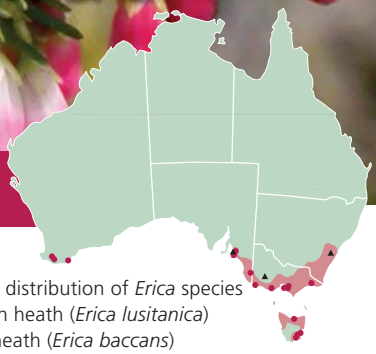
Weed Management Guide

Managing weeds for biodiversity



Recorded distribution of *Erica* species
- Spanish heath (*Erica lusitanica*)
- Berry heath (*Erica baccans*)
- ▲ *Erica glandulosa*

This map highlights 3 *Erica* species listed above. Other species such as *E. arborea*, *E. quadrangularis*, *E. scoparia* and *E. discolor* occur within this range.

Spanish heath (*Erica lusitanica*) and other *Erica* species

The problem

Shrubs in the genus *Erica* (heaths, heathers or ericas) originate from Europe and Africa and are widely grown in gardens and for the cut-flower industry. Many species have been introduced to southern Australia and some have escaped from cultivation to become weeds in native vegetation. Spanish heath (*Erica lusitanica*), also known as Portuguese heath, is the most widely distributed erica in Australia and will be the main species profiled here. Tree heath (*E. arborea*), common in the southeast and berry heath (*E. baccans*), which is also established in the west are also described, with other species of *Erica* discussed in less detail.

Although it is only a declared weed in Tasmania, Spanish heath still rated for consideration in the recent Weeds of National Significance assessment. In 2005 tree heath in Tasmania and Spanish heath in Victoria were nominated amongst the 10 most serious weedy garden plants currently for sale. They form dense populations in bushland, dominate the understorey, and have the potential to alter the composition and diversity of native plant communities. Both species establish on roadsides and require expensive control to maintain sight lines. Spanish heath is also capable of invading unimproved pasture. Heather (*Calluna vulgaris*), a related species, is already on the Australian Alert List and is covered by its own weed management guide. Other ericas have escaped into bushland and may have potential to become more widespread weeds in the future.

Erica is a large genus containing numerous species, hybrids and cultivars, many of which are grown in Australia. In most cases the weed potential of this genus is unknown, however many are permitted entry to Australia without a prior weed risk assessment. When plants first escape from gardens and invade neighbouring land, they may not be noticed until it becomes a costly exercise to eradicate them, especially from native vegetation. The number of weeds threatening Australia's biodiversity is increasing and the safest strategy is to avoid planting species that are known to escape. Numerous non-weedy alternatives are available for water-wise planting and alert gardeners and horticulturists can help by removing garden plants that are capable of spreading, or escaping from their property.

Spanish heath (*Erica lusitanica*) invading native vegetation: Tasmania.
Photo: Matthew Baker, Tasmanian Herbarium

Key points

- Spanish heath produces numerous tiny seeds.
- If the plants are burnt or broken they readily regrow from the lignotuber or butt.
- Small plants can be hand pulled. Mature plants can be cut and painted with herbicide.
- Other *Erica* species are invading native vegetation in southern Australia and species growing in gardens may become weeds in the future if allowed to escape.
- Accurate weed identification is essential—weedy *Erica* species are sometimes confused with native heaths.
- Apply control methods for Spanish heath to other weedy *Erica* species.

The weed

Spanish heath is an erect shrub to 2.5 m tall with dense foliage. The branches carry crowded, narrow leaves, 4–7 mm long. Flowers are small and tubular, with 4 lobes, white with a pink tinge in the bud. A mature bush can produce millions of tiny seeds each year and many of these persist in the soil seedbank for 4 years or more. Plants have a well-developed woody crown or lignotuber at the base, from which new stems will grow if the top is damaged by fire or slashing. The canopy of established plants recovers quickly, competing effectively with native plants. Spanish heath has a fine, deeply penetrating root system, and survives hot dry summers. Apart from seedlings, the foliage is not palatable to stock. Tree heath appears to have similar growth patterns and distribution to Spanish heath, but its abundance and habitat preferences may differ at the local scale.

Ericas are commonly believed to be native plants as they have a similar shape and size to native heaths with their stiff, narrow leaves. In winter and spring, they may be covered in flowers and unfortunately, their prolific seed production increases their capacity to spread along roadsides and into bushland. Features that make ericas attractive as garden plants also contribute to their weediness in the higher rainfall districts—they are hardy, fast growing, long lived and will grow in infertile native soils.

