

Chapter 5

Further information

Co-occurring grasses

Grasses can be difficult to identify. This guide provides information on grasses – both native and introduced – that commonly occur with gamba grass. They can look similar to gamba grass at certain times of the year. This section focuses on how each of these grasses are similar to and different from gamba grass.

Remember: If you're not certain whether the grass you have is gamba grass, either talk to a local weed professional or send a specimen to your nearest herbarium (contact details provided on page 121). Talk to the herbarium before sending a specimen to get advice on what they'll need. Data for distribution maps have been sourced from www.ala.org.au.

Cenchrus pedicellatus annual mission grass

Introduced (Qld, NT and WA)

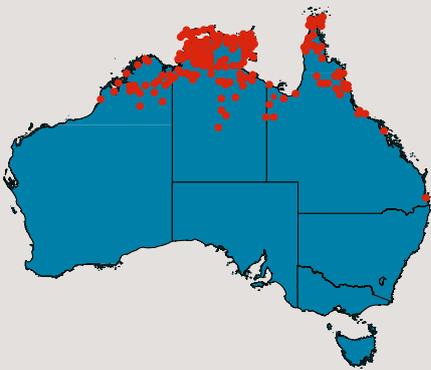
Erect, annual tussock grass to 1.5 m tall

Differences from gamba grass

- compact flower spike, white to off-white, sometimes with a pink tinge
- leaves lack white midrib and usually hairless or softly hairy.

Similarities to gamba grass

- slender stems with hairs at margins on the leaf sheath
- leaves can be a reddish-purple colour.



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Cenchrus polystachios perennial mission grass

Introduced (Qld, NT, NSW and WA)

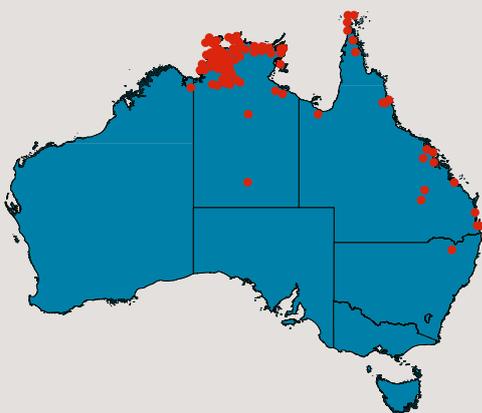
Erect, perennial tussock grass to 3 m tall,
usually 2 m

Differences from gamba grass

- compact yellow flower spike, densely packed seedhead dries to yellow-brown/cream
- leaves lack white midrib.

Similarities to gamba grass

- leaves can be a reddish-purple colour.



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Cenchrus purpureus elephant grass

Introduced (Qld, NT, NSW and WA)

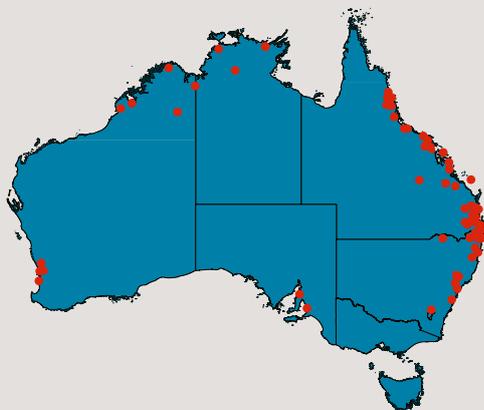
A very robust grass forming large, bamboo-like clumps (often 3–4 m tall)

Differences from gamba grass

- the leaf sheaths are hairless to stiffly hairy, and there is a dense fringe of hairs where the sheath meets the leaf blade
- the leaf blades are large (20–120 cm long and 1–5 cm wide)
- the seed head is spike-like (8–30 cm long and 1.5–3 cm wide) and very bristly.

Similarities to gamba grass

- leaf has a prominent white midrib.



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Cymbopogon procerus, *Cymbopogon bombycinus* lemon-scented grass

Native (Qld, NT and WA)

Erect, perennial tussock grass to 2 m tall

Differences from gamba grass

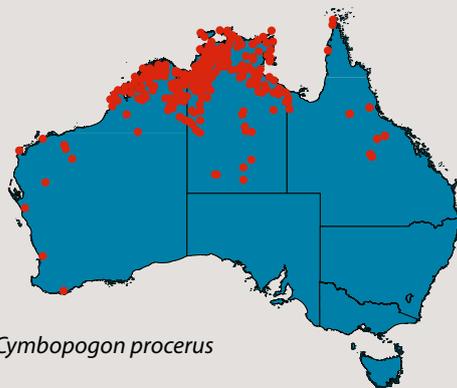
- crushed leaf and stalk smell like lemon/citronella
- smooth stems, with only a white midrib at base of leaf.

