Australian Government
Department of Agriculture, Water and the Environment

Conservation Advice for *Acacia enterocarpa* (Jumping Jack Wattle)

In effect under the *Environment Protection and Biodiversity Conservation Act 1999* from 29 September 2021.

This document provides a foundation for conservation action and further planning.

Photo of *Acacia enterocarpa* (Jumping Jack Wattle) © Copyright, Murray Fagg (2007), Australian National Botanic Gardens

Conservation status

Acacia enterocarpa (Jumping Jack Wattle) is listed in the Endangered category of the threatened species list under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act) effective from 16 July 2000. The species is eligible for listing because prior to the EPBC Act, it was listed as Endangered under the *Endangered Species Protection Act 1992* (Cwlth).

The Jumping Jack Wattle is listed as Endangered due to its limited area of occupancy, small number of locations and ongoing decline in the number of subpopulations and quality of habitat.

Species can also be listed as threatened under state and territory legislation. For information on the current listing status of this species under relevant state or territory legislation, see the Species Profile and Threat Database.

Species information

Taxonomy

Conventionally accepted as *Acacia enterocarpa* R.V.Sm. (1957).

Description

The Jumping Jack Wattle (Family Fabaceae) is a small, prickly, spreading shrub to 1.5 m high and 1.5 m wide (Whibley 1980; Jessop & Toelken 1986). Mature branchlets are reddish brown and ribbed (Cowan & Maslin 2001). Phyllodes are linear 2–4.5 cm long, 1–1.3 cm wide and straight or slightly curved, with 10–12 distinct raised nerves. Phyllodes have a sharp reddish-brown rigid tip. Flowers are bright yellow globular balls, situated in the axil and generally occur in pairs. Flowers occur as 20 together on peduncles approximately 5 mm long (Whibley, 1980). Pods are typically a zigzag shape to 2 cm long and 2 mm wide, brown with thickened yellow margins and sparsely hairy (Whibley 1980; Cowan & Maslin 2001). The common name, Jumping Jack Wattle, is derived from the pod resembling a jumping jack cracker (spring-shaped). Seeds are longitudinal, oblong to elliptic to 3 mm long (Whibley 1980).

Distribution

The Jumping Jack Wattle occurs in South Australia (SA) and Victoria (Vic). In SA it is found in several disjunct subpopulations on Eyre Peninsula, Yorke Peninsula and in the South East region. In Victoria it is restricted to a small area in the state's west, in the Diapur-Kaniva area of the Wimmera. The stronghold for the species is on Yorke Peninsula and in the Victorian Wimmera.

A total of 77 distinct extant subpopulations were identified in the 2011 recovery plan, totalling between 5680 and 6900 individual plants across the species range, based on post-1990 data (Table 1). Subpopulations were recorded as containing between 1 and 940 individual plants. In SA there were 34 known subpopulations with a total of approximately 3,886 individual plants (Table 1). Victoria has approximately 45 subpopulations with around 2500 individual plants recorded since 1990 (DELWP 2021a).

The Jumping Jack Wattle is likely to have been more widespread historically, as it occurs in areas of fertile soils that were heavily cleared for agriculture (Overman & Venn 1999). Historic subpopulations that are no longer present in SA include four subpopulations in the South East, three on Yorke Peninsula and 13 on Eyre Peninsula (Moritz & Bickerton 2011). In the South East, two subpopulations were recorded near Mundulla (1964), one subpopulation at Keith (1951) and another subpopulation containing one remnant plant on the corner of Carew Road and Desert Camp Road that was reported to have died since 2000 (ALA 2021; Steed pers. comm. 2004, in Moritz & Bickerton 2011). Seed was collected from this last subpopulation and 25 plants have been replanted into the area (Steed pers. comm. 2004, in Moritz & Bickerton 2011). One historic subpopulation known from the Yorke Peninsula occurs on the Pine Point Road near Curramulka (1975) (ALA 2021). There are several historic records from both southern and northern Eyre Peninsula (ALA 2021). One of the largest subpopulations on southern Eyre Peninsula is in coastal private property at Peake Point which increased between 2009 and 2016, from 200 individuals to 383. This increase occurred through natural recruitment after rabbit grazing pressure was reduced (EPNRM Board, 2016).

