



Shire of
Donnybrook Balingup

Weed Management Review 2023

Council Plan 3.1.1 - Review Weed Management Practices on Shire Land

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Introduction

The Shire of Donnybrook Balingup is responsible for the control of Pests and Weeds on Shire managed lands. There are many common weeds in the Shire; usually comprised of garden escapees or agricultural pests. Some have been allowed to grow by unwitting community members; others have entered the Shire using various methods of transportation, such as animals, vehicles, wind, and water flowing across the landscape; even shoes and clothing.

There are several invasive species that are currently being controlled by the Shire, using various methods to manage the impacts these organisms have on our landscape. This weed management review aims to summarise the various methods of weed control that are carried out on public lands within the Shire of Donnybrook Balingup and assess their effectiveness in comparison to other available methods. This report outlines the responsibility regarding weed control, common weeds found in the Shire and the process of prioritisation of weeds, and a comparison of methods commonly used.

Rationale

The Shire manages weeds on public lands for a variety of purposes, including:

Biosecurity

The Department of Agriculture Western Australia has identified numerous pest plants within the Shire that can have a significant impact on productivity in the Agricultural sector, and therefore the economy within the Shire. These plants can reduce productivity across the landscape in many ways, such as competition for sunlight, water and nutrient uptake, disease transmission, and through harbouring pest fauna.

Biodiversity

The Shire of Donnybrook Balingup is located within a globally recognised biodiversity hotspot, and invasive plants have had a significant impact on the survival of many of our plant species. Weeds can cause significant land degradation in our natural areas by outcompeting native species and providing harbourage for other pests. Weeds that are unpalatable as food reduce the availability of food necessary to support native wildlife. Weeds can also introduce disease to native plants and animals, impact soil quality and choke waterways. Waterways and riverbanks are a method of transport for many invasive plants; and weeds continue to have a significant effect on watercourses, across the Shire, the Southwest Region, and the State. Impacts can be widespread, such as reduced water availability and quality, alterations to food webs and flow regimes, and reduced habitat for native fauna such as fish and frogs.



Road Maintenance and Safety

Weeds thrive on roadsides where competition is low, and weeds have potential to spread to neighbouring lands, both private and public and can also be spread via transport corridors on the tyres and undercarriage of vehicles. Maintaining weeds on road verges is an appropriate way to limit weed spread. Certain weeds also have the potential to limit lines of sight, as well as block drains and damage verges, increasing risk to public safety and infrastructure.

Bushfire Protection

Weeds increase the biomass available as fuel for fires, changing the composition and structure of native vegetation. Many weed species are also highly flammable and leaving weeds to grow prolifically in an area can increase fire risk. After a fire has impacted an area, it is likely that infestations of weeds will colonise the newly cleared areas; the Shire manages these weeds to allow native species to return to the area.

Controlling Weeds on Shire Land

Problematic weeds are usually:

- Fast growing
- Unpalatable for grazing animals
- Highly adaptable and resilient in our climate and soils
- Easily spread across the landscape

The responsibility is on every land holder to manage the pests on their lands, to minimise the impacts across the landscape. Through effective management practices, the impact weeds have can be reduced; however, a consistent approach is required to maintain an area, ensuring weed populations are controlled effectively. The Shire of Donnybrook Balingup controls weed populations in line with the National Weed Strategy (Invasive Plants and Animals Committee, 2016), by

- Exercising statutory duties to encourage responsible weed management
- Managing weed problems on local government land in a responsible way, in co-operation with other landowners
- Assisting with the coordination of community weed management programs
- Representing community interests in weed management
- Supporting the activities of local groups undertaking weed management
- Assisting with data collection and information exchange
- Developing and adopting 'good neighbour' policies, where appropriate, to help reduce the spread and impacts of high risk weed species
- Supporting and building public awareness about weed issues.



The Shire of Donnybrook Balingup utilises the expertise of trained Shire staff, Qualified and Experienced Contractors, and Local not-for-profit groups to assist in weed control activities.