Similarities to gamba grass

- long, fluffy seed heads, although not just at top of flowering stems like in gamba grass.



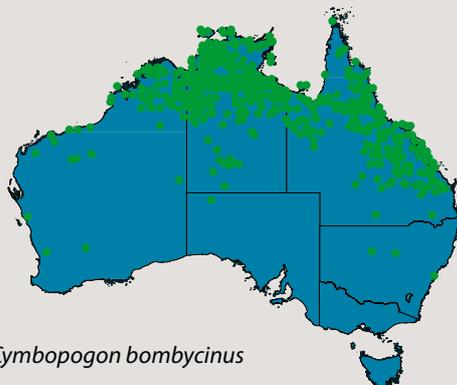
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Cymbopogon procerus



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Cymbopogon bombycinus



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Cymbopogon procerus

Heteropogon triticeus
spear grass

Native (Qld, NT and WA)

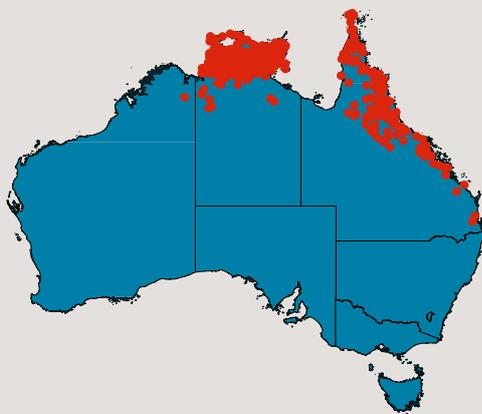
Erect, densely clumping tussock grass to 2 m tall

Differences from gamba grass

- has fan-like flatted base of stems
- slender, smooth stem with long leaf sheath
- long black awn on seed
- all leaves come from the base of the plant.

Similarities to gamba grass

- white midrib but narrower than gamba grass
- leaf margin slightly rough tip to base.



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Hyparrhenia rufa thatch grass

Introduced (Qld, NT, NSW and WA)

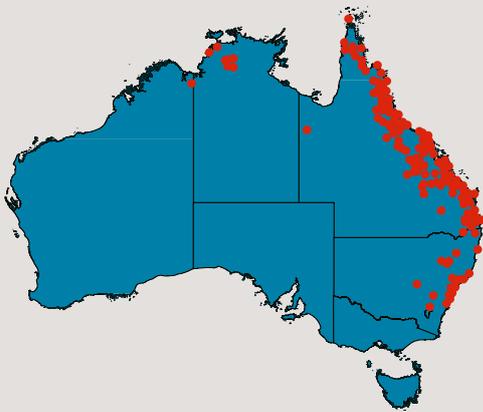
Densely bunched, erect, perennial tussock grass to 3 m tall, usually 2 m

Difference from gamba grass

- slender stems with alternate green and yellow segments
- narrow hairless leaves
- does not form big tussocks like gamba grass and has less leaves.

Similarities to gamba grass

- v-shaped inflorescence (reddish to rusty brown)
- leaf has a white midrib.



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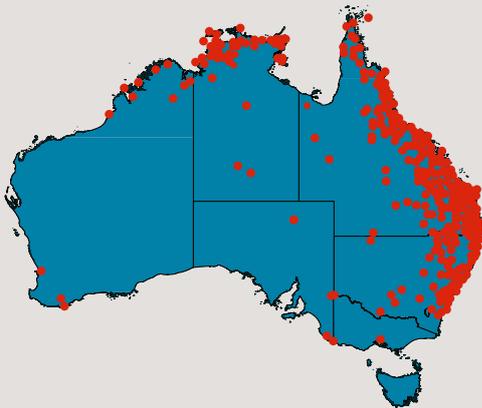
Megathyrus maximus
Guinea grass

Introduced (Qld, NT, WA, NSW, Vic and SA)

Erect perennial tussock grass, usually 2 m but can grow to 4 m

Differences from gamba grass

- large, open inflorescence on slender stems above the leaves
- broad leaf without white midrib or hairs, margin rough to touch in both directions
- robust stems – some cultivars have short, prickly hairs.