Through strategic native vegetation management using minimum disturbance methods, the impact of weedy ericas on biodiversity can be minimised. At the same time, there is a need to prevent new species escaping. Other *Erica* species that invade native vegetation should be controlled in the same way as Spanish heath.

Spanish heath (*Erica lusitanica*) flowers are numerous and pink-tinged in bud.
Photo: Matthew Baker, Tasmanian Herbarium

Weed identification and similar species

Related species

More than 12 species of *Erica* have been recorded as naturalised in Australia. All are shrubs, with narrow leaves that are opposite or in whorls of 3 or 4. Flowers are bell-shaped, tubular or globular with 4 lobes. Fruits are capsules containing numerous small seeds. The main features of the most common species in Australia are summarised in the table on the next page.

Tree heath (*Erica arborea*). Branched hairs on the branchlets can be seen with a hand lens.
Photo: Matthew Baker, Tasmanian Herbarium

Naturalised *Erica* species in Australia: main species and features

Species	Habit*	Flowers and season#	Leaves	Young stems	Legislation and AQIS	Distribution
 Spanish heath *Erica lusitanica.* Photo: Matthew Baker, Tasmanian Herbarium	Shrub to 2.5 m tall; resprouts after fire	White, pinkish in bud, tubular, 4–5 mm long; in winter to spring	4–7 mm long, narrow, crowded, generally in whorls of 4	With unbranched hairs 1 mm long	Declared in Tas.; quarantine weed in WA AQIS Not permitted entry	Widespread: ACT, NSW, SA, Tas., Vic. Origin: Europe
 Tree heath *Erica arborea.* Photo: Jean Michaux Flore de Franche-Comté, http://crdp2.ac-besancon.fr/flore/flore.htm	Shrub to 5 m tall; resprouts after fire	White, bell-shaped, 2–3 mm long; in spring	3–7 mm long, narrow, crowded, generally in whorls of 4	With branched hairs 1 mm long	No declaration AQIS Permitted entry	Widespread: NSW, SA, Tas., Vic. Origin: Europe, Africa, Macronesia
 Berry heath *Erica baccans.* Photo: Matthew Baker, Tasmanian Herbarium	Shrub to 2 m tall; does not resprout after fire	Bright pink (magenta), globular, approx. 5 mm long, in bunches at stem tips; in spring	Up to 9 mm long, in whorls of 4	Hairless	No declaration AQIS Permitted entry	Widespread: SA, Tas., Vic., WA Origin: South Africa
 Angled heath *Erica quadrangularis.* Photo: © South African National Biodiversity Institute, www.SANBI.org	Shrub to 1 m tall; does not resprout after fire	White to pink, cup-shaped, 3 mm long, lobed, single in upper leaf axils; in spring	1.5–3 mm long, in whorls of 4 or in opposite pairs	With unbranched hairs	Quarantine weed in WA AQIS Permitted entry	Localised: SA, Vic. Origin: South Africa
 Besom heath *Erica scoparia.* Photo: Matthew Baker, Tasmanian Herbarium	Shrub to 2.5 m tall; resprouts after fire	White / green to reddish, bell-shaped, 1–2 mm long; in spring to summer	3.5–7 mm long, in well spaced whorls of 3 or 4	Hairless	No declaration AQIS Permitted entry	Localised: Tas. Origin: Europe, north Africa, Macronesia
 *Erica glandulosa.* Photo: © K. Blood	Shrub 0.75–1 m tall; resprouts after fire	Pink to mauve, tubular to 3 cm long, in clusters; year-round, especially in autumn	Up to 7 mm long, sticky, narrow, crowded	With glandular hairs, sticky	No declaration AQIS Permitted entry	Localised: NSW, SA, Vic. Origin: South Africa
 Bicoloured heath *Erica discolor.* Photo: © K. Blood	Shrub to 3 m tall; resprouts after fire	Pink to dark red with pale tips, tubular, 18–24 mm long, in clusters; year-round, especially in autumn	Up to 7 mm long, narrow, crowded, whorled		No declaration AQIS Permitted entry	Localised: SA, Vic. Origin: South Africa

*Response to fire is based on research in native range.

Usual season of flowering.

Other species that are naturalised include *Erica holosericea*, *E. caffra*, *E. mauritanica* and *E. cruenta* from southern Africa and *E. cinerea* from Europe.