Legislative Responsibility

Nationally, the *Environment Protection and Biodiversity Conservation Act 1999* contains identified Weeds of National Significance. Plant species were selected based on their invasiveness and impact characteristics, their potential and current area of spread and their primary industry, environmental and socioeconomic impacts on a national scale.

The Department of Primary Industry and Regional Development are the regulating authority when it comes to pest species, as set out in the *Biodiversity and Agriculture Management Act 2007* (BAM Act). This legislation sets out requirements in association with introduced pest species and provides a framework for different methods of management. Declared pests in Western Australia are assigned to a C1, C2 or C3 control category under the *Biosecurity and Agriculture Management Regulations 2013* (BAM Regulations), as outlined below:

Control Categories

C1 Exclusion: *Organisms which should be excluded from part or all Western Australia.*

C2 Eradication: *Organisms which should be eradicated from part or all Western Australia.*

C3 Management: *Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism, or prevent or contain the spread of the organism.*

Unassigned: *Declared pests that are recognised as having a harmful impact under certain circumstances, where their subsequent control requirements are determined by a Plan or other legislative arrangements under the Act.*

Common Weeds in the Shire of Donnybrook Balingup

The following tables contain information regarding the significant pest plants that are found in the Shire of Donnybrook Balingup. Prioritisation of weed control is dependent on:

- Plant features
- Environmental factors and significance
- Location
- Infestation size
- Control Category assigned by the Department of Primary Industry and Regional Development



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The below list is not exhaustive and does not include weeds that impact our turf on public open spaces; **further information can be obtained by contacting the Shire's Environmental Officer.** Table 1 contains weeds that are prioritised for treatment, and Table 2 outlines weeds that are in significant numbers and are treated as resources allow.

TABLE 1: Weeds considered most significant in the Shire of Donnybrook Balingup.

Common Name:	Scientific Name:	DPIRD Control Category:
Grassy Weeds		
Elephant Grass, Giant Bamboo	<i>Arundo donax</i>	None
Woody Weeds		
Blackberry	<i>Rubus sp.</i>	Declared (C3)/WONS
Apple of Sodom	<i>Solanum linneanum</i>	Declared – exempt
Narrow Leaf Cotton Bush	<i>Gomphocarpus fruticosus</i>	Declared (C3)
Herbacious Weeds		
Cleavers	<i>Galium aparine</i>	Declared- exempt
Variogated Thistle	<i>Silybum marianum</i>	Declared- exempt
Spear Thistle	<i>Cirsium vulgare</i>	None
Paterson's Curse	<i>Echium plantagineum</i>	Declared exempt
Vines / Climbers / Creepers		
Bridal Creeper	Bridal Creeper	Bridal Creeper
Bulbs		
Arum Lily	<i>Zantedeschia aethiopica</i>	Declared – exempt



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TABLE 2: Other significant weeds in the Shire of Donnybrook Balingup.

Common Name	Scientific Name	Common Name	Scientific Name
Woody Trees		Grasses	
Fruit Trees	<i>Various</i>	African Lovegrass	<i>Eragrostis curvula</i>
Cootamundra Wattle	<i>Acacia baileyana</i>	Bulbs / Corms / Rhizomes	
Flinders Range Wattle	<i>Acacia iteaphulla</i>	Three cornered Garlic	<i>Allium triquetrum</i>
Sydney Golden Wattle	<i>Acacia longifolia</i>	Watsonia	<i>Watsonia sp (6)</i>
Kurrajong	<i>Brachychiton populneus</i>	African Cornflag	<i>Chasmanthe floribunda</i>
Pine Trees	<i>Pinus sp</i>	Cape Tulip	<i>Iridaceae sp (various)</i>
		Gladiolas	<i>Gladiolus caryphyllaceus & undulatus</i>
Woody Weeds		Vines / Climbers / Creepers	
Sweet Briar	<i>Rosea sp</i>	Dolichos pea	<i>Dipogon lignosus</i>
Herbacious Weeds		European Honeysuckle	<i>Lonicera perclymenum</i>
Italian Lavendar	<i>Lavandula stoechas</i>	Blue Periwinkle	<i>Vinca major</i>
Montpeliar Broom	<i>Genista monspessulana</i>		
Aquatic Weeds			
Bullrush	<i>Typha latifolia</i>		