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Mnesithea rottboellioides northern cane grass

Native (Qld, NT and WA)

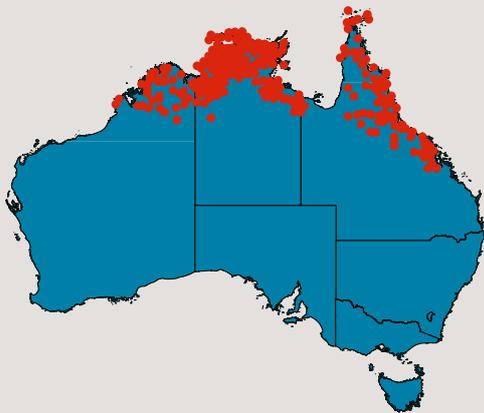
Erect, perennial tussock grass to 3 m tall

Differences from gamba grass

- inflorescence on several spike-like branchlets, up to 10 cm long
- hairless or sparsely hairy stems and base.

Similarities to gamba grass

- broad leaf with thick white midrib
- leaf margin slightly rough tip to base.



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Rowena Eastick

Rottboellia cochinchinensis
itch grass

Native (Qld and NT)

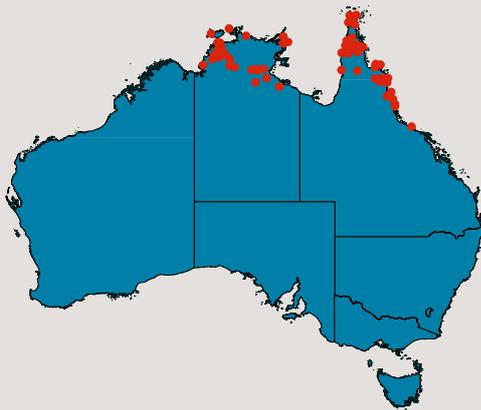
Erect, annual tussock to 3 m tall

Differences from gamba grass

- cylindrical inflorescence
- round, robust stems with stiff prickly hairs.

Similarities to gamba grass

- broad leaf with white midrib, but hairless, and leaf margin very rough from tip to base.



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***Sorghum* spp. (referred to as *Sarga* spp. in Queensland)
perennial sorghums (e.g. *S. plumosum*)**

Native (Qld, NT, NSW and WA)

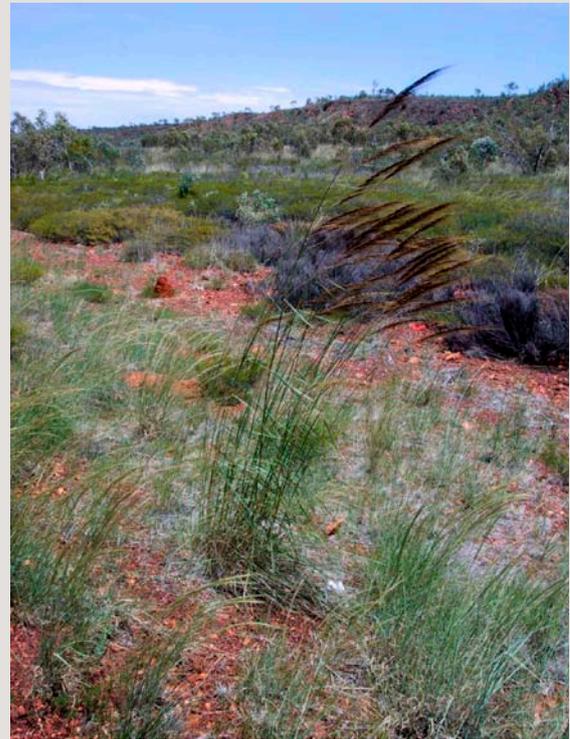
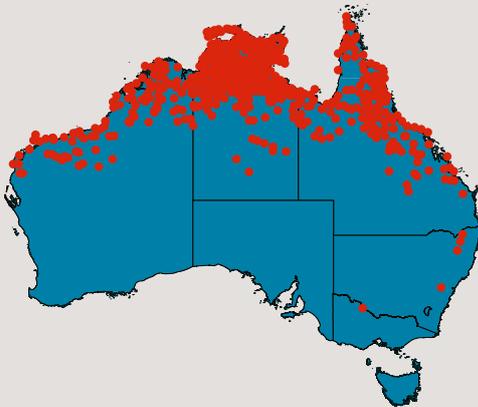
Erect, perennial tussock grass to 3 m tall

Differences from gamba grass

- leaf blade is narrow and hairless and can have a 'frosted' or dusty-looking coating
- large seeds and long robust awns on a large, open brown panicle inflorescence.

