

Eyre Peninsula NRM Board  
PEST SPECIES REGIONAL MANAGEMENT PLAN  
*Pinus halepensis* Aleppo pine



This plan has a five year life period and will be reviewed in 2023.



Natural Resources  
Eyre Peninsula



Government of South Australia  
Eyre Peninsula Natural Resources  
Management Board

# INTRODUCTION

## Synonyms

*Pinus halepensis* Mill., Gard. Dict., ed. 8. n.8. (1768)  
*Pinus abasica* Carrière, Traité Gén. Conif. 352 (1855)  
*Pinus arabica* Sieber ex Spreng., Syst. Veg. 3: 886 (1826)  
*Pinus carica* D.Don, Discov. Lycia 294 (1841)  
*Pinus genuensis* J.Cook, Sketch. Spain 2:236 (1834)  
*Pinus hispanica* J.Cook, Sketch. Spain 2:337 (1834)  
*Pinus loiseleuriana* Carrière, Traité Gén. Conif. 382 (1855)  
*Pinus maritima* Mill., Gard. Dict. ed. 8. n.7. (1768)  
*Pinus parolinii* Vis., Mem. Reale Ist. Veneto Sci. 6: 243 (1856)  
*Pinus penicillus* Lapeyr., Hist. Pl. Pyrénées 63 (1813)  
*Pinus pseudohalepensis* Denhardt ex Carrière, Traité Gén. Conif. 400 (1855). [8]

Aleppo pine, Jerusalem pine, halepensis pine, pine [8].

## Biology

The Aleppo pine (*Pinus halepensis* Mill.) is a medium sized 25 - 30 metre tall, coniferous tree species. The needle like leaves are 6- 10 cm long, bright green and arranged in pairs.

Conifers typically produce male and female cones that are retained in the trees canopy. Aleppo pines begin producing female cones at approximately four years of age, the cones take about three seasons to mature. Cones are 5.0 – 11.0 cm long and held on short stalks.

Aleppo pines are prolific seeders, potentially depositing between 25 - 105 seeds per square metre [2], studies have estimated mature trees can produce about 17,400 seeds per year [5] [7]. The seeds are produced and protected within female cones and stored in the canopy, potentially for many years. Seed release often occurs in response to an environmental trigger (serotinus), commonly fire and the winged seeds are transported by wind. The viability of canopy-stored seed can be maintained for as long as 20- 50 years [2], but seedling survival can be low.

## Origin

The Aleppo pine is native to the Mediterranean. It was introduced to Australia in the 1800's as a forestry tree and widely recommended and planted as a shade and shelterbelt tree in agricultural areas.

## Distribution

Aleppo pine has naturalised in rural regions of South Australia having winter rainfalls between 450 – 760mm.

The seeds once released from parent trees are transported by wind across the landscape. The seeds are able to establish in a range of habitats from otherwise treeless roadsides to areas of native vegetation.

It is most abundant on southern Eyre Peninsula, Yorke Peninsula and Mid-North, and less frequent in upper Eyre Peninsula and the Murray Mallee. Aleppo pines appear absent from the pastoral zone.

Infestations occur in Waitpinga Conservation Park, Innes National Park, Hindmarsh Island and many small parks in the Adelaide Hills. Large infestations of Aleppo pines occur on lower Eyre Peninsula along the Flinders Highway and many roadside reserves, Uley Wanilla, Uley South and Lincoln Basin (SA Water Corporation).

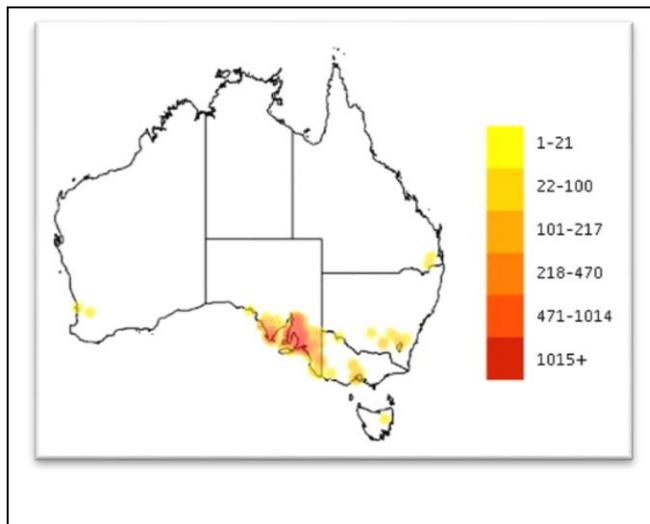


Figure 1: Occurrence of Aleppo pine in Australia. Source: The Atlas of Living Australia [1]



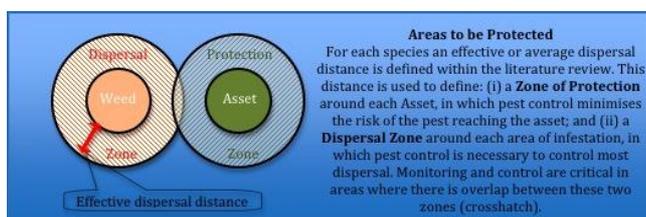
Figure 2: Aleppo pine distribution on lower Eyre Peninsula. Source: Way 2006

# RISK ASSESSMENT

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a national framework for environmental management (including the recognition of nationally threatened species and ecological communities), thereby directing resources towards the delivery of improved environmental protection. The EPBC Act applies where declared pest species threaten any listed species or ecological



community or where its control may have adverse effects on matters of national environmental significance on Commonwealth land.



