



Declared Plant Policy

This policy relates to natural resources management under section 9(1)(d) of the Landscape South Australia Act 2019 (the Act), enabling co-ordinated implementation and promotion of sound management programs and practices for the use, development or protection of natural resources of the State. Specifically, this policy provides guidance on the use and management of natural resources relating to the prevention or control of impacts caused by pest species of plants that may have an adverse effect on the environment, primary production or the community, as per object s7(1)(f) of the Act.

skeleton weed (*Chondrilla juncea*)

Skeleton weed is a deep-rooted perennial weed established in the cereal growing areas of South Australia with the potential to spread rapidly and seriously reduce the yield of cereal crops.

Management Plan for Skeleton Weed

Outcome

- Negative impacts of skeleton weed on production minimised in rotational broad acre cropping and irrigated pastures.

Objectives

- High priority outbreaks in generally uninfested areas destroyed.
- Large outbreaks in generally uninfested areas contained and reduced in density.
- Seed dispersal prevented in generally uninfested areas.
- Impact of skeleton weed reduced in generally infested areas.

Best Practice Implementation

Within areas generally free of skeleton weed,

- Regional landscape boards and Green Adelaide to ensure high priority infestations, as determined by the authority, on private or public land are controlled.
- Regional landscape boards and Green Adelaide to control high priority infestations on road reserves and recover costs from adjoining landholders in accordance with regional management plans.
- Regional landscape boards and Green Adelaide to ensure large infestations are contained by property-level management plans.
- Regional landscape boards and Green Adelaide to ensure contaminated seed and fodder are not brought into or distributed within their regions.

Regional Implementation

Refer to regional management plans for further details.

Region	Actions
Alinytjara Wilurara	Monitor
Eyre Peninsula	Limited action
Green Adelaide	Manage sites
Hills and Fleurieu	Manage sites
Kangaroo Island	Destroy infestations – regional alert
Limestone Coast	Manage sites
Murraylands and Riverland	Manage weed
Northern and Yorke	Monitor
South Australian Arid Lands	Limited action

Declaration

To implement this policy, skeleton weed is declared under the *Landscape South Australia Act 2019* throughout the whole of the State of South Australia to minimise further spread. Its movement or transport on a public road by itself or as a contaminant, or sale by itself or as a contaminant, are prohibited.

Regional landscape boards and Green Adelaide may require land owners to control skeleton weed plants growing on their land. These authorities are required to control plants on road reserves in their regions and may recover costs from the adjoining land owners.

Skeleton weed is declared in category 2 under the Act for the purpose of setting maximum penalties and for other purposes. Any permit to allow its sale or road transport can only be issued by the Chief Executive of the Department for Environment and Water or their delegate pursuant to section 197.

Under the *Landscape South Australia (General) Regulations 2020*, Regulation 27 specifies the conditions under which a person is exempt from the operation of section 186 and may transport wool, grain or other produce or goods carrying skeleton weed on public roads. Regulation 28 specifies conditions under which a person is exempt from the operation of section 188(2) and may sell wool, grain or other produce or goods carrying skeleton weed. Note that certain produce or goods may be excluded from these general movement and sale exemptions by Gazettal Notice of the Chief Executive, DEW.

The following sections of the Act apply to skeleton weed throughout each of the regions noted below:

Sections of Act	Region									
	AW	EP	GA	HF	KI	LC	MR	NY	SAAL	
186(1) Prohibiting entry to area										
186(2) Prohibiting movement on public roads	X	X	X	X	X	X	X	X	X	X
188(1) Prohibiting sale of the plant	X	X	X	X	X	X	X	X	X	X
188(2) Prohibiting sale of contaminated goods	X	X	X	X	X	X	X	X	X	X
190 Requiring notification of presence										
192(1) Land owners to destroy the plant on their properties										
192(2) Land owners to control the plant on their properties	X	X	X	X	X	X	X	X	X	X
194 Recovery of control costs on adjoining road reserves	X	X	X	X	X	X	X	X	X	X

Review

This policy is to be reviewed by 2025, or in the event of a change in one or more regional management plans for skeleton weed.

Weed Risk

Invasiveness

Flowers of skeleton weed produce seed automatically without any need for pollination. One plant can annually produce 20,000 to 30,000 seeds. These are well adapted for dispersal by the wind, and are also easily transported in wool, fabric, machinery, vehicles, railway trucks, and contaminated hay or chaff.

There is little dormancy in seeds of skeleton weed, so germination usually occurs soon after seed is shed, as soon as sufficient moisture is available in autumn. Seeds will germinate with as little as 5 mm of rain; the seedlings require three to six weeks of soil moisture to establish successfully, and can develop a taproot to 1 metre deep by the following spring. They can establish among competition from pasture or relatively undisturbed native vegetation.

Impacts

Skeleton weed is a pest of broad acre crops, pastures and occasionally roadsides. It reduces yields through competition for moisture, nitrogen and light, and has a high cost of control. Yield losses of up to 80% have occurred in densely infested cereal crops, and the wiry flowering stems can even make harvesting difficult.

It is poor fodder for cattle and can out-compete other pasture plants. However, carrying capacity for sheep may be improved by the presence of skeleton weed presence because it provides green summer fodder. In rotational systems, its impact on crops far outweighs its benefit in pastures.

Potential distribution

Skeleton weed is suited to semi-arid or Mediterranean climates, but will grow in other climates under suitable conditions. It is found primarily in areas receiving more than 300 mm mean annual rainfall. However, since it can regenerate repeatedly from deep roots, it is not limited to sites regularly receiving this rainfall but can afford to miss dry years and recover in wet years. It is tolerant of waterlogging and any levels of frost that occur in South Australia.

