

# Declared Plant Policy



## swamp oak (*Casuarina glauca* and *C. obesa*)

Government  
of South Australia

Swamp oaks are suckering trees 15 to 20 m tall native to the east coast of Australia in New South Wales and Queensland. They have been widely planted and have become naturalised beyond their native range, particularly on river banks in South Australia and Western Australia.

### Management Plan for Swamp Oak

#### Outcomes

- Protect the integrity of native riparian vegetation from the impacts of swamp oak.
- Maintain water flow and quality in watercourses.

#### Objectives

- Prevent the further spread of swamp oak.
- Achieve control of existing swamp oak infestations in the Adelaide Mount Lofty Ranges and South East regions that threaten significant native vegetation sites.

#### Implementation

- Delimit the extent of swamp oak infestations in the Adelaide Mount Lofty Ranges and South East regions.
- Control infestations according to regional priorities.
- Increase awareness of the impacts of swamp oak.
- Prevent further sale and distribution of swamp oak.

#### Regional Implementation

Refer to regional management plans for further details.

NRM Region	Actions
Adelaide and Mount Lofty Ranges	protect sites
Alinytjara Wilurara	limited action
Eyre Peninsula	limited action
Kangaroo Island	limited action
Northern and Yorke	limited action
South Australian Arid Lands	limited action
South Australian Murray Darling Basin	limited action
South East	protect sites

## Declaration

To implement this policy, swamp oaks are declared under the *Natural Resources Management Act, 2004* throughout the whole of the State of South Australia so that sale and road transport of the plants can be prevented. The movement or transport of the plant on a public road by itself or as a contaminant, its entry to South Australia, or sale by itself or as a contaminant, is prohibited. NRM authorities in the Adelaide and Mount Lofty Ranges region may require land owners to control swamp oaks growing on their land. NRM authorities in this region are required to control plants on road reserves and may recover costs from the adjoining land owners.

Swamp oaks are declared in category 3 under the Act for the purpose of setting maximum penalties and for other purposes. Any permit to allow their movement or sale can only be issued by the regional NRM Board pursuant to section 188.

The following sections of the Act apply to swamp oaks throughout each of the NRM regions noted below:

Sections of Act	Region							
	AMLR	AW	EP	KI	NY	SAAL	SAMDB	SE
175(1) Prohibiting entry to area	X	X	X	X	X	X	X	X
175(2) Prohibiting movement on public roads	X	X	X	X	X	X	X	X
177(1) Prohibiting sale of the plant	X	X	X	X	X	X	X	X
177(2) Prohibiting sale of contaminated goods								
180 Requiring notification of infestations								
182(1) Landowners to destroy the plant on their properties								
182(2) Landowners to control the plant on their properties	X							
185 Recovery of control costs on adjoining road reserves	X							

The dwarf cultivars *Casuarina glauca* 'Cousin It' and *Casuarina glauca* 'CAS01' are exempt from the declaration. 'CAS01' is subject to Plant Breeders Rights in Australia and is marketed as Free Fall™.

## Review

This policy is to be reviewed by 2020, or in the event of a change in one or more regional management plans for swamp oaks.

## Weed Risk

### Invasiveness

In South Australia swamp oaks have been observed to spread primarily by suckering, with seedlings being rare. Seedlings were reported in wetlands at St Kilda and a watercourse at Riverton. Establishment by suckering is vigorous due to access to resources from the parent tree. This enables establishment in dense vegetation. As its foliage is palatable to stock, grazing will prevent its spread into pasture, but not in native vegetation.

Suckering by swamp oaks leads to dense circular thickets around the original parent tree. The parent tree will eventually be surrounded by maturing suckers, which in turn will produce their own suckers.

## swamp oak policy

Dispersal of swamp oaks by suckering is only a few metres per year. Occasional spread along watercourses would probably occur, through movement of root pieces in flooding events, or cone bearing branches which would release seeds upon drying.

Swamp oaks produce an average of 70 seeds per cone. Seed is held in cones until the death of branches/trees (e.g., following fire). Thus whilst seed will accumulate in the crown, annual seed rain is likely to be much less than 1000 seeds per square metre. Time to seed production for new suckers is likely to be >3 years, given competition from older suckers.

Swamp oak seeds are winged and seeds have been found to disperse more than 100 metres.

### Impacts

Swamp oaks can form dense thickets on a variety of soil types and spread into adjacent native vegetation. Whilst their rate of spread is slow, they have the potential to reach a high density if uncontrolled.

At a large infestation above the Poldia Basin on Eyre Peninsula in native vegetation that had been protected from grazing for 30 years, swamp oak thickets 80-100 m diameter had formed from each of several originally planted trees.