Similarities to gamba grass

- leaves have a white midrib
- dense tussock of hairless to hairy robust stems.



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Sorghum plumosum

***Sorghum* spp. (referred to as *Sarga* spp. in Queensland)
tall annual sorghums (e.g. *S. intrans*, *S. timorense*)**

Native (Qld, NT and WA)

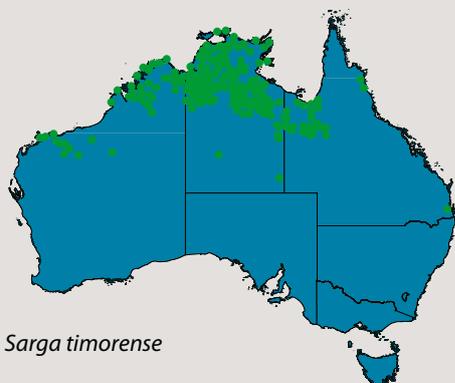
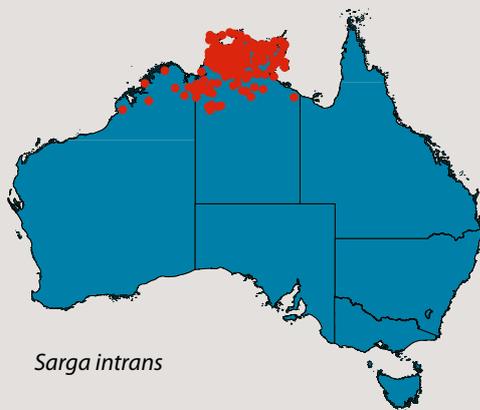
Erect, perennial tussock-forming grasses with stems to 3.5 m tall

Differences from gamba grass

- large rusty-brown inflorescence
- leaves are narrower than gamba grass
- slender individual stems rather than a clump
- 'stilt' roots are common.

Similarities to gamba grass

- leaves have a white midrib.



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Sarga intrans

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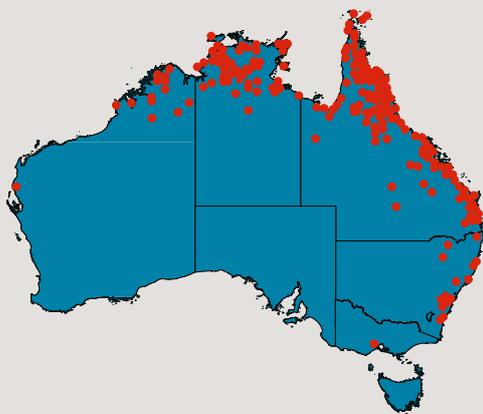
Themeda quadrivalvis grader grass

Introduced (Qld, NT, WA, NSW and Vic)

Annual, generally distinct tufted grass with an upright habit growing 50–200 cm tall

Differences from gamba grass

- stems, leaves and seed heads turn reddish-brown or golden-brown as they mature
- seed heads consist of many drooping, fan-shaped flower clusters interspersed with short 'leaves'
- mature seeds (4.5–5.5 mm long) have a cluster of hairs at the base and are topped with a large, twisted awn (10–45 mm long).



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Herbaria contact information

Australian National Herbarium

GPO Box 1700, Canberra ACT 2601
phone: (02) 6246 5084
email: canbr-info@anbg.gov.au
website: www.cpbr.gov.au/cpbr/herbarium

Queensland Herbarium and Biodiversity Science

Brisbane Botanic Gardens, Mt Coot-tha Road
Toowong Qld 4066
phone: (07) 3199 7699
email: queensland.herbarium@qld.gov.au
website: <https://www.qld.gov.au/environment/plants-animals/plants/herbarium>

State Herbarium of South Australia

Old Tram Barn, Hackney Road
GPO Box 1047
Adelaide SA 5001
phone: (08) 8222 9311
email: stateherbsa@sa.gov.au
website: <https://www.botanicgardens.sa.gov.au/science/research/state-herbarium>

