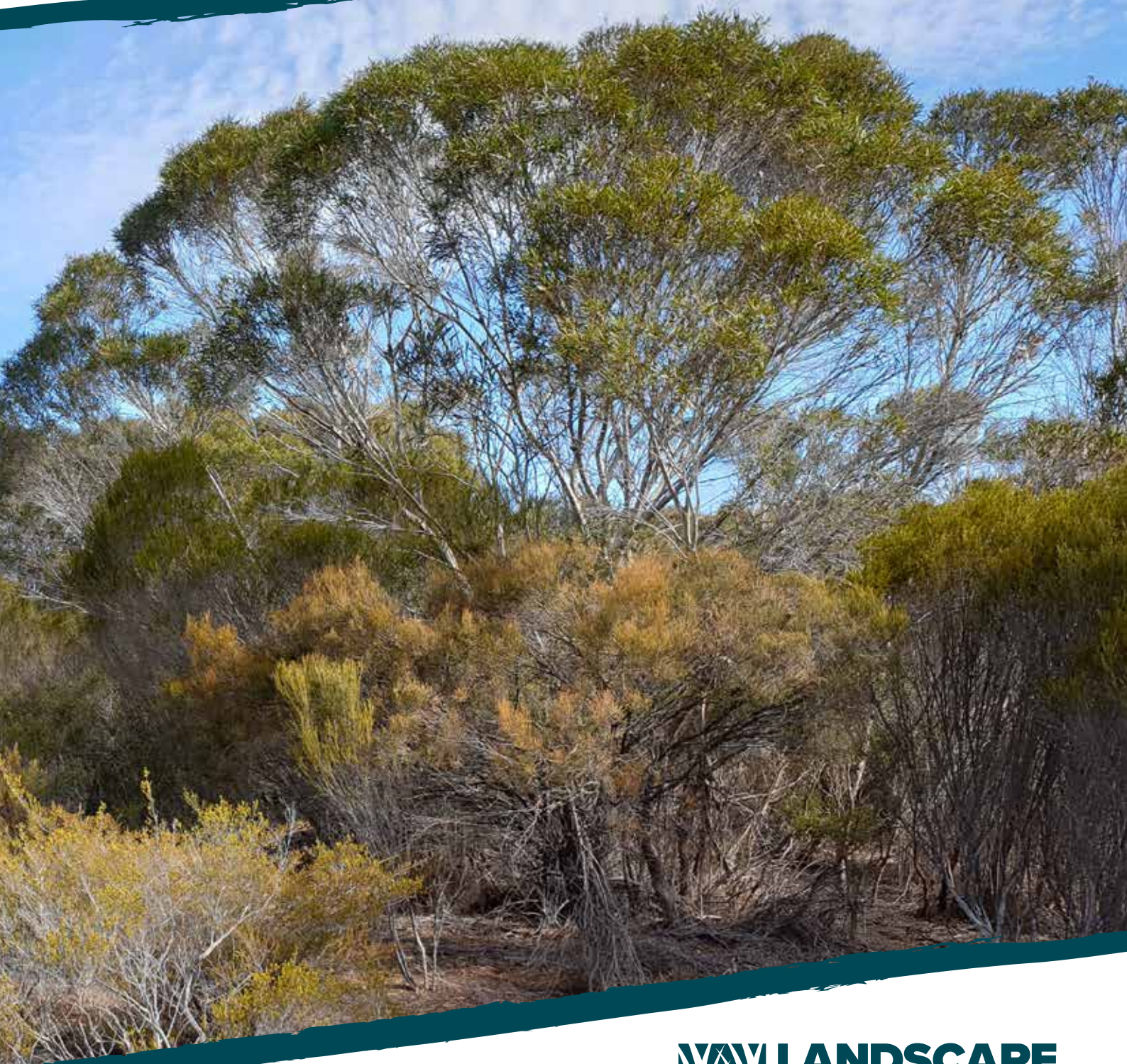


KI Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland Management Guidelines for Landholders





Acknowledgment of Country

The Kangaroo Island Landscape Board acknowledges and respects Aboriginal people as the First Peoples and Nations of the lands and waters on which we live and work and we pay our respects to their Elders past, present and emerging. We acknowledge and respect the deep spiritual connection and the relationship that Aboriginal and Torres Strait Islander people have to Country.