Similar native species

Australian heaths were formerly in the family Epacridaceae but are now in the expanded family Ericaceae as are *Erica* species. Native heaths in the subfamily Styphelioideae that could be confused with ericas in southern Australia generally have 5 petals rather than 4 and stiff leaves that are alternate instead of whorled or opposite. Examples are listed in the table below.

Common heath (*Epacris impressa*) is generally an erect shrub to 1.2 m tall, with stiff pointed leaves up to 13 mm long that are alternate and well-spaced. Flowers red, pink or white bells with 5 lobes, tube up to 20 mm long. Fruit a capsule. NSW, SA, Tas., Vic.
Photo: Jackie Miles and Max Campbell

Prickly / long-flower beard-heath (*Leucopogon juniperinus*) is a shrub to 1 m tall with pointed leaves to 12 mm long. The white tubular flowers have 5 short lobes, bearded inside. Fruit succulent. NSW, Qld, Vic.
Photo: Jackie Miles and Max Campbell

Peach heath (*Lissanthe strigosa*) is a shrub to 1 m tall with pointed leaves, 6–13 mm long, white or pinkish urn-shaped flowers and fleshy fruit. NSW, Qld, SA, Tas., Vic.
Photo: Jackie Miles and Max Campbell

Prickly broom-heath (*Monotoca scoparia*) is a shrub to 1.2 m tall with pointed leaves to 15 mm long and small white flowers. Fruit somewhat fleshy. NSW, Qld, SA, Tas., Vic.
Photo: P. Ormay © Australian National Botanic Gardens

Other native shrubs may look similar to ericas when not in flower; for example:

Common fringe-myrtle (*Calytrix tetragona*) has small, narrow, crowded leaves, but flowers are star-shaped with 5 petals. It is widespread in southern and eastern Australia.
Photo: Jackie Miles and Max Campbell

How it spreads

Erica seeds are small and generally borne in dry capsules. The millions of tiny seeds that Spanish heath plants produce are dispersed short distances by gravity, water, wind, vehicle draught and slashing or soil movement. Long distance dispersal is generally a result of human activity—planting in gardens, commercial cultivation, or inadvertent transport of soil containing seeds to new locations.

Disturbed, open situations such as roadsides and edges of bushland provide favourable conditions for establishment and the weeds spread from there into the bush. Depending on the species, fire may not be essential for seed germination, but it can create gaps that favour regrowth, recruitment of seedlings or both. In their native range some *Erica* species have the ability to form a long-lived seedbank and seeds buried in the top few cm of soil can survive fire.

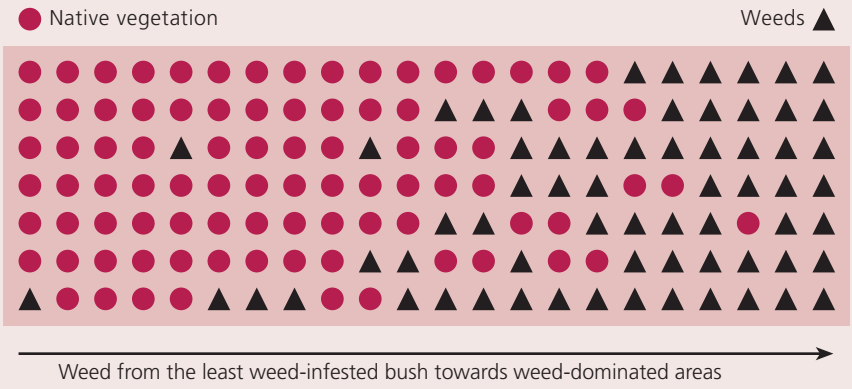
Ericas have dry seed capsules: berry heath (*Erica baccans*), Tasmania.
Photo: Matthew Baker, Tasmanian Herbarium

Where it grows

In southern Australia, *Erica* species generally occur in regions with an average annual rainfall of 600 mm or more; in heathland, forest and woodland, along drainage lines and in coastal vegetation.

Spanish heath is native to Mediterranean Europe. Tree heath is very widespread and also native to Mediterranean Europe and parts of north and east Africa. It is a dominant shrub or tree in some major vegetation types. The *Erica* genus is particularly

Strategic weeding in native vegetation



diverse in southern Africa, where there are more than 700 native species, including berry heath.