In Vic at least six subpopulations have not been recorded since the 1970s (ALA 2021). The species has disappeared from at least one subpopulation since 2000: on the Sandsmere-Bleakhouse Road where severe fungal gall was evident (ALA 2021).

In SA, the species is conserved in Aberdour Conservation Park (CP) in the South East and in Ramsay CP on Yorke Peninsula. In Vic, it is reserved in Sandsmere Flora Reserve and Jumping

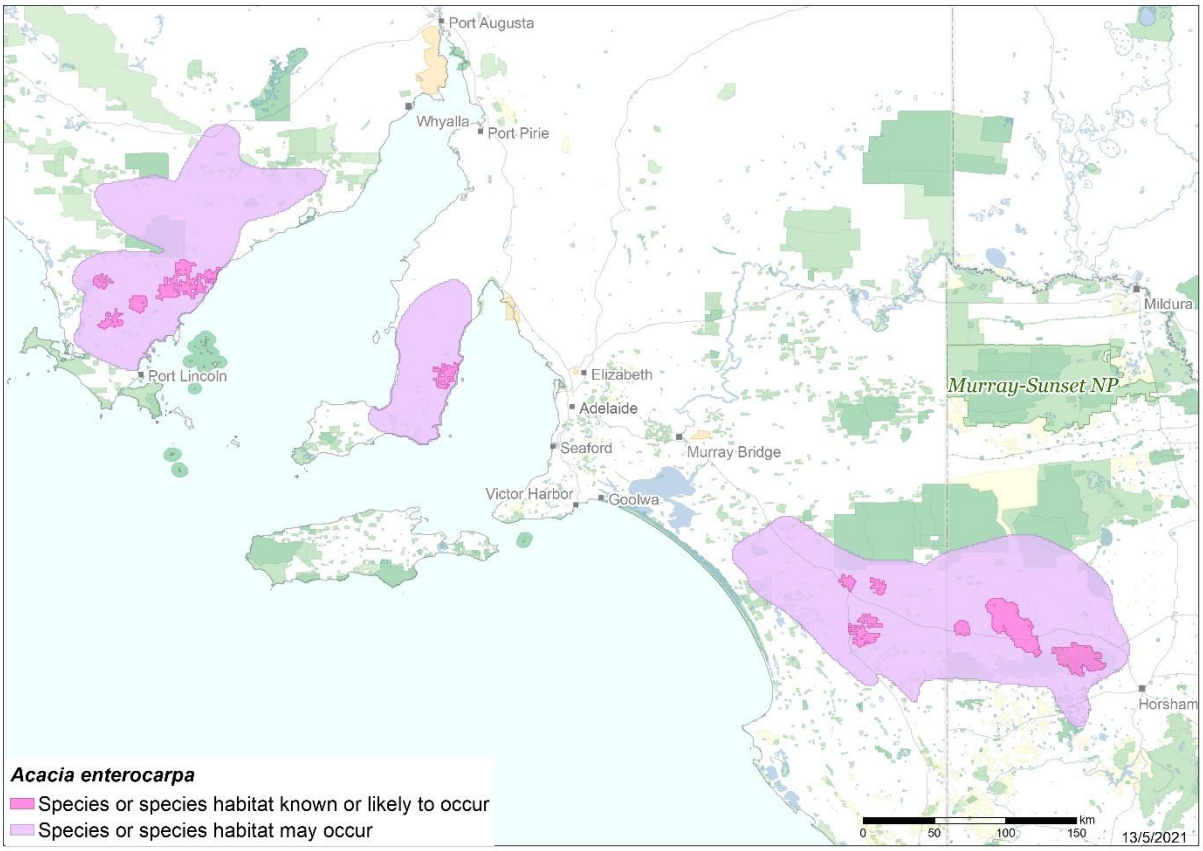
Jack Wattle Nature Conservation Reserve; however it was planted into the latter in 1977 where it is believed to have once occurred naturally (Stuwe 1980). It was also planted into Lonsdale Nature Conservation Reserve near Stawell in 1976. Most of the other subpopulations are restricted to roadside or rail reserves, particularly on Eyre Peninsula (Pobke, 2007), with a few subpopulations occurring on private land, mostly on Yorke Peninsula and in South East SA.