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Australian Government



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A Kangaroo Island endemic vegetation community

Kangaroo Island Narrow-leaved Mallee Woodland is endemic to the eastern-half of Kangaroo Island (KI). The woodland is characterised as having *Eucalyptus cneorifolia* (KI Narrow-leaved Mallee) as the dominant tree canopy species. Several other eucalypt species including *Eucalyptus rugosa*, *Eucalyptus diversifolia* ssp. *diversifolia* and *Eucalyptus albopurpurea* may be present in the community, but are never the most common species. KI Narrow-leaved Mallee Woodland occurs mostly as small isolated patches, as farm shelterbelts and along roadsides, where it often forms overhead arbours that are a cultural icon of Kangaroo Island. Understorey species can be highly variable between patches, and include a range of native shrubs and herbs which vary in density and composition depending on site and soil characteristics.

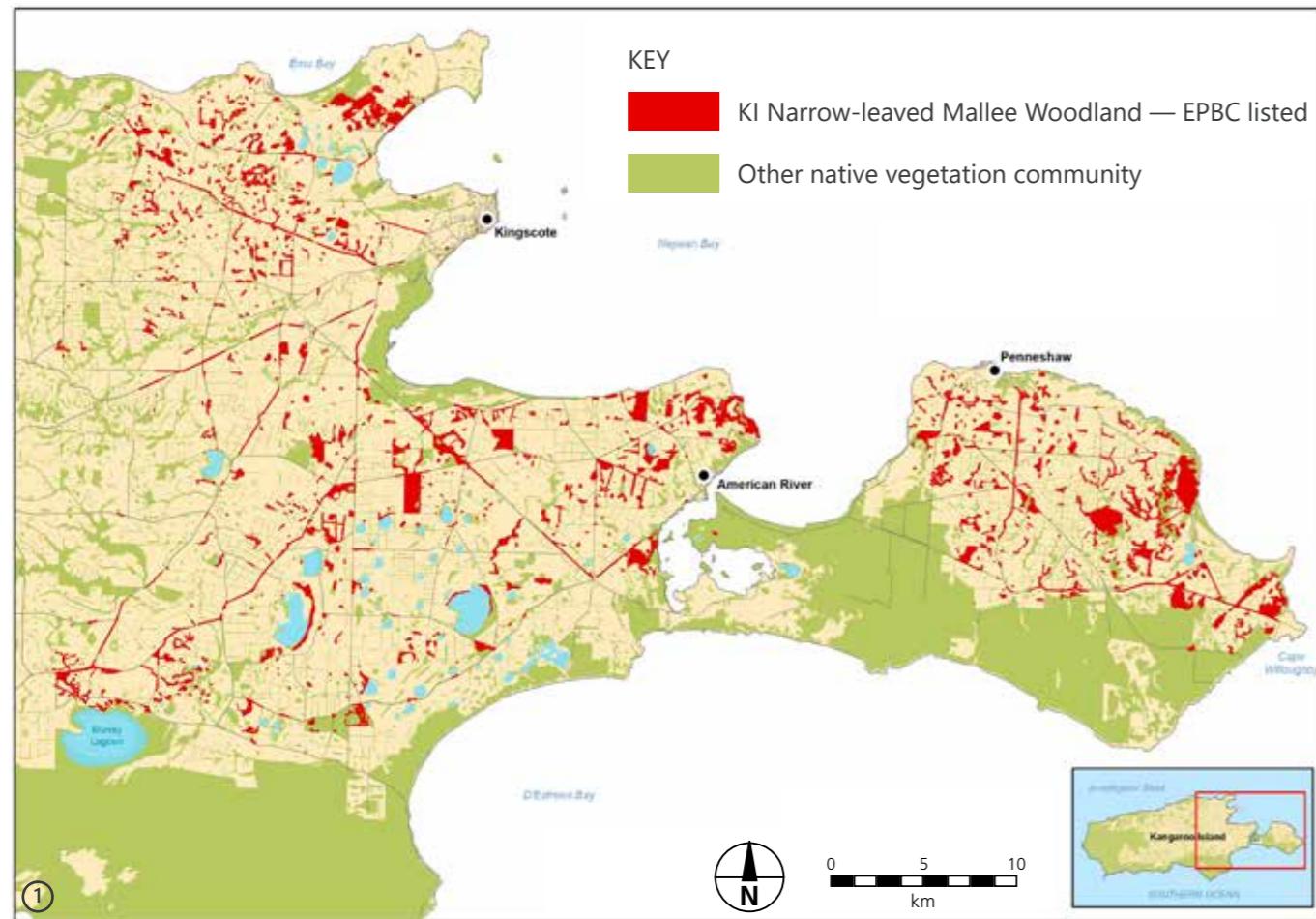
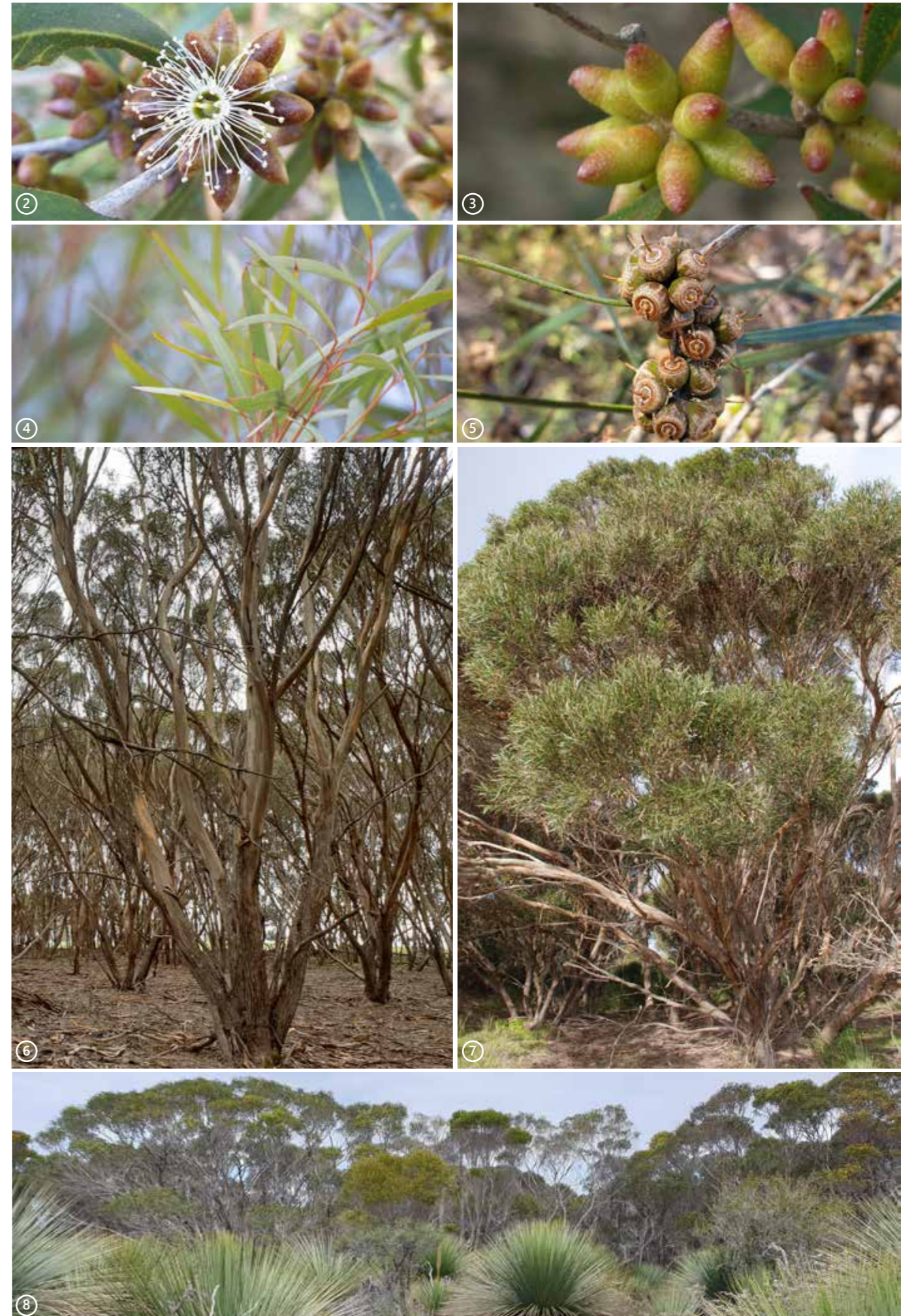


Figure 1. Map of the distribution of KI Narrow-leaved Mallee Woodland on Kangaroo Island.