Potential distribution

Spanish, tree and berry heaths have the potential to spread locally and to new regions in southern Australia if planted or inadvertently transported, particularly in districts with relatively high winter rainfall. The potential distribution of most ericas in Australia is largely unknown. Worldwide, most occur within a Mediterranean or temperate climatic regime in soils of relatively low fertility. Correspondingly, most of the cultivated ericas prefer acid to neutral soils although some will tolerate a wider range of soil pH.

Fourteen species of *Erica* are listed in *A global compendium of weeds*, because they have been recorded as naturalised or weedy somewhere in the world and three of these species were only cited as weedy in Australia.

The capacity for resprouting from lignotubers and reproduction by seed after disturbance varies between species and may be important factors in assessing potential weediness in Australian native vegetation as well as in planning control. Whereas Spanish and tree heaths are strong resprouters, berry heath in South Africa is killed by fire and it reproduces from seed.

Besom heath (*Erica scoparia*) spreading from roadsides into bushland: northern Tasmania.
Photo: Matthew Baker, Tasmanian Herbarium

Growth cycle

The season of active growth for Spanish heath is from late autumn to early summer. It flowers between June and September and seed production has been recorded in October and November. Seed germination may occur in autumn or spring. Seedlings are vulnerable to dry conditions and therefore recruitment is episodic. This species has a fairly wide geographic and climatic range, from Sydney to southern Tasmania and has been reported to be sensitive to frost. The season of active growth may vary in length from place to place and year to year, so it is helpful to observe patterns of growth in local populations. Flowering season varies between species and some may flower throughout the year.

What to do about it

Several *Erica* species are widespread and well established in Australia and others are escaping in a few locations, while the majority are currently known only in gardens or are yet to be introduced. To address existing and potential threats to biodiversity, a range of strategies is needed:

- **Site management:** ensure erica infestations are included in site-specific strategies for native vegetation that manage major weed threats and encourage natural regeneration of native species.
- **Pastures:** when controlling Spanish heath in non-native pastures, ensure management options limit the risk of soil erosion.
- **Regional planning:** contain naturalised species and prevent them from spreading locally and regionally; eradicate localised outbreaks.
- **Public and private garden management:** prevent additional species from becoming naturalised.
- **Biosecurity:** conduct weed risk assessments before permitting entry of new species at borders.

Prevent ericas spreading

- Raise awareness about weedy ericas among gardeners, landscapers, nursery suppliers, floriculturists and road management authorities. Increase community capacity to identify weedy ericas.
- Botanic gardens and other agencies growing ericas need to assess weed risks and implement a management plan so that weedy forms are identified, monitored, removed or effectively contained.
- Implement weed hygiene practices in areas such as roadsides; detect and remove new outbreaks promptly. Erica seeds can easily be spread by slashing, particularly during the peak fruiting season.
- Identify locations where naturalised *Erica* species occur as isolated plants or sparse infestations. Remove seedlings and treat isolated plants or clumps first and follow up. Keep uninfested areas weed-free.

Reduce established infestations

In regions where one or more *Erica* species are widespread, total eradication may not be a realistic goal. However, at the local or property scale a long-term management program can reduce harmful effects, help contain spread and encourage native vegetation to recover.

A planned, strategic approach is essential to ensure that after treatment, the weed is replaced by native plants rather than new seedlings, regrowth or other weeds. As well as the information presented in this guide on *Erica* species' biology and control methods, a plan needs to be based on specific knowledge about the site—including the distribution of other major weeds.

Develop and implement a **long-term** weed management plan.

1. Investigate the site

- **Identify all plant species:** weeds and native plants.
- **Map erica infestations:** indicate weed density throughout the site; identify major sources of seed from which re-invasion can occur.
- **Map native vegetation condition:** assess its capacity for recovery after erica is removed and identify sites of high biodiversity value, such as rare flora.
- **Values and risks:** identify native fauna habitat values and high risk sites for erosion potential and other factors.

2. Develop the site action plan

- Identify goals and priorities based on the site information.
- Define priority areas for control by overlaying maps of erica density, native vegetation, site values and risks.
- Plan to weed strategically:
  - protect the healthier native vegetation first and consider the needs of rare fauna and flora
  - work from isolated ericas towards core infestations
  - control plants from upstream to downstream.
- The size of the area targeted at each stage should be manageable enough to follow up thoroughly. *Erica* species control that is not followed up is wasteful and can cause a bigger problem.
- Include control of other weeds so that they do not establish where erica has been removed.
- Select the most suitable control method for each weed growth stage in each area to avoid damage to native vegetation. Plan appropriate disposal of weed material.
- Prepare a weed management calendar to maximise the effectiveness of control activities.