Swamp oak thickets observed in SA had excluded most other vegetation, through dense shading and competition for soil moisture. The species has very high annual litter fall rates in comparison to other Australian temperate and subtropical forest species, implying a high potential impact on native plants through smothering or possible allelopathy.

Tall, dense thickets of swamp oaks substantially slow movement of animals and people, but are rarely impenetrable. Water movement through watercourses may be impeded. Swamp oaks on roadsides also limit vision and vehicular access, especially as road grading produces dense suckering.

The roots bear nodules containing nitrogen-fixing bacteria. Soils beneath *Casuarina* are nutrient sinks, and flood events flush these nutrients into streams. Thus swamp oaks may potentially increase nitrogen levels in riparian ecosystems.

Swamp oaks may pose a threat to non-saline groundwater and stream flow levels in dry areas. It has been found that greater groundwater discharge rates in swamp oak stands compared to *Eucalyptus camaldulensis* and *Melaleuca halmaturorum*. However, the potentially negative effect of increased groundwater use may be offset by the ability of swamp oaks to utilise saline groundwater without uptake and leaf excretion of salt.

### Potential distribution

Swamp oaks persist in a wide range of soil types in SA. They grow particularly well in heavier clay soils and tolerate acidic, saline and, waterlogged soils. They can naturalise in areas with above 350 mm annual rainfall in SA.

## Feasibility of Containment

### Control costs

There has been little experience with controlling swamp oaks in South Australia as they have only recently been recognised as pests. Like other tree weeds, they are expensive to clear once large infestations have developed. General tree-killing herbicides are registered for use on swamp oaks but there are not likely to be selective herbicide treatments.

### Persistence

Swamp oaks are likely to form monocultures and regrowth from suckers can necessitate repeated control treatments.

### Current distribution

Scattered infestations exist in the lower Flinders Ranges, Mid North, Mount Lofty Ranges and Fleurieu Peninsula, on Eyre Peninsula and Yorke Peninsula. Infestations have established from plantings in the Flinders Ranges (Quorn) and Tarlee, Riverton, Hindmarsh Island, Strathalbyn and St Kilda. As the two species are often confused it is not certain whether a given infestation is *C. glauca* or *C. obesa* unless a specimen has been confirmed at the State Herbarium.

Other localities where swamp oaks have become naturalised include:

- Eyre Peninsula - Elliston, Boston Island, Koppio hills and Port Lincoln
- Yorke Peninsula – Maitland-Winulta and Minlaton-Stansbury roadsides
- Mid North - Clare-Farrell Flat and Spalding-Gulnare roadsides
- Adelaide Metropolitan and Hills – Monarto, Belair National Park, Watiparinga Reserve, Brownhill Creek Recreation Park, Mt Barker and Little Para Estuary
- Fleurieu Peninsula – Onkaparinga Gorge and estuary
- Kangaroo Island – Dudley Peninsula, outskirts of Brownlow, Kingscote and
- Cygnet River estuary
- Murray Mallee – Murray Bridge
- Upper South East – Bordertown to Pinaroo roadside

## 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
Aquatic (riparian)	high 101	high 28	contain spread

## Considerations

*Casuarina glauca* and *C. obesa* have been in cultivation in SA for over a century. They have been widely planted across the agricultural zone of SA for farm windbreaks and shelter, farm and roadside amenity plantings, and for dryland salinity control.

## swamp oak policy

Risk assessment indicates a management action at State level of containing spread in native riparian vegetation. The Adelaide and Mount Lofty Ranges NRM region protects sites by enforced control in some situations. The South East NRM region also has a strategy of site protection but does not require enforced control. In other regions, action is limited to enforcing the prohibition on sale to limit further plantings of swamp oak.

Separation of the two species can only be done by examining the new permanent shoots to see if leaf teeth are recurved or not. Another species from the eastern States, *Casuarina cunninghamiana*, has also been planted in South Australia.

### Synonymy

*Casuarina glauca* Sieber ex Spreng., Syst. Veg. 3: 803 (1826).

Taxonomic synonym:

*Casuarina obtusa* Miq., Prodr. 16: 334 (1868).

*Casuarina torulosa* Miq., Nieuwe Verh. Eerste Kl. Kon. Ned. Inst. Wetensch. Amsterdam reimpr. 13: 75 (1848) nomen illegitimum.

*Casuarina obesa* Miq., Pl. Preiss. 1: 643 (1845).

Other common names include Brazilian oak, cadigal, grey sheoak, guman, longleaf ironwood, saltmarsh ironwood, scaly-bark beefwood, swamp sheoak.

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Conservation

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