Tasmanian Herbarium

University of Tasmania
College Road
PO Box 5058, UTAS LPO
Sandy Bay Tas 7005
phone: (03) 6165 5143
email: herbarium@tmag.tas.gov.au
website: https://www.tmag.tas.gov.au/collections_and_research/tasmanian_herbarium

The National Herbarium of New South Wales

Botanic Gardens Trust, Mrs Macquaries Road
Sydney NSW 2000
phone: (02) 9231 8111
email: herbarium.nsw@botanicgardens.nsw.gov.au
website: <https://www.botanicgardens.org.au/our-science/science-facilities/national-herbarium-new-south-wales>

The National Herbarium of Victoria

Royal Botanic Gardens
Dallas Brooks Dr and Birdwood Avenue
Private Bag 2000
South Yarra Vic 3141
phone: (03) 9252 2300
email: rbg@rbg.vic.gov.au
website: <https://www.rbg.vic.gov.au/science/herbarium/>

The Northern Territory Herbarium

Palmerston: Herbarium Building
The Boulevard
PO Box 496
Palmerston NT 0831
phone: (08) 8999 451
Alice Springs: Alice Springs Desert Park
Larapinta Drive
PO Box 1120
Alice Springs NT 0871
phone: (08) 8951 8791
email: herbarium@nt.gov.au
website: <https://nt.gov.au/environment/native-plants/native-plants-and-nt-herbarium>

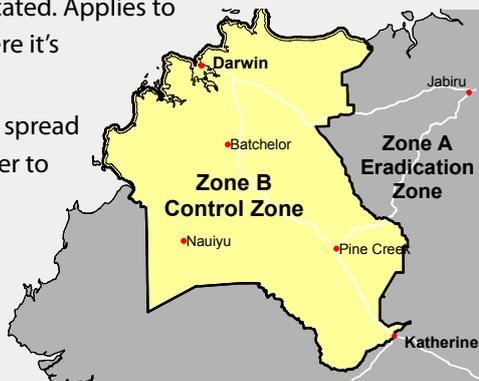
Western Australian Herbarium

Conservation Science Centre
17 Dick Perry Avenue, Kensington
Locked Bag 104
Bentley DC WA 6983
phone: (08) 9219 9000
email: herbarium@dbca.wa.gov.au
website: <https://www.dbca.wa.gov.au/science/research-tools-and-repositories/western-australian-herbarium>

Chapter 5

Additional planning information

Declaration status of gamba grass in Australia

Jurisdiction	Legislation	Declaration and requirements Description
Australia	<i>Biosecurity Act 2015</i>	Not permitted Not permitted for entry into Australia.
Australian Capital Territory	<i>Pest Plants and Animals Act 2005</i>	Declared Must be suppressed: all infestations of gamba grass on a premises must be controlled. Notifiable: presence must be notified to the Director General. Prohibited: supply and propagation is not allowed. This includes the importation of gamba grass plants or seeds, or materials contaminated with plants or seeds, into the ACT.
New South Wales	<i>Biosecurity Act 2015</i>	Declared Prohibited matter: a person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries. Mandatory measure: gamba grass must not be imported into the state or sold. General biosecurity duty: all plants are regulated to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.
Northern Territory	<i>Weeds Management Act 2001</i>	Declared – split declaration Class A: to be eradicated. Applies to all of NT except where it's classified as class B. Class B: growth and spread to be controlled (refer to Zone B in map). 

Queensland	<i>Biosecurity Act 2014</i>	<p>Declared – whole of Queensland</p> <p>Gamba grass is a category 3 restricted invasive plant under the <i>Biosecurity Act 2014</i> (the Act). It must not be given away, sold or released into the environment.</p> <p>The Act requires everyone to take all reasonable and practical measures to minimise the biosecurity risks associated with invasive plants under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO: Gamba grass (publications.qld.gov.au)</p> <p>At a local level, each local government must have a biosecurity plan that covers invasive plants. This plan may include actions to be taken on gamba grass. Some of these actions may be required under local laws. Contact your local government for more information.</p>
South Australia	<i>Landscape South Australia Act 2019</i>	<p>Declared – whole of South Australia</p> <p>Prohibited</p> <p>Sale: must not be sold or traded in any way, including as a contaminant of anything.</p> <p>Movement: must not be transported on a public road, including as a contaminant of anything.</p> <p>Entry: must not be imported into any region of South Australia.</p>
Tasmania	<i>Biosecurity Act 2019</i>	<p>Declared</p> <p>Prohibited: The importation, sale and distribution of gamba grass is prohibited.</p>
Victoria	<i>Catchment and Land Protection Act 1994</i>	<p>Declared – whole of Victoria</p> <p>Restricted: it's an offence to sell or trade gamba grass. You can't buy, sell, possess for sale, display, propagate, bring into Victoria or transport within Victoria gamba grass plants, plant parts, seeds or as contaminant in other materials.</p>
Western Australia	<i>Biosecurity and Agriculture Management Act 2007</i>	<p>Declared – whole of Western Australia</p> <p>Prohibited: gamba grass is an eradication target (C2 – eradication/prohibited).</p>