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Weed Control Methods

Biological, environmental & social considerations to establish weed control requirements

It is outside Shire resources to control every weed infestation that has established itself in the Shire; therefore, weed control activities must be prioritised. The following is a brief outline of the process undertaken to establish an appropriate response to a weed infestation:

1. Understanding the biological properties of the weed being managed is of primary importance to ensure the best methods of control are undertaken. It must be understood by considering:
 - When is it actively growing?
 - When is it flowering and seeding?
 - What are the vulnerable times in the life cycle?
 - How long do seeds or other propagules remain viable in the soil?
 - How does it respond to fire?
 - Is there a preferred time for physical control?
 - What is the preferred time for chemical controls?
2. Environmental factors must also be established, such as:
 - Land tenure
 - Environmental significance
 - Proximity to waterways and wetlands
 - Proximity to objects of significance/assets
 - Proximity to neighbours
 - Risk to neighbouring plants
 - Weather/seasonal implications against the preferred control method
 - Risk of Action vs No Action
 - Size of infestation
 - Probably spready direction and timeframe
3. And social factors, such as:
 - Risk to the public
 - Cost of implementing and not implementing controls
 - Proximity to neighbours
 - Notification requirements
 - Training and availability of staff
 - Impact on social values of neighbours and/or wider community

These factors allow for ensuring control measures are in line with Shire Policy, legislative requirements and the needs of the environment and community (Brooks, 2002).



Weed Control Activities undertaken by the Shire

Physical

Manual Pulling

Hand pulling of individual weeds are used when

- Few and localised areas of weed infestation exist
- The area is frequently visited
- The weed is easily removed by pulling
- Other plants closely associated with the weed could be easily damaged by other methods

This method is commonly used in our parkland areas to control weeds in the garden beds of our recreational areas, avoiding unnecessary damage to the desired plants in the beds.

Felling/Ringbarking

Carried out on trees and shrubs that do not resprout or sucker; usually undertaken on roadsides or in reserves. On occasion, a chemical may be painted on the newly cut areas to kill the plant and/or impede regrowth, for example with introduced acacia species that reshoot. The Shire commonly uses this method in road and nature reserves to control invasive and destructive woody trees.

Mowing and Slashing

This is carried out in areas that are dominated by grasses or small herbaceous shrubs where there are no desirable native species present. Mowing and slashing is carried out prior to seed set to inhibit the spread of seeds, and in certain cases, followed by chemical application on fresh growth to improve the efficiency of the chemical application to kill the plant (for example, lovegrass or blackberry infestations). This method is commonly used by Shire staff to manage grassy weeds such as wild oats in our open parkland areas.

Biological

Biological control is the introduction of a biological vector that either creates grazing pressure on the weed (such as goats) or introduces disease that destroys the weed (such as Bridal Creeper Rust). The Shire currently engages Recognised Biosecurity Groups to apply Bridal Creeper Rust to Bridal Creeper on Shire Lands as resources allow, and training is available to landowners to assist in the control of Bridal Creeper in the Shire (on their property).



Chemical Herbicides

The use of herbicides is the most common and cost-effective method of controlling many environmental weeds because it can be targeted at species or weed classes, with large areas being treated in a cost effective manner. The Shire selects herbicides that target different weed types as appropriate. Herbicides used by Shire staff are usually in the form of glyphosate, metsulfuron and Fluzifop, which are briefly described below:

Commonly used herbicides in the Shire of Donnybrook Balingup

Fluzifop:	<i>Selective post-emergent grass herbicide, little residual action, absorbed through the leaves.</i>
Glyphosate (e.g.: Biactive):	<i>Post-emergent herbicide affects most species at high rates but can be selective at low rates. Non-residual, absorbed by the leaves, and can be used as a wipe on stumps or stem injection.</i>
Metsulfuron methyl:	<i>Post-emergent herbicide used to treat ferns, bulbous and some woody species, absorbed through the leaves, residual activity for up to a few weeks depending on soil pH.</i>