A nationally threatened ecological community

KI Narrow-leaved Mallee Woodland is listed as a Critically Endangered Ecological Community under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It's estimated that KI Narrow-leaved Mallee Woodland once occupied an area of approximately 75,000 hectares, however following European settlement, large areas of the woodland were cleared and converted to farmland. The remaining woodland now occupies an area just over 7,880 hectares and is fragmented between more than 800 individual vegetation patches. This equates to KI Narrow-leaved Mallee Woodland occupying less than 2% of Kangaroo Island. It's important to note that *Eucalyptus cneorifolia* as a tree species is not considered threatened. The Critically Endangered listing only applies to intact patches of native vegetation that have *Eucalyptus cneorifolia* as the dominant tree canopy species.

Figures 2–6 Parts of a KI Narrow-leaved Mallee: 2. KI Narrow-leaved Mallee flower; 3. KI Narrow-leaved Mallee buds; 4. KI Narrow-leaved Mallee leaves; 5. KI Narrow-leaved Mallee fruit; 6. KI Narrow-leaved Mallee trunks. 7. KI Narrow-leaved Mallee tree. 8. KI Narrow-leaved Mallee Woodland.



Not all KI Narrow-leaved Mallee patches are covered by the EPBC Act

KI Narrow-leaved Mallee vegetation patches must meet minimum condition thresholds set out by the EPBC Act to be considered part of the nationally threatened ecological community. The condition threshold means that individual paddock trees, narrow shelterbelts, or small patches where the understorey has been replaced by weeds are excluded from the listing. To aid this classification, a simple rule can be applied based on a patch width of 60 metres.

- » Patches that have a width of 60 metres or more and retain a native understorey qualify as the nationally threatened community. This includes senescent patches where the understorey has died back, but still retain a viable native seedbank in the underlying soil.
- » Patches that are less than 60 metres wide, show signs of general degradation and lack a native understorey, are excluded from the listing. This excludes most farm shelterbelts as well as narrow road verges. See figure 9.

Full details regarding the listing can be found in the Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland guidebook produced by the Australian Government:

<https://www.dcceew.gov.au/sites/default/files/documents/kangaroo-island-mallee-woodlands.pdf>



Figures 10-11: Senescing KI Narrow-leaved Mallee Woodland in remnant native vegetation.

Figure 12: Senescing KI Narrow-leaved Mallee trees in a paddock shelterbelt.

Vitally important habitat

Some of the most threatened plants found on Kangaroo Island rely on KI Narrow-leaved Mallee Woodland for habitat. These include the Small-flower Daisy-bush (*Olearia microdisca*), Beyeria Bush-pea (*Pultenaea insularis*), Kangaroo Island Spider-orchid (*Caladenia ovata*), Kangaroo Island Turpentine Bush (*Beyeria subsecta*) and Macgillivray Spyridium (*Spyridium glabrisepalum*), all of which are endemic to Kangaroo Island. See figures 13–17. The woodland also provides habitat for many species of native birds, reptiles and mammals including the nationally Endangered Southern Brown Bandicoot (*Isodon obesulus obesulus*) and KI Short-beaked Echidna (*Tachyglossus aculeatus multiaculeatus*). See figure 18.

For many properties in eastern Kangaroo Island, KI Narrow-leaved Mallee is the only remaining native vegetation on the property. This makes the woodland very important for providing shelter for stock, windbreaks for crops and also helps to alleviate salinity through water uptake.



Figures 13–17: Threatened plants growing in KI Narrow-leaved Mallee Woodland: 13. Small-flower Daisy-bush; 14. Beyeria Bush-pea; 15. Kangaroo Island Spider-orchid; 16. Kangaroo Island Turpentine Bush; 17. Macgillivray Spyridium (M Haby); Figure 18. KI short-beaked echidna.

