass 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 gamba grass than others?

#### *Establish the community impacts of gamba grass*

What are the motivating factors that drive people in the community to control gamba grass? Are they to do with protecting livestock? Being a good neighbour? Caring for nature? Having a tidy-looking property?

#### *Identify the benefits of controlling gamba grass*

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 gamba grass located and most likely to spread to?

#### *Map the weed extent*

Establish where the core and outlying infestations are. Gamba grass 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 how to identify stakeholders in adjoining areas who could benefit from joining the initiative.

#### *Consider any boundaries crossed by gamba grass*

Management implications will need to be considered if gamba grass crosses any land-tenure boundaries.

- Does gamba grass 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

# Chapter 2

or across boundaries for more effective management?

- Are there stakeholders whose jurisdiction spans similar boundaries to gamba grass who could facilitate coordinated responses?

#### 4. **Know how** – what approaches have been used to control gamba grass 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 gamba grass.

Timing is critical to successful weed control. Consider how the optimum weed-control time fits with other community commitments such as burning, roadside maintenance activities, etc. Will land managers have the capacity to control gamba grass at the optimum time of weed control or have the flexibility to adjust if the season is unpredictable?

#### 6. **Bringing it all together** – develop a weed-management plan.

Develop a landscape-scale weed-management plan that brings together your understanding of both gamba grass 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.

**Acknowledgements:** This section was prepared by the Australian Centre for Culture, Environment, Society & Space (University of Wollongong) with contributions by Associate Professor Nicholas Gill, Associate Professor Jenny Atchison, Associate Professor Sonia Graham, Dr Gina Hawkes, Dr Kaitlyn Height, Dr Rebecca Campbell, Crystal Arnold, Diana Dawson, Jennifer Smart, Janine Bailey, and Laura Butler.