This species is reported to be growing in cultivation in numerous places, including several botanic gardens (Meredith & Richardson 1992, cited in Green 1993).

Table 1 Known subpopulations of *Acacia enterocarpa* (from Moritz & Bickerton 2011; DELWP 2021a)

Region	Current subpopulations	No. of plants (approximate)
Eyre Peninsula, SA	18	786
Yorke Peninsula, SA	7	2850
South East, SA	9	1100
Wimmera, Vic	~45	2500
Total	~79	6,531

Map 1 Modelled distribution of the Jumping Jack Wattle



Source: Species distribution data Species of National Environmental Significance database, Base map Geoscience Australia
Caveat: The information presented in this map has been provided by a range of groups and agencies. While every effort has been made to ensure accuracy and completeness, no guarantee is given, nor responsibility taken by the Commonwealth for errors or omissions, and the Commonwealth does not accept responsibility in respect of any information or advice given in relation to, or as a consequence of, anything containing herein.

Species distribution mapping: The species distribution mapping categories are indicative only and aim to capture (a) the specific habitat type or geographic feature that represents to recent observed locations of the species (known to occur) or preferred habitat occurring in close proximity to these locations (likely to occur); and (b) the broad environmental envelope or geographic region that encompasses all areas that could provide habitat for the species (may occur). These presence categories are created using an extensive database of species observations records, national and regional-scale environmental data, environmental modelling techniques and documented scientific research.

Cultural and community significance

The SA subpopulations occur on country under native title claims by First Nations of the South East (South East), Narungga (Yorke Peninsula), Barngarla and Nauo Peoples (Eyre Peninsula) (NNTT 2020). The Vic subpopulations occur on the traditional lands of the Wotjobaluk, Jaadwa, Jadawadjali, Wergaia and Jupagalk Nations (Aboriginal Victoria 2021). The cultural significance of Jumping Jack Wattle is not well understood, although many *Acacia* species were used by Indigenous Australians for a variety of purposes (Australian National Botanic Gardens 2007).

Relevant biology and ecology

Reproductive ecology

The flowering period of Jumping Jack Wattle is from May to October (Whibley 1980), although the species is often identifiable outside of its flowering season by its distinctive spring-shaped pods. Wattle species are mostly pollinated by insects, particularly bees, and only offer pollen as a reward (Stone et al. 2003). Little is known about the longevity or generation length of the Jumping Jack Wattle, although like many wattles, it probably has a relatively short lifespan of around 20–40 years (Richardson & Kluge 2008). Seed is likely to be long-lived in the soil seed-bank and requires a mechanism to break dormancy (e.g. fire, physical scratching of the seed coat) (Orscheg et al. 2011). Green (1993) suggested that ants could possibly transport seeds and feed on their fleshy arils, helping to break their dormancy.