An ageing woodland

There are many threats to the health of KI Narrow-leaved Mallee Woodland, including vegetation clearance, livestock grazing and weed invasion, however the most widespread issue affecting KI Narrow-leaved Mallee Woodland is a process known as senescence, where vegetation becomes very old and begins to dieback. This is a natural process, however altered fire regimes, particularly suppression of fire across eastern KI, has resulted in a disproportionate amount of long-unburnt senescent stands.

Old stands of KI Narrow-leaved Mallee often form a closed canopy which deprives understorey plants of nutrients, water and sunlight. Over-time the understorey dies out resulting in an overstorey monoculture of *Eucalyptus cneorifolia*. Without natural disturbance, such as wildfire, this senescence will progress to a point where neither the trees nor the understorey will regenerate, leading to the eventual collapse of the woodland. Small and narrow stands such as shelterbelts are especially at risk, with old trees particularly vulnerable to being blown over by strong winds. See figures 10–12.

How to manage KI Narrow-leaved Mallee Woodland

There are several different management actions that can be used to help protect and improve KI Narrow-leaved Mallee Woodland. Many of these actions can be employed in combination to help achieve the best results.

Fencing

Fencing can be used to protect KI Narrow-leaved Mallee patches from grazing and trampling by livestock or unwanted browsing from native herbivores. It's also important for protecting native soil seedbank in senescent patches and helping prevent the unwanted introduction of weeds. Fencing is essential to protect regrowth following pollarding or burning.

Basic stock-proof fence designs are good for preventing unwanted grazing from livestock, however to prevent over browsing by native herbivores, an exclusion type fence is recommended. Exclusion fencing is also highly effective for protecting revegetation plantings. Fences should be placed 5 metres from the edge of vegetation to reduce maintenance needs and damage to fences (i.e. from falling tree branches). See figure 19.



Figure 19: Fencing to protect KI Narrow-leaved Mallee Woodland.

Figure 20: Revegetation of KI Narrow-leaved Mallee Woodland habitat.

Revegetation

Planting native tubestock or direct seeding can be used to increase the diversity of existing KI Narrow-leaved Mallee patches or connect fragmented patches by establishing vegetation corridors. Revegetation can also be used to rehabilitate land affected by salinity, thereby increasing the health of existing adjoining vegetation patches.

Revegetation plantings should include a mixture of species and plant heights (trees, shrubs and groundcovers) and should be designed to replicate what was originally on the site. As a rule, seed and plant material should be collected from within a 10 km radius of the planting site, as properly provenanced plants will be better adapted to the area. Ensure seed and plant material is collected from local native species and not from introduced ones. For best results, tubestock should be planted at a density of 800–1000 plants per hectare.

Protecting seedlings from livestock and native browsers is essential, and either fencing or tree guards can be used. A weed control program must also be implemented to minimize competition from weeds and pasture grasses.

The Kangaroo Island Landscape Board is available to support landholders with advice about what best to plant where and how, to suit specific property conditions. The Kangaroo Island Landscape Board's Native Plant Nursery also grows over 100 different species of KI native plants, which can be used for revegetation projects. See figure 20.

Ecological restoration

Controlled ecological burning

The principal management technique for restoring senescent remnant Kangaroo Island Narrow-leaved Mallee, is the planned use of fire. The general prevention of fire throughout eastern Kangaroo Island has significantly impacted the abundance of threatened plant species and the health of KI Narrow-leaved Mallee Woodland. KI Narrow-leaved Mallee, like much of the vegetation of Australia, has evolved to rely on fire for regenerating ageing overstorey trees and stimulating the germination of dormant soil seedbank. Many of Kangaroo Islands highly threatened plants will only germinate and grow in the years immediately after fire. The implementation of ecological burns can address the problems with senescence and prevent the collapse of the woodland over time.

Permission to burn

Ecological burning for the 'preservation or enhancement of ecological processes' is considered a form of native vegetation clearance under the *Native Vegetation Act 1991*. Therefore ecological burning must be conducted in accordance with the *Native Vegetation Regulations 2017*. Burning can have significant adverse effects on habitat, therefore landholders need to develop a Management Plan in line with Native Vegetation Council (NVC) requirements before burning can occur. Details regarding what needs to be addressed in the management plan are outlined in the NVC Ecological Prescribed Burning Guideline which is available from the following webpage:

<https://www.environment.sa.gov.au/topics/native-vegetation/clearing/ecological-restoration>

The Kangaroo Island Landscape Board can provide ecological expertise to assist with the preparation of management plans, or alternatively landholders can engage with a NVC accredited consultant.