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Pre-planning questions

Ask yourself...	Draw out the reasons and possible solutions
<i>Why is gamba grass a problem?</i>	Refer to the 'Impacts' section of Chapter 1 and Table 2.1 in Chapter 2 to briefly describe the problem
<i>What do we want to achieve?</i>	What does success look like? For example: <input checked="" type="checkbox"/> removing or reducing biomass <input checked="" type="checkbox"/> reducing or preventing seed production <input checked="" type="checkbox"/> reducing or preventing seed spread
<i>What's my legal obligation to manage gamba grass?</i>	Are you in an eradication zone and what's expected of you?
<i>What are we currently doing to manage it?</i>	How effective is it? What can we do better?
<i>What else is being done?</i>	Other weeds, fire management, etc, and does it support or conflict with gamba grass management?
<i>Who's involved?</i>	1. Who else should be involved in the planning process? 2. Who else should be involved in the review process?

Plan template

This template provides a suggested contents page of critical information to be included in your gamba grass management plan. It also includes a summary of each section and links to part of this manual or other documents that can help you populate this information.

Suggested headings and subheadings	Links to source data	Description
1. Overview/background 1.1 Description of gamba grass	Use info in Chapter 1	Draw from relevant information on biology and ecology. For example, list the habit, life cycle and characteristics relevant to management in 2–3 lines.
1.2 Description of management area		Describe your site or management area. Include information on the location, size, climate, rainfall, soil type and land use history. Describe any assets (natural assets, cultural assets, built assets and production values). You may want to include some information on adjacent areas (regional context).
1.3 The need for gamba grass management	Refer to Chapter 2 (Table 2.1)	Describe the drivers or reasons you need to manage gamba grass. List the impacts and threats presented by gamba grass.
1.4 Distribution of gamba grass and assets	Refer to Chapter 2, Step 1	Use the map created in Step 1 to set the scene and support the discussion on assets, management objectives and priority areas.
1.5 Legal management requirements	Use pages 122–123 as a guide. Also check with your weed management authority in your state or territory	Briefly describe the status of gamba grass in your region and what's legally expected of you. For example, are you in an eradication zone?
1.6 Stakeholders and partners	Refer to Chapter 2 'Better together' fact sheet on page 39	Identify who else should be involved in your planning process or on-ground management. You may decide that a joint management plan is preferable. If so, explain that partnership, who the partners are, and how it will work.

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2. Management goals and objectives	Refer to Chapter 2 Use Table 2.2	Restate your drivers from 1.3 above, and state what you want to achieve or what success would look like for your situation. Using distribution information, use Table 2.2 and Figure 2.3 to state your management objectives, any priority areas and long-term goals of what you hope to achieve through managing gamba grass.
2.1 Reasons or drivers for management		
2.2 Desired outcomes	Use Table 2.2	
2.3 Management objectives	Figure 2.3	
2.4 Priority management areas	Refer to Chapter 2, page 34	
3. Management options	Use Chapter 3	Identify the most appropriate control methods for your situation and stated goals and objectives. Describe any site nuances that you'll need to take into consideration.
4. Management action plan	Use Chapter 3 to select an appropriate management method Use Chapter 4 for ideas of what other people are doing	Create a table outlining your control program, control methods, timing and responsibility. Identify alternatives should something not go to plan (e.g. there's a wildfire, or the wet season is prolonged and the site isn't accessible). Include your follow-up control plan.
5. Evaluation	Refer to Chapter 2, page 37	Describe how you'll monitor control activities and how you'll determine the success or failure of your program.
6. Resourcing		Estimate the amount of time and money that will be required to carry out your planned control, monitoring and evaluation. Include costs for labour, chemicals, equipment and other logistics. Alternatively, consider if your efforts can be improved by working with others in a more strategic or coordinated way.
7. Appendices		Attach any other relevant information that you may require to implement your plan. This could include additional maps and overlays, stakeholder and partner contact details, and protocols that are being used (e.g. mapping, hygiene).