Chemically treating weeds on Shire lands is carried out by either Shire staff or external contractors. Small infestations in our townsites are usually treated by staff using handheld sprayers; larger or more remote infestations are usually controlled using external contractors. A dye is sometimes added to ensure that areas are adequately treated, however this has not been implemented in all areas of application. Adding dye to chemicals increases the cost of weed control applications and offers no additional safety to the public, as the Health Regulations require that chemicals be dry (and therefore safe) before signage is removed.

Many Shire roads are impacted by undesirable weeds and vegetation, and the Shire of Donnybrook Balingup carries out Biannual Road verge treatments on many of our transport corridors to ensure verges are maintained appropriately, in accordance with Shire Verge Policies (which can be accessed by the Shire website). For landowners that wish to avoid chemical treatments on their verge, they can notify the Shire in writing to register their land as a “No Spray” property and assume responsibility for weed control on their verge. Should the landowner fail to maintain the verge to a suitable standard, the Shire reserves the right to re-initiate chemical treatment to ensure weed infestations are managed appropriately, in line with Council Policy.



Managing staff and public safety around chemicals

When applying chemicals, all Shire operators and contractors follow requirements of the *Work Health and Safety Act 2020*. Products are mixed and applied in accordance with the product label, in a safe and responsible manner using best practice provided from the Western Australian Department of Health, and in line with the Shire's Operational Procedure *EXE/OP-13 Dangerous Goods and Hazardous Substances*. All Shire staff that carry out herbicide spraying have obtained relevant qualifications in the application of pesticides. All external contractors are also required to be suitably qualified and experienced for the works required.

During the spraying activity, Shire staff are supplied with and wear the appropriate personal protective equipment, are required to display appropriate signage, and document their chemical application. Signage is displayed so people who wish to avoid the areas can do so, indicating the name of the product that is being applied. Signage remains in place until the product has been fully applied and is touch dry in accordance with the *health (pesticide) Regulations 2016*. Weather conditions are also considered, and chemicals are only applied under appropriate environmental conditions, in line with the manufacturer's guidelines. Favourable weather conditions need to be utilised to ensure there is no off-target impacts due to wind drift and to ensure effective results.



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Control Methods Comparison Tables

Current Methods

The current weed control methods undertaken in the Shire of Donnybrook Balingup are found in Table 3 below, outlining their applications, advantages, and disadvantages.

TABLE 3: Current Weed Control Methods

HAND REMOVAL / DIGGING			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> - Young plants, - Small plants. 	<ul style="list-style-type: none"> - No chemicals, - Effective, - Selective. 	<ul style="list-style-type: none"> - Not suited to species where removal of all reproductive material is difficult, - Can be impractical if infestations are large, - Whole Plant needs to be removed, - Can trample/impact non target emerging species 	<p>This method is primarily used in garden beds or by community groups during busy bees</p>
SPOT SPRAY			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> - Grasses and annuals, - Woody weed seedlings. 	<ul style="list-style-type: none"> - Effective, - Selective, - Minimises herbicide wastage. 	<ul style="list-style-type: none"> - Weather dependent. 	<p>Carried out using diluted herbicide using handheld spray gun, used on footpaths, gutters, median strips and turf</p>
CUT / CUT AND PAINT			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> - Larger woody plants. 	<ul style="list-style-type: none"> - Effective, - Selective, - Improved aesthetics. 	<ul style="list-style-type: none"> - Labour intensive, - Requires disposal of materials. 	<p>Painting the cut section with herbicide is sometimes necessary to effectively kill the plant.</p>