Bicoloured heath (*Erica discolor*): Pomonal, near the Grampians NP, Vic.
Photo: © K. Blood

3. Implement the action plan

- Remove ericas from the least infested areas first. Ensure that activities do not spread seeds or disturb ground cover. Adapt to local seasonal conditions.
- Follow up weed regrowth each year in areas previously treated before moving to new areas of infestation.
- Coordinate control programs with neighbouring landholders to maximise effectiveness and reduce ongoing spread by seed.

4. Monitor and evaluate outcomes and adapt the plan accordingly

Include **monitoring of native plant regeneration**. In weed management programs there is often a tendency to focus on the removal of weeds as a goal, but at the site level the ultimate goal is restoration of native vegetation.

Control methods

Erica species are difficult to manage in native vegetation because they grow among native plants, most resprout from the base, produce millions of tiny seeds and may form a soil seedbank. During the period of active growth when herbicide treatment is most effective, mature seed is likely to be present, so the potential to spread seed from the site must be managed. Burning is likely to favour these weeds due to their rapid regrowth so it is not recommended as a means of control. In areas that have been burnt, just as after primary treatment, follow up before seedlings mature is particularly important to prevent weeds increasing in density and spread. No biological control agents are available for ericas.

In selecting the most suitable control techniques it is essential to minimise adverse impacts on native vegetation and to encourage its subsequent recovery. Whichever methods are used, it is important to manage plant material that may be carrying seeds to prevent dispersal.

Physical weed removal

Hand removal of small erica plants including the root is possible in moist or light soil. To get a secure grip, use a pair of pliers. If grubbing or pulling larger plants, the basal lignotuber or butt needs to be removed. If part of it remains in the soil, vigorous regrowth may result. Sometimes large plants can be snapped below the lignotuber if the trunk is tilted and the base hit sharply. Care is needed to minimise soil disturbance.

Chemical control

Herbicide can be highly effective, providing it is carefully chosen and selectively applied to minimise regrowth, off-target damage and disturbance. The main herbicide treatments for ericas are cut-stump and frill, stem injection and foliar spray. All of these methods are most effective if the plants are actively growing at the time of application and must be followed up.

Seedlings may be hand pulled. Berry heath (*Erica baccans*) seedling: Tasmania.
Photo: Matthew Baker, Tasmanian Herbarium

Large tree heath (*Erica arborea*) trunk and lignotuber ready for swabbing: SA.
Photo: T. Hands, Friends of Scott Creek CP

Foliar spray

For spraying to be effective, all erica foliage must be wetted and the equipment suited to the size of the plants. In native vegetation, careful spot spraying using hand-held equipment (knapsack or handgun and hose) is required to avoid off-target damage. In this situation, foliar spraying is generally limited to small plants and regrowth under conditions when spray drift will not occur. Where possible, native plants should be shielded.

Cut-stump application

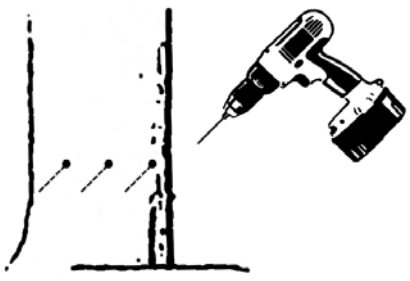
Suitable for all basal stem sizes

Cut all stems horizontally with secateurs, bush saw, brush cutter or a chainsaw as close as possible to ground level and frill the stump by peeling the bark away to increase the area through which herbicide can be absorbed. Paint the herbicide on the cut and exposed surfaces immediately (within 10 seconds), using a hand-held spray bottle or a brush. Use a dye in the mixture to show that stems have been treated.

Stem injection

For basal stem diameter larger than 5 cm

This method has the advantage that it does not create gaps in vegetation that encourage weed growth. Drill holes at approx-imately 5 cm intervals around the stem, angled downwards and sideways. Holes need only be as deep as the living wood just under the bark. Inject immediately with herbicide using a squirt bottle or plastic syringe.



Stem injection. Side view of trunk showing 45° -angled holes in wood.