Skeleton weed has an advantage on deep sandy soils where its root system can exploit deep soil water resources, but can grow competitively in a wide range of soil types and is suited to the majority of the arable areas in the State.

Feasibility of Containment

Control costs

To prevent the spread of skeleton weed, seeds and roots must not be moved from infested areas. As wind dispersal of seed is important, seed set should be prevented where possible. Sheep can be useful minimising spread if placed in infested paddocks from October to

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November before the weed flowers. Continuous grazing will not kill the plant, but it will prevent the development of flower heads and seed production.

Herbicide control of skeleton weed is easiest in a wheat crop. If possible it is recommended wheat be sown in large infestations, with barley or oats the next best options. Lupin crops should not be used as they are highly susceptible to damage by any herbicides useful for managing skeleton weed.

In pastures, seeding with annual or perennial legumes can provide significant competition to minimise the spread of skeleton weed.

Co-ordinated containment programs, especially on light soils, have encountered problems from the long-term persistence of herbicide in soil leading to risk of erosion. There is a specific need for alternative control strategies for large infestations on light soils.

Persistence

Skeleton weed seeds have little dormancy and are short lived. They usually germinate within six months and no seed bank is formed. The root system is long lived, enabling individual skeleton weed plants to survive for many years. It also enables mature skeleton weed plants to regenerate from deep roots, making them more difficult to kill.

Current distribution

Infestations of skeleton weed are scattered throughout the Mount Lofty Ranges, Mid North, Limestone Coast and Eyre Peninsula regions. The weed is more widespread in the Mallee and Riverland regions.

State Level Risk Assessment

Assessment using the Biosecurity SA Weed Risk Management System gave the following comparative weed risk and feasibility of containment scores by land use:

Land use	Weed Risk	Feasibility of control	Response at State Level
Crop-pasture rotation	high 116	medium 32	protect sites
Irrigated pasture	high 105	medium 42	protect sites
Grazing-rangeland	low 22	very high 11	monitor
Grazing - southern	low 31	low 61	limited action
Native vegetation	low 38	medium 40	limited action

Considerations

Skeleton weed was introduced to New South Wales by 1897 when it was detected in Wagga Wagga and had spread to South Australia by 1947. Attempts at eradication commenced immediately, but were unsuccessful due to lack of effective control techniques. It had spread to the upper Limestone Coast, Eyre Peninsula, Yorke Peninsula and Northern areas by 1965.

It has still not reached its ecological limits in South Australia, as several decades of intensive management have successfully delayed its spread. It has potential to establish and cause losses throughout the cereal areas, especially in the lower rainfall zones.

Chondrilla juncea is an aggregate of many agamospecies (clones that reproduce by non-sexually produced seeds). At least three of these agamospecies occur in South Australia, and their distribution has implications for biological control. Several of biological control agents were introduced in the 20th century and reduced the density and impacts of the commonest form of skeleton weed in heavily infested regions. However, a consequence has been an increase in the relative abundance of two other forms that are less susceptible to these agents.

Risk assessment indicates site protection as the appropriate action at State level in rotational cropping and irrigated pastures, and monitoring in rangelands. While sale and movement are prohibited uniformly across the State, regional actions vary according to the land uses in each region. Co-ordinated control programs are not conducted in areas where skeleton weed is widespread and there are few benefits from enforced control. However, all regional landscape boards retain the power to enforce control actions if necessary.

On Kangaroo Island, skeleton weed is a regional alert species and infestations are destroyed when detected. The Murraylands and Riverland aims to manage the weed; the Green Adelaide, Hills and Fleurieu, and Limestone Coast regions aim to manage sites.

Skeleton weed is monitored in the Alinytjara Wilurara and Northern and Yorke regions. Only limited action is undertaken in the Eyre Peninsula region where control is normally left to the judgement of landowners.

Synonymy

Chondrilla juncea L., Sp. Pl. 796 (1753)

Taxonomic synonyms:

- Chondrilla acantholepis* Boiss., Diagn. Pl. Orient. ser.1, 11: 48 (1849)
- Chondrilla angustissima* Hegetschw., Fl. Schw. 762 (1840)
- Chondrilla bornmuelleri* Haeckel, Repert. Spec. Nov. Regni Veg. Beih. 108: 69 (1938)
- Chondrilla brevirostris* Fisch. & C.A. Meyer, Index Sem. St.Petersberg 3:32 (1837)
- Chondrilla canescens* Kar. & Kir., Bull. Soc. Imp. Naturalistes Moscou 15: 397 (1842)
- Chondrilla graminea* M.Bieb., Fl. Taur.-Caucas. 2: 244 (1808)
- Chondrilla gummifera* Iljin, Bull. Sect. Rubber-Produc. Pl., Moscow, 3) 49: 56 (1930)
- Chondrilla latifolia* M.Bieb., Fl. Taur.-Caucas. 2: 244 (1808)
- Chondrilla rigens* Rchb., Fl. Germ. Excurs. 271 (1832)
- Chondrilla virgata* J.Presl & C.Presl, Delic. Prag. 116 (1822)

Other common names include devil's grass, gum succory, hogbite, naked weed, and rush skeletonweed.

References

Panetta, F.D. & Dodd, J. (1995) *Chondrilla juncea* L. In Groves, R.H. et al. (eds) *The Biology of Australian Weeds* 1: 67-86.

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