Habitat ecology

In SA the Jumping Jack Wattle is recorded from a variety of habitats. On Yorke Peninsula it is recorded in a variety of mallee woodlands including *Eucalyptus gracilis* (Yorrell), *E. conglobata* (Cong Mallee), *E. incrassata* (Ridge-fruit Mallee) or *E. socialis* (Red Mallee), over a shrub layer of *Melaleuca uncinata* (Broombush) and an understorey of herbs and grasses (Steed pers. comm. 2004, in Moritz & Bickerton 2011, ALA 2021). Green (1993) recorded that the overstorey of mallee on Yorke Peninsula was generally sparse and in places it had been totally cleared, leaving an exposed understorey. In the South East Jumping Jack Wattle is recorded from remnant woodlands of *E. leucoxylon* (Yellow Gum), *E. camaldulensis* (Red Gum) or *E. fasciculosa* (Pink Gum) on sandy loam soils and sometimes in association *E. diversifolia* (Soap Mallee) and Broombush in roadside remnants (Johnson 2005). On Eyre Peninsula it is also recorded in a variety of mallee associations, including *E. calycogona* (Square-fruit Mallee), *E. dumosa* (White Mallee) *E. gracilis, E. incrassata, E. peninsularis* (Cummins Mallee) and *E. socialis*, typically over Broombush and *M. lanceolata* (Dryland Tea-tree) (Pobke 2007). On Eyre Peninsula it primarily occurs on mottled-yellow duplex soils interspersed with red duplex and red friable loams in the south, and on red calcareous, hard pedal red duplex soils and dense brown loams in the north (Pobke 2007). Detailed descriptions of vegetation communities at seven subpopulations in the South East and Yorke Peninsula are presented in Moritz & Bickerton (2011).

In Vic the species has a limited geographic range, but it grows in a range of habitats from Broombush on the highest parts of the northern Lawloit Range on gravely duplex ironstone

soils, to mallee scrub and grassy woodlands of Yellow Gum, *E. microcarpa* (Grey box) and *Allocasuarina luehmannii* (Buloke) on more fertile soils in adjacent areas (Stuwe 1980, ALA 2021). Detailed descriptions of vegetation communities at six subpopulations in Vic are presented in Moritz & Bickerton (2011).

Fire ecology

Cheal (1992) noted that most vegetation types in which the Jumping Jack Wattle grows were rarely subjected to fire. Little is known about the Jumping Jack Wattle's response to fire, but the species probably recruits from soil-stored seed and may also resprout from the base following fire, like many wattles (Palmer 2016).

Gall fungus

A gall rust fungus has been recorded as attacking Jumping Jack Wattle plants in Vic and the South East of SA. In severe attacks the whole canopy can be covered with these galls, which appear to weaken the plant, reduce leaf canopy, inhibit seed production and even kill adult plants (Tonkinson pers. comm. 2004, in Moritz & Bickerton 2011). Fungal samples collected from Vic specimens of the Jumping Jack Wattle in 1996 were identified as the Australian native gall rust fungus *Uromycladium* spp. (Keane pers. comm. 2004, in Moritz & Bickerton 2011). It has not been determined if this is the same species that occurs on subpopulations in the South East.

Studies into the effect of this fungal species on the Jumping Jack Wattle have not been undertaken, and the information that follows is what is understood about the impact of the gall rust on hosts. Rusts of the *Uromycladium* genus produce galls that appear as large, brown, irregularly shaped swellings on the actively growing branches, phyllodes or flower buds of the host tree, generally during spring (Keane pers. comm. 2004, in Moritz & Bickerton 2011). Witches' brooms (abnormally bushy shoots) may also be produced (ARC 2004). Heavily infected host plants may bear several hundred or even thousands of galls and witches' brooms that consume nutrients that would have gone into normal growth and reproduction (ARC 2004). As a result, very few phyllodes, flowers and pods are produced; shoot tips die back and branches often break when weakened by the galls (ARC 2004). Severely affected plants are killed (ARC 2004). Insects can enter the gall, generally when the gall rust has run its course (Keane pers. comm. 2004, in Moritz & Bickerton 2011).

Habitat critical to the survival

Due to the species eligibility for listing (highly restricted range and severe fragmentation), all habitat is considered critical to the survival of the species.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Important populations

In this section, the word population is used to refer to subpopulation, in keeping with the terminology used in the EPBC Act and state/territory environmental legislation.

There is sufficient evidence through the species eligibility for listing, to declare all populations/the national population of this species as important populations under particular

pressure of survival and which therefore require protection to support the recovery of the species.