Herbicides for *Erica* species

Erica species are not listed on any registered herbicide labels in Australia. A 'Permit to allow minor use of an AGVET chemical product' may be issued to allow registered products to be used for a purpose or in a manner that is not included on the approved label. Permits that include treatment of *Erica* species or environmental woody weeds generally in some non-crop situations exist in the ACT, NSW, SA, Tas. and WA. Refer to the Australian Pesticides and Veterinary Medicines Authority website to find the relevant permit for your state or territory and obtain advice on local conditions from the permit holder. Refer to the factsheet 'Off label chemical use in Victoria' for sources of advice in that state.

Glyphosate is commonly applied under permit to individual erica plants in native vegetation by community groups, landholders and public land managers. It is systemic and non-residual but it is not selective and care is needed to avoid contact with non-target plants. Examples of glyphosate treatments that may be included in a permit are summarised below. Alternatively, selective herbicide may be suitable for some situations where native grasses are at risk and may be included in a permit. Permits may specify the training required by users.

When using herbicides always read the label and follow instructions carefully. At least one member of a group should have formal training in the safe storage, handling, preparation and use of the chosen herbicides. Particular care should be taken when using herbicides near waterways because rainfall runoff can carry herbicides. Use special formulations for such environments where appropriate.

Active constituent	Off-target risk	Method and target plants	Mixture	Details / timing
Various registered glyphosate-only products including aquatic registration	Any type of plant when foliage, green stems or exposed non-woody roots are in contact with chemical	Foliar spray (small plants or regrowth)	Diluted in water	Add dye See label for advice on safety, weather conditions and timing Refer to permit and seek advice on a suitable dilution rate
		Cut-stump (basal stems of any size), frill bark to increase dose, paint all stumps immediately after cutting	Undiluted or diluted in water	
		Stem injection (stems 5 cm or more in diameter), inject herbicide immediately after drilling	Undiluted or diluted in water	

Legislation

Spanish heath is a declared plant in Tasmania and subject to controls detailed in the statutory weed management plan (for further details the relevant contact can be found on p.10). Spanish heath and angled heath are quarantine weeds prohibited entry into WA, and importation of many other *Erica* species to that state is conditional on assessment.

There are 132 species, hybrids, cultivars and subspecies of *Erica* in the AQIS permitted seeds list for import to Australia. This includes all of the naturalised species apart from Spanish heath. Species that are not on the list require a weed risk assessment before they can be imported. The majority of the permitted taxa are already grown in Australia, including 84 that are listed in the 1992 census of plants growing in Australian botanic gardens. In total, the census listed over 200 species, hybrids and forms. Gardens in SA, NSW and Tas. recorded large erica collections.

Acknowledgments

Information and guide review: M. Baker, Tasmanian Herbarium; V. Stajsic, National Herbarium of Victoria; A. Crane and T. Rudman, Tasmanian DPIW; K. Blood, Victorian DPI; G. Keighery, Western Australian Herbarium; S. Gehrig, University of Adelaide and T. Hands, Friends of Scott Creek CP.

Case study: P. Franklin, Wellington Park Bushcare Group.

Map: Australia's Virtual Herbarium, (*Erica lusitanica*, *E. baccans* and *E. glandulosa*) via Royal Botanic Gardens Melbourne, Council of Heads of Australian Herbaria. www.rbg.vic.gov.au/cgi-bin/avhpublic/avh.cgi.

Knowledge gaps

Little is known of the ecological impacts of *Erica* species on native vegetation or of the potential for additional species to become weeds in Australia. A number of ericas are ecologically important in their native habitat in Europe or Africa and there is a large but patchy scientific literature on their seed ecology, response to fire and cutting, associated ericoid mycorrhizae and life history. There has been limited collation of relevant ecological data. Research into *Erica* species biology and weed impacts in Australia could assist in assessing weed risk and developing management strategies.

...case study

Matching the method to the Spanish heath infestation

Wellington Park in Tasmania contains extensive areas of bushland on the hills and mountains behind Hobart. Much of its boundary abuts residential areas and it is crossed by a number of roads, trails and service corridors. Weeds such as Spanish heath, gorse and other garden plant escapees are well established in some areas and invading the native vegetation. Previously disturbed, open habitats such as edges, road verges and powerline clearances are particularly prone to invasion.

Hand removal of Spanish heath (*Erica lusitanica*): Wellington Park, Tasmania.
Photo: Peter Franklin, Wellington Park Bushcare

The Wellington Park Management Trust oversees the planning and management of this area, involving community groups and agencies. The Park's management plan states that weed control work will only be undertaken in such a way that non-target species are protected. This requirement is met through the use of selective, minimum disturbance techniques.