Safety and welfare information

For programs involving volunteers, a risk management tool called *Running the Risk?* is available from Volunteering Australia (www.volunteeringaustralia.org).

Further information on safety and welfare policy, standards, guidelines and legislation can be accessed by contacting the following government departments and volunteer organisations.

Jurisdiction	Website	Contact
National	https://safeworkaustralia.gov.au	info@swa.gov.au
	https://volunteeringaustralia.org	03 9820 4100 volaus@volunteeringaustralia.org
ACT	https://worksafe.act.gov.au	13 22 81 worksafe@worksafe.act.gov.au
NSW	https://safework.nsw.gov.au	13 10 50
NT	https://worksafe.nt.gov.au	1800 019 111 ntworksafe@nt.gov.au
Qld	https://worksafe.qld.gov.au	1300 362 128 https://worksafe.qld.gov.au/contact/general-enquiries
SA	https://safework.sa.gov.au	1300 365 255 help.safework@sa.gov.au
Tas	https://worksafe.tas.gov.au	1300 366 322 wstinfo@justice.tas.gov.au
Vic	https://worksafe.vic.gov.au	1800 136 089 https://myworksafe.vic.gov.au/s/customer-enquiry
WA	https://commerce.wa.gov.au/WorkSafe	1300 307 877 wscallcentre@dmirs.wa.gov.au

Chapter 5

Additional management tools

State and territory contacts for weed control information

State and territory government departments provide information on controlling weeds. Contact details and helpful website addresses are provided below. Local/regional weed management authorities may also be contacted for information and advice.

State or territory	Department	Phone	Email	Website
ACT	ACT Parks and Conservation Service	13 22 81	ACTBiosecurity@act.gov.au	https://www.environment.act.gov.au/parks-conservation/plants-and-animals/biosecurity/invasive-plants
NSW	Department of Primary Industries	1800 680 244	weeds@dpi.nsw.gov.au	https://www.dpi.nsw.gov.au/biosecurity/weeds
NT	Department of Lands, Planning and Environment	08 8999 4567	weedinfo@nt.gov.au	https://www.nt.gov.au/environment/weeds
Qld	Department of Primary Industries	13 25 23	Not available at time of publication	https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/invasive
SA	Department of Primary Industries and Regions	08 8303 9620	PIRSA.InvasiveSpecies@sa.gov.au	https://www.pir.sa.gov.au/biosecurity/weeds
Tas	Department of Natural Resources and Environment Tasmania	1300 368 550	biosecurity.tasmania@nre.tas.gov.au	https://www.nre.tas.gov.au/invasive-species/weeds
Vic	Agriculture Victoria	13 61 86	Refer to https://www.agriculture.vic.gov.au for contact options	https://agriculture.vic.gov.au/biosecurity/weeds
WA	Department of Primary Industries and Regional Development	1300 374 731	enquiries@dpird.wa.gov.au	https://www.agric.wa.gov.au/pests-weeds-diseases/weeds

FACTSHEET: Using herbicides legally, safely and effectively

Herbicide labels and legislation

The Australian Pesticides and Veterinary Medicines Authority (APVMA) regulates the availability of all pesticides, including herbicides. Herbicides are registered with the APVMA for specific applications as stated on the label, and state or territory governments regulate the use of herbicides after sale (see pages 61–62). A herbicide label is a legal document that defines where, when and how a herbicide may be used, on which weed species and at what rate. This is referred to as 'on label' use.

By law, you must read the label (or have it read to you) before using any herbicide product.

Off-label use

Off-label use is the use of a registered chemical to address a specific issue that isn't covered by an APVMA approved label or permit, such as:

- to control a different weed
- to protect a different host (such as a crop)
- to apply at a different rate (lesser) or frequency
- to apply in a different manner (not allowed in ACT, NSW and Tasmania).

Off-label use is permitted in all states and territories; however, conditions vary in each jurisdiction.