Threats

The major threats to the Jumping Jack Wattle are droughts (driven by climate change), habitat destruction, inappropriate disturbance regimes, browsing by exotic herbivores, competition with weeds and the genetic consequences of small subpopulations (Table 2).

Table 2 Threats impacting Jumping Jack Wattle

Threat	Status and severity [a]	Evidence
Habitat destruction		
Road and rail maintenance	• Timing: current • Confidence: known • Consequence: major • Trend: unknown • Extent: across part of its range	Subpopulations that occur on roadside and rail reserves are generally small and isolated, contain a small number of individual plants and occupy narrow remnant vegetation (Moritz & Bickerton 2011). Road and rail subpopulations are also subject to specific threats related to management works and location including vegetation clearance, dumping of rubbish and road building materials, burning for fire management, installation of services (i.e. power lines and cables), herbicide drift from adjoining land, stock droving and damage from vehicles or heavy machinery. Roadside reserves are also potentially threatened by the work of contractors maintaining power, water and telecommunication services along easements. Moreover, large edge to area ratios of road reserves increase their susceptibility to weed invasion and nutrient input from adjacent agricultural land (Hobbs 1991). Roadside subpopulations of this species are important, as they constitute over 60% of known subpopulations.
Clearing	• Timing: current • Confidence: known • Consequence: major • Trend: unknown • Extent: across part of its range	Clearing of native vegetation along roadsides by herbicide application and for renewable energy projects continues to threaten some roadside subpopulations, particularly in Vic (DELWP 2021b).
Mining	• Timing: current • Confidence: known • Consequence: major • Trend: unknown • Extent: across part of its range	One subpopulation occurs on private land in Vic that has been subject to gravel extraction. Overman & Venn (1999) state that if this activity continued it could seriously affect this subpopulation through direct removal of plants to access quarry materials and indirect impacts of mining activities, although there is no

		recent information on this subpopulation.
Climate Change		
Increased frequency and severity of drought	• Timing: current/future • Confidence: suspected • Consequence: moderate • Trend: increasing • Extent: across the entire range	Climate projections for south-eastern Australia include reduced rainfall, increased average temperatures, and more frequent droughts (CSIRO & Bureau of Meteorology 2015). *Acacia* species can be killed by severe drought (Fensham et al. 2019), although there is no information of impacts to the Jumping Jack Wattle. Decreasing rainfall may be related to low levels of natural recruitment observed in this species (Moritz & Bickerton 2011).
Disease		
Fungal gall infestation	• Timing: current • Confidence: known • Consequence: major • Trend: unknown • Extent: across the entire range	Gall infestation represents a serious potential threat to subpopulations, with 11 of 19 Vic subpopulations and at least five of the nine South Eastern SA subpopulations reported to be infested with a gall-producing fungal rust of the *Uromycladium* genus (Keane pers. comm. 2004, in Moritz & Bickerton 2011). Subpopulations on the Yorke and Eyre Peninsulas are apparently free from fungal gall infestations (Moritz & Bickerton 2011). These rusts affect their host by stressing the plant and prevent optimal seed set by reducing vigour and health (McAlpine 1906). Poor health following gall infestation may also leave plants open to insect attack or other secondary infections. Gall infection also has other implications, including reducing available seed for collection and limiting the ability to undertake revegetation. Gall infection was reported to be a major limiting factor in revegetation of the Diapur Flora Reserve in the 1970s (Overman & Venn 1999). However, the small plantation in Lonsdale Nature Conservation Reserve is reportedly healthy and free of galls (Rudolph pers. comm. 2008, in Moritz & Bickerton 2011).
Phytophthora cinnamomi and Mundulla Yellows	• Timing: current • Confidence: unknown • Consequence: moderate • Trend: unknown • Extent: across part of its range	*Phytophthora* species are water borne moulds that attack the roots of susceptible plants, cutting off water supply and eventually killing the host plant. *Phytophthora cinnamomi* is the most common species recorded in SA and has a large host range, including *Acacia* species. Mundulla Yellows is observed as a yellowing of the leaves and results eventually in plant death. It is considered to be the result of an