The Wellington Park Bushcare Group is one group working with the Trust and has a grant from the Australian Government Envirofund to support some of its work. Members walk the isolated trails within the park to detect isolated weed outbreaks and prevent these from becoming established infestations. Spanish heath has been found on creek banks, far from the disturbed sites where it dominates. Peter Franklin, the group's coordinator, observed "It doesn't seem to have come downstream so the only conclusion that we can make is that seed is being blown upstream in the breezes that creeks seem to attract."

Patches of mature Spanish heath in native vegetation have been cut and swabbed using glyphosate. Other weeds have been dealt with at the same time. The volunteers then follow up by regularly revisiting to ensure that regrowth and seedlings are treated by spot spraying and hand pulling. They found that in damp habitats, plants are harder to kill and treatment needs to be thorough. The plants are treated using the cut-stump method with frilling of the bark below the cut. Herbicide is applied to all exposed surfaces. Bushes that have previously been slashed without chemical treatment have multiple stems and are very difficult to deal with other than by spraying. Another technique under trial for large infestations where there is no risk to native plants is slashing then spraying regrowth after 1–2 months.

In one infestation where the Bushcare group had undertaken primary weeding by cut and swab, a managed burn for fuel reduction was conducted shortly afterwards. They returned to follow up and found that in places, a dense carpet of Spanish heath seedlings had germinated near the parent plants, leaving them an immense task. Clearly, in this mature population there were numerous viable weed seeds in the soil. Dealing with the weed seedbank is an issue when removing weeds like Spanish heath from native vegetation. A proportion of soil-stored seeds germinate when the understorey has been opened up but germination after fire may not exhaust the seedbank. Adult plants resprout rapidly and may outcompete native species following disturbance. If burning is required for management purposes, the impacts on both weeds and natives need to be considered, and timing and follow up planned accordingly.

The commitment of the Bushcare Group highlights the importance of persistence when dealing with Spanish heath.

case study

Contacts

State / Territory	Department	Phone	Email	Website
ACT	Environment ACT	(02) 6207 9777 or 132281	EnvironmentACT@act.gov.au	www.tams.act.gov.au/live/environment
NSW	NSW Dept of Primary Industries / Dept of Environment and Climate Change NSW	1800 680 244 131 555	weeds@dpi.nsw.gov.au	www.dpi.nsw.gov.au/weeds www.nationalparks.nsw.gov.au
Qld	Dept of Natural Resources and Water	(07) 3405 5537	enquiries@nrw.qld.gov.au	www.nrw.qld.gov.au/pests/index.html
SA	Dept of Water, Land and Biodiversity Conservation	(08) 8303 9620	N/a	www.dwlbc.sa.gov.au
Tas.	Dept of Primary Industries and Water	1300 368 550 (cost of a local call)	Weeds.Enquiries@dpiw.tas.gov.au	www.dpiw.tas.gov.au/weeds
Vic.	Dept of Primary Industries / Dept of Sustainability and Environment	136186	customer.service@dpi.vic.gov.au	www.dpi.vic.gov.au www.dse.vic.gov.au
WA	Dept of Agriculture and Food	(08) 9368 3333	enquiries@agric.wa.gov.au	www.agric.wa.gov.au
Australia-wide	Australian Pesticides and Veterinary Medicines Authority (APVMA)	(02) 6272 5852 Fax: (02) 6272 4753	EnquiryLine@apvma.gov.au	www.apvma.gov.au http://services.apvma.gov.au/PubcrisWebClient

Contact details for state and territory agencies with responsibility for weeds are listed above, along with the APVMA. The APVMA website hosts the PUBCRIS database which contains information on all herbicides that are registered for use on weeds in each Australian state and territory, including minor use permits.

Consult the natural resource management organisation for your region or local council to find local contacts on managing weeds for biodiversity, including community groups working on *Erica* species. Also seek advice on non-invasive or local native alternatives to planting ericas in your garden.

Refer to the CRC for Australian Weed Management website (www.weeds.crc.org.au) for weed management guides including Weeds of National Significance and Alert List species (including heather (*Calluna vulgaris*)). The Introductory Weed Management Manual (also available from this website) may assist in developing a plan tailored to your situation.

Selected references and further information

AQIS Permitted Seeds list: Quarantine Amendment Proclamation 2006 (No. 7) Legislative Instrument—F2006L04007. www.frli.gov.au/

Council of Heads of Australian Botanic Gardens (1992). *Census of Plants in Australian Botanic Gardens.* www.anbg.gov.au/chabg/census

Csurhes, S. and Edwards, R. (1998). *Potential environmental weeds in Australia: candidate species for preventative control.* National Weeds Program, Queensland Department of Natural Resources.