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BASAL BARK TREATMENT			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> Trees. 	<ul style="list-style-type: none"> Kills plant in situ, Minimal labour component, Minimal disturbance, Selective. 	<ul style="list-style-type: none"> Unightly, Not suited to high traffic areas, Must be applied to entire diameter of the trunk when trunk surface is dry. 	Diluted herbicide is applied to the bark at the base of the tree, up to 50cm from the ground.
MOWING			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> Annual grasses in cleared areas. 	<ul style="list-style-type: none"> Covers large areas with minimal labour time. 	<ul style="list-style-type: none"> Needs to be done regularly unless used with other methods, Potential to spread weeds. 	
MULCHING USING WOODCHIPS			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> All. 	<ul style="list-style-type: none"> Suppresses weeds, Gives natives an opportunities to establish and shade out pest plants. 	<ul style="list-style-type: none"> Can be labour intensive, Mus ensure that mulch is weed free, Must ensure mulch in dieback sensitive areas are dieback free. 	Can utilise vegetative material obtained from the same site if it is free of weeds.
BIOLOGICAL CONTROL			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> Bridal Creeper (rust). 	<ul style="list-style-type: none"> Minimal labour, Self spreading, Selective, Minimal cost. 	<ul style="list-style-type: none"> Will not eradicate, but will slow growth and spread. 	
BROADSCALE SPRAY			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> Road verges. 	<ul style="list-style-type: none"> Cost and time efficient, Simplifies maintenance schedule of road verges, Selective chemicals can be used. 	<ul style="list-style-type: none"> All vegetation on roadsides can be killed if non-selective chemical is used, Not always able to get sufficient coverage to eradicate infestations, Weather dependent. 	

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MECHANICAL MULCHING			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> - All (usually woody weeds in particular). 	<ul style="list-style-type: none"> - Covers large areas with minimal labour time. 	<ul style="list-style-type: none"> - Removes most habitat in a short time; fauna on site may be impacted. 	Used in areas where there are large infestations, such as highly disturbed sites.
BRUSHCUTTING			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> - Annual Species, - Edges of trails, - Infrastructure boundaries. 	<ul style="list-style-type: none"> - Controls and reduces biomass on the surface, - Delays production of seed set, - Eventually depletes seed bank. 	<ul style="list-style-type: none"> - Time dependent, must be done prior to seed set, - Must be regularly undertaken to ensure long term success, - Can take multiple years to achieve seedbank depletion. 	Useful to maintain areas, rather than eradicate weeds.

Alternative Methods Considered

There are many different methods available to control weeds, including alternative treatments to the synthetic chemical controls that the Shire currently utilises. Studies have been carried out by various stakeholders to quantify the viability of using methods such as heat, steam, and more “natural” chemical applications such as fatty acids and acids, to control weeds. The Shire of Donnybrook Balingup carried out a desktop investigation into these applications to compare these against the use of chemicals such as glyphosate. Alternative Methods that were considered as part of the review are listed below in table 4, discussing their applications and the reported findings from users of these methods to investigate their potential viability for Shire implementation (Antipas, 2019), (Barker, 2009), (Bowler, 2020), (Delaney, 2020), (Albany, 2019) (WALGA (Western Australian Local Government Association), 2019).

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TABLE 4: Alternative Methods

SMOTHERING			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> - All. 	<ul style="list-style-type: none"> - Prevents germination of weed seeds, - Avoids chemicals. 	<ul style="list-style-type: none"> - Expensive, - Materials can be difficult to apply around established plants, - Possible issues with water penetration, - Time intensive, - Creates waste. 	<p>This method is where materials such as black plastic is used to cover pest plants and block available sunlight. Impractical for all but previously cleared areas.</p>
FLAME WEEDING			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> - Young weeds and grasses, - Some annual and perennial weeds. 	<ul style="list-style-type: none"> - No chemicals, - No soil disturbance. 	<ul style="list-style-type: none"> - Safety and fire hazards, - May affect non-target species, - Time consuming, - May need repeating, - High water usage. 	<p>Thin blasts of heat via propane flame is targeted at weeds, boiling the water in the leaf tissues. Potential alternative to chemical spray, however fast recovery of most target plants has been reported, and applications must be carried out more frequently to maintain current standard of control.</p>
HERBICIDE GRANULES			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> - Various. 	<ul style="list-style-type: none"> - No spray drift, - Can reduce the need for repeat applications. 	<ul style="list-style-type: none"> - Rain or moisture required, - Limited choice of herbicide, - Potential for herbicide to be washed off site, - May affect non target species. 	