Minor use and emergency use permits

The APVMA may issue minor use and emergency use permits for herbicide applications that aren't otherwise registered for that particular use. Minor use permits can also be referred to as 'off-label' permits. Minor use and emergency permits are valid ('in force') for a limited time. See the APVMA website to find current permits.

If you're unsure which herbicides may legally be used on a particular weed, contact the

APVMA or your local weed authority for advice and further information.

Chemical use training and certification

Chemical use training is required for people using herbicides as part of their job or business. Training is also recommended for community groups and may be required if working on public land. Training courses may be available through local councils or non-government organisations.

Commercial weed control operators must be licensed. It should also be noted that there may be shared responsibility between land managers and their contractors for any breaches of laws and regulations such as herbicide drift.

Safe use of herbicides

Operator safety

Herbicide labels will indicate the personal protective equipment (PPE) required for operator safety. This may include:

- impervious gloves
- eye protection
- respirator (with a filter appropriate to the level of herbicide toxicity)
- clothes, hat and boots that cover the whole body.



NESP

For herbicides with a higher risk to operator safety, additional PPE and precautions may apply, including wearing a full-face respirator and chemical-resistant overalls.

Always follow the herbicide label requirements and consult the Safety Data Sheet (SDS) on the health risks of exposure and PPE recommendations.

Environmental protection

Herbicide labels provide the mandatory measures an operator should adopt to protect the environment and non-target plants during the product's use. This may include instructions for preventing spray drift.

Herbicide users have a legal obligation to avoid spray drift damage and to ensure that the applied chemical stays within the target area. This is to avoid 'off-target' impacts to crops, native vegetation and other plants, and 'chemical trespass' onto neighbouring properties.

Measures to reduce the risk of spray drift include:

- spraying when the wind is 3–15 km per hour, or when no surface temperature inversion conditions exist
- using a coarse to very coarse spray quality nozzle type
- avoiding the use of high pump/sprayer pressures that create small droplets that float in the air
- having buffer zones.

Using herbicides near water

Riparian zones are sensitive habitats and a licence may be required to conduct weed control works. Only use herbicides that are registered or permitted for use in and around aquatic areas; some are formulated to be lower risk when used near water. Never:

- spray herbicides over waterbodies or plants standing in water
- add adjuvants to herbicides to be used near water unless they're registered for aquatic use.

Effective use of herbicides

Successful herbicide control is dependent on:

- selecting the right herbicide for the target species
- the growth stage of the target species
- the weather conditions during and after spraying
- how thoroughly the herbicide is applied
- the herbicide mix and application rate.

For spraying, wind speeds should be low (between 3 and 15 km/h). For glyphosate, it's generally recommended that there is no rain for at least 2 hours after spraying.

Don't apply herbicide to target plants that are under any sort of stress because it won't be absorbed and translocated effectively, resulting in a reduced level of control. Plants may be stressed owing to:

- dry soil
- low humidity
- air temperatures above 30°C
- frost.

Herbicide effectiveness can be maximised by:

- mixing it with dye to help minimise missed areas and prevent over-spraying (double spraying). Similarly, a foam marker or GPS can be used to indicate the edges of boom spraying
- using an adjuvant – an additive that improves herbicide uptake
- ensuring spray equipment is correctly calibrated and maintained, including by thoroughly cleaning it between uses.

If an adjuvant is used, always read the product label to ensure it's compatible with the herbicide and there are no restrictions on its use, e.g. adjuvants shouldn't be used near waterways.

Where to get help

Use the further contacts information listed in this chapter to direct any further queries about the safe use of herbicides and chemical use training and certification.

Herbicide Treatment Record Sheet

Contractor		Date/Time	
Operator Names		Property/GPS Location	
Area Description (landmarks, etc.)			
Growth Stage (✓)			
Target Species	Seedling	Juvenile	Flowering
1			
2			
3			
Plant Growth/Comments (✓)			
Target Species	Active Growth	No Active Growth	Under Stress (comments)
1			
2			
3			
Environmental Conditions			
Soil Conditions (circle)	Dry	Damp	Wet
Rainfall – Previous 12hrs (Y/N)			
None expected in next 12hrs (Y/N)			
Wind Direction			
Wind Speed			
Temperature			
Application Method (circle)			
Handgun or knapsack	Splatter gun	Wick wiper	Boom spray
Aerial spray			
Operator signature		Project Officer signature	

Chapter 5

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