## South Australian weed risk assessment process

The Primary Industries and Regions SA (PIRSA) Biosecurity SA division, in cooperation with Natural Resources Management Boards developed the Biosecurity SA Weed Risk Management System [6] to rank the importance of pest plants, standardise the prioritising of these plants for control programs and to assess weed species for declaration.

The Biosecurity SA Weed Risk Management System uses a series of questions to determine weed risk and feasibility of control for a species within a specific land use type. The result of the assessment is used to determine and prioritise weed management actions within each land use type.

Weed risk characteristics assessed include; invasiveness (i.e. its rate of spread); economic, environmental and social impacts, and potential distribution (total area) of the weed.

Appropriate management objectives are determined and can be prioritised using a risk matrix which compares weed risk scores against feasibility of control scores. Pest plants that have both high weed risk and are feasible to control have higher priority management objectives e.g. eradication. Conversely, species that are not feasible to control will not rank as a high priority, monitoring or limited management action may be the most appropriate management objective.

The risk matrix categorises each weed species into one of nine risk categories for regional management:

1. **ALERT:** to prevent species which pose a significant threat arriving and establishing in a management area.
2. **ERADICATE:** remove from a management area.
3. **DESTROY INFESTATIONS:** significantly reduce the extent in a management area.
4. **CONTAIN SPREAD:** prevent the ongoing spread in a management area.
5. **PROTECT SITES:** prevent spread to key sites/assets of high economic, environmental and/or social value.
6. **MANAGE WEED:** reduce the overall economic, environmental and/or social impacts through targeted management.
7. **MANAGE SITES:** maintain the overall economic, environmental and/or social value of key sites/assets through improved general weed management.

8. **MONITOR:** detect any significant changes in the species' weed risk.
9. **LIMITED ACTION:** species would only be targeted for coordinated control if its presence makes it likely to spread to land uses where it ranks as a higher priority.

## Pest risk

Aleppo pines colonise degraded and naturally disturbed landscapes, such as roadside and coastal vegetation, where the density of native plants have been reduced by grazing or other disturbances.

Wind can carry seeds up to 100m from parent plants. The seeds have a high viability, with up to 90% germination in favourable conditions, but seedling survival can be low.

Several cockatoo species are known to feed on seed contained in unripe cones, destroying them.

Aleppo pines regularly shed their needle-like leaves, which under mature trees, forms a thick mulch like layer that inhibits germination of other plant species. As the pine needles decompose they release a chemical resin into the soil that also inhibits the growth of other plants (allelopathic effect).

The resins contained within the leaves of Aleppo pines are highly flammable. The resinous leaves, dead cones and branches retained in the canopy of Aleppo pines present an extreme hazard in the event of a wildfire.

## Feasibility of control

Mechanical methods of removing large trees is an effective method of control. Felled trees are usually burnt or chipped on-site. Ring barking is also an effective control method, however large dead trees will need to be felled in situations where they present a hazard to life and property. Younger Aleppo pine infestations may be treated with foliar herbicide or by cutting with a brush-cutter or saw. Aleppo pines must be cut as close to the ground as possible, all green needles need to be removed to ensure the stumps do not re-sprout. Swabbing the stump with herbicide immediately after cutting can increase the kill rate.

Control sites need to be monitored and follow-up treatment applied to re-sprouting stumps and seedlings. Follow-up should be undertaken before the seedlings reach sexual maturity at four years of age [4]. Aleppo pines have a high germination rate but low seedling survival rate, so focus should be on removing seedlings that have survived at least one year.

The Natural Resources Eyre Peninsula risk management assessment reveals the feasibility of achieving eradication of Aleppo pines on Eyre Peninsula is unlikely, however protecting prioritised conservation sites from Aleppo pine infestation is an achievable outcome.

When determining an approach to Aleppo pine management on Eyre Peninsula many issues need to be considered, including:

- Impact on biodiversity, either threat or beneficial.
- 'Best practice' weed management.
- Varying extent and density of infestation.
- Varying community attitudes towards Aleppo pines.
- Constraints on time, money and resources.

## Status

The Natural Resources Eyre Peninsula risk management assessment (Table 1) rates Aleppo pine as '**protect sites**' in native vegetation systems on Eyre Peninsula.