When and how to burn

The primary consideration when planning an ecological burn, is that it must be done in a manner that protects life and property. For this reason ecological burning is generally conducted during either spring or autumn, when conditions are suitable for fire, but when there is a low risk of fire escaping from the intended burn area. For specific threatened species the seasonal timing of burning is also important. Many orchid species for example, respond well to fire during their dormant season, but are negatively affected by a fire during their growth season.

Due to the senescent nature of many KI Narrow-leaved Mallee patches, which have little to no understorey of shrubs, some amount of fuel manipulation may be necessary to help carry a fire under mild conditions. This can be achieved by cutting or flattening the canopy to elevate surface fuel loads.

Avoid saline areas

Saline areas should not be burnt, as stressed trees will not recover.



Figure 21. An ecological burn begins. 22. Regenerating KI Narrow-leaved Mallee Woodland post-fire.

Pollarding

For KI Narrow-leaved Mallee patches that require restoration but fire is impractical, the use of pollarding or coppicing should be considered. Pollarding is best suited for narrow stands such as shelterbelts, rather than larger patches. Pollarding involves cutting KI Narrow-leaved Mallee trunks at ground level to encourage the tree to regrow. KI Narrow-leaved Mallee trees have a woody underground swelling at the base of the trunk known as a lignotuber. This lignotuber contains a food reserve that enables the tree to re-shoot when necessary from dormant buds. By cutting the trunks off at ground level, the tree is forced to regenerate via these dormant buds.

Permission to pollard

Pollarding for the purposes of ecological restoration is considered a form of native vegetation clearance under the *Native Vegetation Act 1991*. Therefore pollarding must be conducted in accordance with the *Native Vegetation Regulations 2017*. If carried out incorrectly, pollarding can result in the tree dying, therefore landholders need to develop a Management Plan in line with Native Vegetation Council (NVC) requirements before pollarding can occur. Details regarding the elements to be addressed in the management plan are outlined in the NVC Ecological Restoration and Management of Vegetation Guideline which is available from the following webpage:

<https://www.environment.sa.gov.au/topics/native-vegetation/clearing/ecological-restoration>

The Kangaroo Island Landscape Board can provide ecological expertise to assist with the preparation of management plans, or alternatively landholders can engage with a NVC accredited consultant.

When and how to cut

Trunks should be cut as close to the ground as possible to promote strong and vigorous regrowth. KI Narrow-leaved Mallee trees generally have multiple stems, so ensure all stems are cut. Pollarding should be undertaken between May and November, whilst soil moisture levels are high. Pollarding during seasons with low rainfall or periods of extended drought should be avoided, as stressed trees may not recover.

Patches that have been pollarded should not be done again for at least 30 years.

Promoting understorey regrowth

To encourage regeneration of understorey plants, pollarded treetops can be piled over the pollarded area and burnt. A cautious approach should be taken when burning pollarded stumps, as fire may not be appropriate in all circumstances, and may actually hinder reshooting of the mallee stumps. Any burning should be undertaken within three weeks of cutting to prevent regrowth from being damaged. Further advice should be sought from the Kangaroo Island Landscape Board prior to burning pollarded stumps. For very old mallee stands with little prospect of understorey regeneration, it may be beneficial to plant or direct-seed understory species after pollarding. This will promote a more diverse and dense habitat.

Avoid saline areas

Saline areas should not be pollarded, as stressed trees will not recover.



Figure 23. A pollarded KI Narrow-leaved Mallee tree regenerating.

24. A pollarded KI Narrow-leaved Mallee shelterbelt regenerating.

Managing restoration areas

Protection is vital

Following ecological burning or pollarding, it is essential to prevent livestock from feeding on the regrowth and germinating seedlings. For the best results, native herbivores should also be excluded from regrowth areas. Exclusion fencing provides the best protection from both livestock and native herbivores. Fencing should be placed at least 5 m from the canopy drip-line to allow for natural spread of regrowth and the germination of new plants.