		imbalance in soil chemistry (Czerniakowski et al. 2006). The Jumping Jack Wattle occurs where *Phytophthora* species have the potential to occur, based on annual rainfall. In addition, the main subpopulation of Jumping Jack Wattle in the South East of SA is known to occur within 20 km of where Mundulla Yellows is present (Johnson pers. comm. 2004, in Moritz & Bickerman 2011). The potential impact of *Phytophthora* and Mundulla Yellows on this species is not known, however both are known to affect *Acacia* species.
Invasive species		
Browsing by introduced herbivores	• Timing: current • Confidence: known • Consequence: moderate • Trend: unknown • Extent: across part of its range	Grazing, particularly from European rabbits (*Oryctolagus corniculus*) and domestic stock, is likely to be impacting several subpopulations across the range of Jumping Jack Wattle (Moritz & Bickerman 2011; EPNRM Board 2016b). At high grazing pressure sites on Eyre Peninsula, such as the Peake Point subpopulation prior to rabbit control works, young natural germinants only recruited under the protective prickly canopy of adult Jumping Jack Wattle (DEW 2021). Green (1993) suggests that individual plants are likely to survive in grazed remnants of vegetation once seedlings have become established, due to the prickly nature of the adult phyllodes. However, seedlings may be impacted by herbivory in preference to adults, as evidenced by surveys which found no plants smaller than 30 cm high (Green 1993). Discontinuity of herbivore control programs is an issue (DEW 2021). Subpopulations on roadside reserves may be impacted by stock droving during drought years, particularly if subject to grazing for extended periods of time due to road reserve grazing licenses).
Competition with weeds	• Timing: current • Confidence: known • Consequence: moderate • Trend: unknown • Extent: across part of range	Weeds have the potential to directly reduce the growth, recruitment and survival of the Jumping Jack Wattle by smothering existing plants and preventing regeneration of seedlings (D'Antonio & Vitousek 1992). Major weeds reported to occur sympatrically with Jumping Jack Wattle subpopulations include Bridal creeper (*Asparagus asparagoides*), Horehound (*Marrubium vulgare*), African Boxthorn (*Lycium ferocissimum*), False Caper (*Euphorbia terracina*), Salvation Jane (*Echium*

		plantagineum) and the introduced grasses Phalaris (*Phalaris aquatica*), Wild Oats (*Avena* spp.) and Perennial Veldt Grass (*Ehrharta calycina*) (Johnson pers. comm. 2004, and Steed pers. comm. 2004, in Moritz & Bickerton 2011; Pobke 2007). Subpopulations that are within small, fragmented areas, including those on roadside reserves, are potentially at greatest risk.
Inappropriate disturbance regimes		
Lack of fire	• Timing: current • Confidence: suspected • Consequence: major • Trend: unknown • Extent: across the entire range	Many *Acacia* species require periodic disturbances such as fire to stimulate plant reproduction and recruitment. The disturbance requirements of the Jumping Jack Wattle have not been determined. However, many Jumping Jack Wattle subpopulations are reported to exhibit poor recruitment (Moritz & Bickerton 2011). Anecdotal information collated from monitoring and opportunistic subpopulation surveys indicates that in Vic, over half the surveyed subpopulations (68%) have poor recruitment levels (Moritz & Bickerton 2011). Most subpopulations across SA appear to have little or no recruitment (Moritz & Bickerton 2011). The low levels of recruitment across the range of the species suggests that disturbance regimes may be inappropriate (Moritz & Bickerton 2011). Regeneration of the Jumping Jack Wattle has been noted in disturbed, as well as undisturbed, subpopulations (Stuwe 1980, Overman & Venn 1999). However, little is known about the effects of specific disturbance methods, such as fire, on the species. Poor recruitment may be related to a range of other threats including fungal gall infection, weed invasion, grazing of seedlings and/or poor genetic viability.
Genetic threats resulting from small and fragmented subpopulations		
Small subpopulation size	• Timing: current • Confidence: suspected • Consequence: moderate • Trend: unknown • Extent: across part of range	Many small, isolated subpopulations are subject to the effects of low genetic diversity (Frankham et al. 2014). The Jumping Jack Wattle is suspected to have occurred more widely than its current known distribution. As a result of fragmentation and clearance of its habitat in the past, it is now found in mostly small and often disjunct subpopulations. Small and isolated subpopulations may be susceptible to extinction by a single catastrophic event, and as a result of having a high edge to area ratio are more likely to