Jordan, G. (2007). *Key to Tasmanian dicotyledons.* University of Tasmania. www.utas.edu.au/dicotkey/DicotKey/

Mather, L.J. and Williams, P.A. (1990). Phenology, seed ecology, and age structure of Spanish heath (*Erica lusitanica*) in Canterbury, New Zealand. *New Zealand Journal of Botany*, **28**:207-215.

Randall, R.P. (2007). *A global compendium of weeds.* Online database: www.hear.org/gcw

South African National Biodiversity Institute (2007). *Plants of southern Africa.* www.sanbi.org/frames/infofram.htm

South Coast Weeds: www.esc.nsw.gov.au/Weeds/

Spanish heath—Statutory Weed Management Plan: www.dpiw.tas.gov.au/weeds

Victorian Alert Weeds. www.dpi.vic.gov.au/weeds

Walsh, N.G. and Entwisle T.J. (eds.) (1996). *Flora of Victoria Volume 3: Dicotyledons* (*Winteraceae to Myrtaceae*). Inkata Press.

Weeds in Australia. www.weeds.gov.au

Weeds Information Notes—*Coastal note for Spanish heath*: www.dpi.vic.gov.au/dpi/index.htm

Strategic management of ericas

Vegetation management or weed control?

A removal program for ericas can be judged successful if the ericas are ultimately replaced by vegetation that is valued. Adopt a strategic, integrated, long-term approach to restore native vegetation that is self-sustaining and minimise reinvasion by ericas or other weeds. Natural regeneration of native plants is the best form of restoration and occurs gradually over many years.

In southern Australia, species-rich sclerophyll native vegetation (heathland, shrubby woodland or forest) on infertile soil is a typical vegetation type invaded by ericas. Application of minimum disturbance methods to weed infestations has often been successful in such vegetation, providing it is not significantly affected by influx of nutrients, phytophthora root fungal disease, continuing disturbance, inappropriate fire regime or invasion by nitrogen-fixing weeds such as brooms.

Apply herbicides during periods of active growth

Herbicide should only be applied when plants are actively growing. Avoid hot or wet conditions, or periods when plants are under stress, as specified on the herbicide labels.

Strategic management of ericas

Quick reference guide

Regional / local status of *Erica* species	Not yet established	Small, isolated outbreaks	Widely established
Management goals	Prevent establishment	Eradicate	Contain infestations and mitigate threats
Strategies required	Practise weed hygiene Raise community awareness and capacity to recognise the weeds and the problem Monitor, detect and identify possible new infestations	Manual or herbicide treatment with follow up Prevent re-establishment or invasion by other weeds—encourage natural regeneration of native vegetation Monitor and keep clean sites uninfested	**Native vegetation:** Identify high priority biodiversity assets under threat from ericas, protect them through implementing long-term site management plans following bush regeneration principles After a fire, weeding with minimum disturbance is particularly important to favour native species recovery and recruitment over weeds
			Public and private gardens: Replace any known weedy species Remove other erica specimens if seedlings are produced
			Roadsides: Map infestations and practise weed hygiene to prevent spread along and from roadsides, containing the species at the invasion front in and adjacent to native vegetation
			Pastures: Seek advice on management options to restore degraded pastures invaded by Spanish heath

Consider disposal options

Active growth may coincide with the production of seeds, so measures are needed during control programs to avoid seed spread. Piles of cut weeds should not be left on top of native vegetation.

Follow up

It is essential to monitor for regrowth from stumps after physical or chemical treatment and follow up thoroughly. Cut and paint or spot spray.

Prevent erica re-establishment

Once mature plants have been killed, the focus is on preventing re-establishment from seeds.

Erica species appear to vary greatly in their seed longevity and capacity to form seedbanks. They have been little studied in Australia and local observations may be the most useful source of information.

1. Avoid large-scale disturbance that would create extensive openings or areas of bare soil, such as too-frequent fire in native vegetation.
2. Encourage natural regeneration of native plants.
3. Identify patterns of invasion and manage likely seed sources and dispersal agents.
4. Monitor weed-free areas every few years to detect and remove seedlings before they mature.

Berry heath (*Erica baccans*): Tasmania.
Photo: Matthew Baker, Tasmanian Herbarium

CRC Weed management