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DROWNING			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> Emergent species in wetlands. 	<ul style="list-style-type: none"> Effective on emergent species. 	<ul style="list-style-type: none"> Time consuming, Access can be problematic, Safety issues if in riparian zones. 	<p>Need to cut plants to below water levels.</p>
SOLARISATION			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> Low growing or semi aquatic weeds. 	<ul style="list-style-type: none"> No chemicals, Good for small infestations. 	<ul style="list-style-type: none"> Time consuming, Not effective on large infestations, Effectiveness is varied, Plastic may have to be left in place for long periods, Will also kill non target species. 	<p>Plastic is used to smother plants and heated by the sun to kill them.</p>
ACIDS / FATTY ACIDS			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> Annual weeds, grasses and broadleaf weeds. 	<ul style="list-style-type: none"> No chemicals, Fast acting, Little- no residual effect on soils. 	<ul style="list-style-type: none"> May effect non-target species, Expensive to purchase, Hazardous, can cause eye and skin irritation/injury, Repeat applications may be required. 	
STEAM			
Suitable for:	Advantages:	Disadvantages:	Notes:
<ul style="list-style-type: none"> Young weeds, Footpaths, Areas of no non-target species. 	<ul style="list-style-type: none"> More effective than flame weeders, No chemicals. 	<ul style="list-style-type: none"> Non selective- will also kill non target plants, Repeat treatments required in shorter timeframes , Time consuming (example application rate of 50m strip in 2 hours), Kills invertebrates in the surface soil, Mobilising equipment is difficult, Access can be problematic, Uses fossil fuels as part of the process (ratio 3L unleaded:8L Deisel:600L Water), Application is loud and smelly, Traffic Management may be required during application, Expensive to initiate and implement in comparison to other methods. 	<p>Super-heated steam applied to the base of the plant to cook the tissues. Plants with sufficient roots recover within 4-6 weeks, so repeat applications are required.</p>

Summary of Results

The following Local Government Areas were investigated regarding Weed Control methods in use, to compare the current methods available to the methods currently used by the Shire:

- Shire of Augusta-Margaret River,
- Town of Bassendean,
- Shire of Bruce Rock,
- City of Joondalup,
- City of Perth,
- City of South Perth,
- City of Albany.

The Shire also reviewed scholarly articles on chemical alternatives, and resources provided to Local Governments by the WA (Western Australia) Local Government Association also provided information relating to weed control programs that are appropriate for use across the state. Based on the desktop investigation carried out by the Shire's Environmental Officer in 2023, most common alternative methods to currently used weed control applications have been found by other Local Government Areas to be generally higher in cost and an increased risk to public safety; requiring these methods to be restricted in their use, if they are adopted by Council. For example, WALGA reports that 17 Local Governments reviewed the use of steam weed treatment, and all found that steam weed treatment is a costly option, both in implementation and application, when compared with other weed control methods (WALGA, 2019). Seven Local Governments adopted the use of steam as ongoing treatment in their weed control programs, including the Cities of Fremantle, Joondalup, Perth, South Perth, and Subiaco (Town of Bassendean and Shire of Bruce Rock). These areas still report that they use chemical herbicides as part of their weed control processes, based on public information accessed via their websites in 2023; except for the City of Perth and The Shire of Bruce Rock, where no information was obtained regarding their current weed control methods.

Conclusion

Based on the findings of this report, the Shire considers its current methodology as the most contemporary, safe, and cost effective, given the environmental, social, and financial constraints that Shire operations are required to work within. Weed reviews such as this one will be undertaken every three years to ensure that the Shire remains in line with modern methodologies and best practice available. It is recommended that a detailed analysis of the Shire's unique weed control requirements be initiated, including suitability and associated costs, should the Shire wish to introduce alternative methods to current chemical treatments.



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