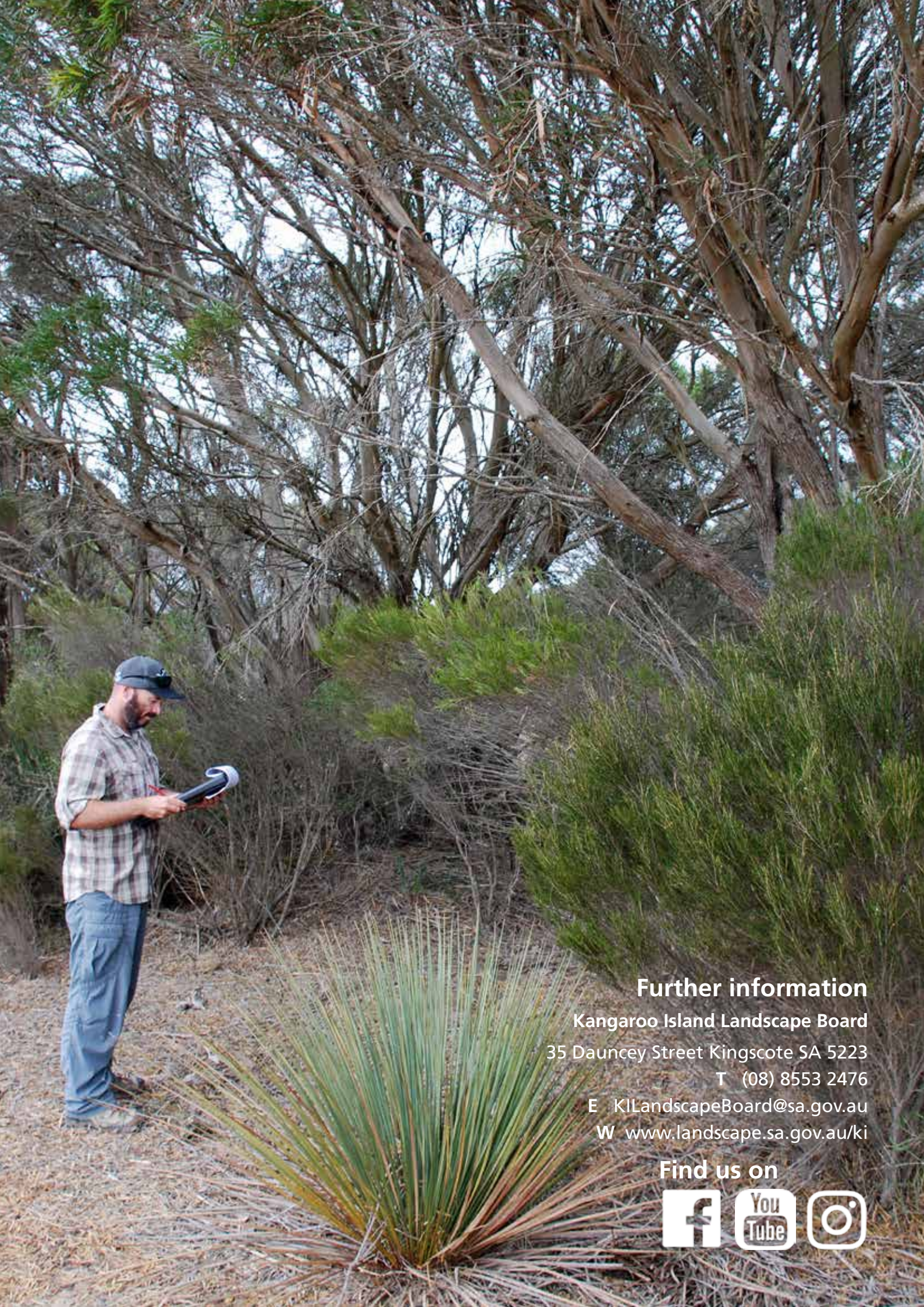
Figure 25. KI Narrow-leaved Mallee Woodland fenced for protection from stock and native animals.

Weed control

Complementary weed control will be required to prevent pasture grasses or environmental weeds such as Bridal Creeper and Bridal Veil from infesting restoration areas. The KI Landscape Board can provide information on different weeds and the best control methods to use.



Figure 26. Bridal veil invading KI Narrow-leaved Mallee Woodland roadside vegetation.



Further information

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