		be subject to impacts along their edges (e.g. from weed invasion, small-scale clearing, grazing, and exposure to fertiliser drift). The isolated and scattered nature of subpopulations in conjunction with small subpopulation sizes may also result in a lack of genetic variability in some subpopulations, exhibited by low recruitment.

Status—identify the temporal nature of the threat;
Confidence—identify the extent to which we have confidence about the impact of the threat on the species;
Consequence—identify the severity of the threat;
Trend—identify the extent to which it will continue to operate on the species;
Extent—identify its spatial content in terms of the range of the species.

Each threat has been described in Table 2 in terms of the extent that it is operating on the species. The risk matrix (Table 3) provides a visual depiction of the level of risk being imposed by a threat and supports the prioritisation of subsequent management and conservation actions. In preparing a risk matrix, several factors have been taken into consideration, they are: the life stage they affect; the duration of the impact; and the efficacy of current management regimes, assuming that management will continue to be applied appropriately. The risk matrix and ranking of threats has been developed in consultation with experts and using available literature.

Table 3 Jumping Jack Wattle risk matrix

Likelihood	**Consequences**				
	Not significant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Almost certain	Low risk	Moderate risk	Very high risk **Increased frequency and intensity of drought**	Very high risk	Very high risk
Likely	Low risk	Moderate risk	High risk **Competition with weeds** **Browsing by introduced herbivores**	Very high risk **Road and rail maintenance** **Clearing** **Fungal gall infestation**	Very high risk
Possible	Low risk	Moderate risk	High risk ***Phytophthora cinnamomi* and Mundulla Yellows** **Small subpopulation size**	Very high risk **Mining** **Lack of fire**	Very high risk
Unlikely	Low risk	Low risk	Moderate risk	High risk	Very high risk
Unknown	Low risk	Low risk	Moderate risk	High risk	Very high risk

Priority actions have then been developed to manage the threat particularly where the risk was deemed to be 'very high' or 'high'. For those threats with an unknown or low risk outcome it may be more appropriate to identify further research or maintain monitoring.

Conservation and recovery actions

Primary conservation objective

By 2030, the population of Jumping Jack Wattle will have increased in abundance and viable subpopulations are sustained in habitats where very high risk threats are managed effectively.

Conservation and management priorities

Habitat loss

- Provide physical protection measures against accidental destruction where necessary (e.g. bollards demarcating the extent of a subpopulation on roadsides or rail reserves).
- Ensure that best practice methods for roadside and utility corridor maintenance are used to protect the species and its habitat (e.g. avoid the use of herbicide, ensure slashing does not impact Jumping Jack Wattle plants, ensure grading of roadside verges is restricted to the road shoulder and does not encroach onto roadside vegetation).
- Protect subpopulations of the Jumping Jack Wattle from direct destruction and indirect degradation of habitat by mining operations or other land use changes.
- Liaise with landowners about entering into voluntary management agreements to maintain or enhance the species and its habitat on unsecured private land.
- Ensure all subpopulations are adequately documented on databases used by land managers and, where deemed necessary, physically identified to avoid accidental damage.

Climate change

- Identify all habitat that are modelled as likely to remain or become suitable habitat under climate change scenarios and protect this habitat from threats.
- Investigate translocations to future, climatically-suitable habitat.
- If appropriate, continue to create new subpopulations by implementing conservation translocations in accordance with the *Guidelines for the Translocation of Threatened Plants in Australia* (Commander et al. 2018).