**Table 1: Regional Assessment**

| Land Use          | Pest Risk | Feasibility of Control | Management Action |
|-------------------|-----------|------------------------|-------------------|
| Cropping systems  | NA        | NA                     | NA                |
| Native vegetation | 185 High  | 40 Medium              | Protect sites     |
| Pasture grazing   |           |                        | Manage sites      |
| Urban residential | 20 Low    | 2 Very High            | Protect sites     |

## REGIONAL RESPONSE

### Special considerations/Board position

A State level Declared Plant Policy and Management Plan [8] exists for Aleppo pine (*Pinus halepensis*). The policy provides State level outcomes, objectives and implementation actions for regional NRM authorities.

The Natural Resources Eyre Peninsula pest management plan supports the State Aleppo pine policy.

Land clearance has almost entirely removed an essential food resource for the Eyre Peninsula population of Yellow-tailed Black Cockatoo (*Calyptorhynchus funereus whitei*). In recent times the cockatoo's have learnt to feed on the seeds of Aleppo pines, now considered the most important food source for the cockatoo's on Eyre Peninsula [5]. Failure to adopt Aleppo pine seed into their diet may have resulted in their earlier extinction on Eyre Peninsula [9].

The conservation status of the Eyre Peninsula Yellow-tailed Black Cockatoo population (<12 individuals) is considered 'critically endangered' regionally [9]. The South Australian population is listed as 'vulnerable' under the South Australian National Parks and Wildlife Act, 1972.

### Aim/s

To protect high value conservation sites.

## Objectives

1. Protect prioritized conservation sites from Aleppo pine infestations; and
2. Educate community on identification, control and threat of Aleppo pines.

## Priority area/s to be protected

High priority biodiversity areas include, Coffin Bay National Park, Kellidie Bay Conservation Park, Lincoln National Park, Sleaford Mere Conservation Park and Kathai Conservation Park.

## Actions

1. Develop localised annual action plans to achieve the aim and implement objectives and actions of the Eyre Peninsula regional Aleppo pine management plan;
2. Identify and prioritize key conservation sites and other assets for protection within annual action plans.
3. Recognise recommendations within the Eyre Peninsula Yellow-tailed Black Cockatoo Regional Recovery Plan regarding the management of select Aleppo pine stands as food trees for Yellow-tailed Black Cockatoo's.
4. Survey and map the distribution on EP and monitor control sites to ensure control actions are effective.
5. Establish and manage buffer zones around priority areas to prevent Aleppo pine incursions;
6. Facilitate, encourage or compel control of existing Aleppo pine infestations, to achieve the pest management plans objectives;
7. Establish protocols for systematic data collection and storage in a central spatial database;
8. Raise community awareness of the pests' impacts and promote best practise control methods to land managers.

## Evaluation

Evaluation will be based on:

- analysis of monitoring data to evaluate the outcome of control actions in key assets, protection zones and dispersal areas; and
- Review of surveillance programs at the district level, and the monitoring program every five years.

## Declarations

In South Australia Aleppo pine (*Pinus halepensis*) is a declared weed under Schedule 2 (CLASS 46 – Provisions: 175(2), 177(1) for the whole of the state and 182(2), 185 for the areas of the Adelaide and Mount Lofty Ranges, Eyre Peninsula, Kangaroo Island, Northern and Yorke, South Australian Murray-Darling Basin and South East Natural Resources Management Regions, in accordance with the *Natural Resources Management Act 2004* (Table 2). Meaning that it this species must not be moved or sold throughout South Australia and is required to be controlled for the specific areas mentioned above [8].



**Table 2: Aleppo pine – Relevant sections of the *Natural Resources Management Act 2004* Declared Weed Status [8].**

| Section | Description of how the section applies   |
|---------|--|
| 175 (2) | Cannot transport the plant or any substance carrying the plant in it within the state                    |
| 177 (1) | Cannot sell any produce / goods carrying the plant   |
| 182 (2) | Land owner must keep plants controlled on their land   |
| 185     | NRM authority may recover costs for control of plants or animals on roadsides from adjoining land owners |

## References

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3. Delaine, D.S., Z. 2006. *Controlling Bushland Weeds on Lower Eyre Peninsula*. . 2006.
4. Miles, C. 2009. *Best practice guideline for the removal of Aleppo pines Lower Lakes and Coorong region*. . 2009.
5. Way, S. 2006. *Strategic management of Aleppo Pines on Lower Eyre Peninsula to maximise biodiversity conservation outcomes*, . 2006.
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8. Declared Plant Policy, Aleppo pine. Primary Industries and Regions South Australia. Accessed online at [http://www.pir.sa.gov.au/\\_data/assets/pdf\\_file/0018/22319/1/Aleppo\\_pine\\_policy.pdf](http://www.pir.sa.gov.au/_data/assets/pdf_file/0018/22319/1/Aleppo_pine_policy.pdf)
9. Way, S.L. and Van Weenan, J. 2008 *Eyre Peninsula Yellow-tailed Black Cockatoo (Calyptorhynchus funerus whitei) Regional Recovery Plan*. Department for Environment and Heritage, South Australia.