Disease

- There is no known control of the gall fungus other than physical removal of the galls. It has been suggested that burning may provide a means of managing infestations by removing the reservoir of fungal galls (Tonkinson pers. comm. 2004, in Moritz & Bickerton 2011), but this has not been tested.
- If *Phytophthora* or Mundulla Yellows are identified as a threat to the Jumping Jack Wattle, a number of research activities will be required before adequate management can be undertaken. Knowledge is required of the impact of these diseases on the health, seed set and reproduction of the Jumping Jack Wattle. Hygiene principles will need to be implemented at confirmed *Phytophthora* infestation sites. Field and laboratory experiments should be conducted to investigate ways of controlling Mundulla Yellows in the wild.

Invasive species

- Reduce the impacts of habitat destruction and browsing by feral herbivores by using fencing or herbivore control, including as described in the *Threat abatement plan for competition and land degradation by rabbits* (DOEE 2016).
- Maintain boundary fences to prevent stock from accessing subpopulations.
- Exclude roadsides containing Jumping Jack Wattle subpopulations from road reserve grazing licenses.
- Monitor the impacts of weeds across all subpopulations and implement appropriate control measures if there is evidence to suggest that weeds are, or have the potential to become, a threat capable of causing a decline of the subpopulation.

Lack of fire

- If data indicate that lack of fire is a serious threat, trial planned burns to promote germination in senescing subpopulations. Any planned burns should take into account impacts on other species and vegetation communities, occur at a time of year likely to be beneficial to Jumping Jack Wattle (summer to early autumn) and be accompanied by necessary management actions (e.g. post-fire weed and herbivore control).

Genetic threats resulting from small and fragmented subpopulations

- Collect and maintain ex situ seed collections at appropriate institutions from as many subpopulations as possible across all regions, to ensure genetic diversity is captured.
- If appropriate, continue to create new subpopulations by implementing conservation translocations in accordance with the *Guidelines for the Translocation of Threatened Plants in Australia* (Commander et al. 2018).

Stakeholder engagement/community engagement

- Engage and involve Traditional Owners in conservation actions, including survey, monitoring and management actions.
- Liaise with the local community and government agencies to ensure that up-to-date population data and scientific knowledge inform the implementation of conservation actions for this species. A list of current and potential stakeholders is outlined in Moritz & Bickerton (2011).
- Engage interested nature conservation, land management and landholder groups in conservation management activities (such as survey and monitoring) and engage the broader local community through participation at local community events and collaboration with local schools.

Survey and monitoring priorities

- Establish and maintain monitoring programs to:
    - determine trends in the size of subpopulations,
    - document the distribution and frequency of recruitment,
    - determine threats and their impacts (including weeds, feral herbivores, drought),
    - document and improve understanding of post-fire recovery,
    - determine minimum and maximum tolerable fire intervals, and

  - monitor the effectiveness of management actions and the need to adapt them if necessary.

- Implement an ongoing monitoring program that will provide data capable of addressing the link between population dynamics and drought.

Information and research priorities

- Undertake research into the ecology of fungal gall infestations to inform best practice management of this disease.
- Improve understanding of recruitment, including conditions required to trigger recruitment (e.g. disturbance, rainfall) and threats to immature plants and seedlings.
- Investigate the population genetics of both SA and Vic subpopulations to determine the appropriateness of genetic mixing between subpopulations.

Links to relevant implementation documents

Recovery Plan for the Nationally Endangered Jumping-Jack Wattle Acacia enterocarpa (2011)

Threat abatement plan for competition and land degradation by rabbits (2016)

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Cataloguing data

This publication (and any material sourced from it) should be attributed as: Department of Agriculture, Water and the Environment 2021, *Conservation advice for* Acacia enterocarpa *(Jumping Jack Wattle)*, Canberra. 

This publication is available at the SPRAT profile for Acacia enterocarpa *(Jumping Jack Wattle).*

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Acknowledgements

This Conservation Advice was prepared in consultation with those states and territories who provided input, and we thank them for their contribution.