

Natural Resources Management Plan 2015–2025

Have Your Say

Discussion paper No 7: Management of native vegetation



This discussion paper is part of a series covering all of the 'Big Issues' raised by the community during meetings and workshops about the new Kangaroo Island NRM Plan. It provides a summary of the current state of knowledge about the issue, suggests courses of action and identifies who might work together with us in addressing it.

We now invite your comments, suggestions, criticisms and ideas.

Introduction

Kangaroo Island's landscape has been extensively transformed since European settlement, from primarily continuous mallee vegetation, into a patchwork of native vegetation interspersed with cleared agricultural land. Nevertheless, it still retains the highest level of native vegetation cover (approximately 48%¹) of any agricultural region of South Australia, approximately 65% of which is protected under public or private agreements. However, much of the vegetation is found at the west end and along the south coast of the island, whilst parts of the north coast, the eastern plains and much of Dudley Peninsula retain only isolated, disconnected fragments, with some of the most important remaining habitat reduced to strips of narrow roadside vegetation.

Since the late 1980's, KI has made significant progress in caring for its native vegetation. Private landholders have protected through fencing some 18,700 ha and revegetated another 970 ha. Vegetation patches protected on private land average 59 ha in size² while over 90% of the remainder of patches are [under 20 ha](#)³. There are now a number of contiguous patches of native vegetation exceeding 1,000 ha crossing several property boundaries². In many catchments private landowners are the main custodians of protected habitats (G. Flanagan, *personal communication*).



¹ Mark Morris (personal communication) derived from Natural Resources Kangaroo Island GIS database (2015)

² Natural Resources Kangaroo Island GIS data

³ Willoughby, N and Graham, A. 2001. *Biodiversity Plan Kangaroo Island South Australia: Summary*. Department of Environment and Heritage, South Australia.



Natural Resources
Kangaroo Island



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The KI community generally has a high level of appreciation for native vegetation, though the benefits that it provides may not always be fully accounted for and appreciated. A number of challenges exist with respect to vegetation management and some conflicts exist between different stakeholders on the island that require constructive cooperation in order that suitable resolutions may be found. The vegetation (and its associated wildlife) holds a definite appeal for many, contributing to the uniqueness of the island and constituting an important drawcard for tourists.

Triple Bottom Line Value of Native Vegetation to KI

[Glatz \(2014\)](#)⁴ reports that on KI, native vegetation makes a number of important but often undervalued contributions to agricultural production:

- » [Agricultural pest management](#)⁵ — native plant species generally support fewer crop/pasture diseases and pests than exotic weeds, which are suppressed by healthy native vegetation. Native plants are also associated with insects that are beneficial to primary production and/or they support important life cycle stages of biological control agents.
- » *Agricultural biosecurity* — good quality native vegetation (with an intact seedbank) has the capacity to buffer farm land against the introduction of new species that pose biosecurity threats. It reduces the establishment, build-up and spread of a pests/diseases, key factors in the severity and persistence of outbreaks. Native vegetation has also been shown to support native biocontrol agents that can combat new introductions.
- » *Pollination* — native vegetation plays a vital role in providing forage for native and introduced honeybees and supports the apiary industry. It also supplies habitat for numerous species of native pollinators that are not only crucial to native plant species but also to crops and pasture.
- » *'Clean and green' image* — native vegetation is a key contributor to KI's image and brand value.
- » [Shelter belts and wind breaks](#)⁶ — native vegetation provides shelter for stock and breaks wind, with production benefits for stock and crops.

Further net benefits (or ecosystem services) provided by native vegetation include:

- » *Tourism/marketing appeal* — having abundant native vegetation that contains plants endemic to KI gives the island its scenic look and wild feel. Some locally-common species contribute to a unique aesthetic, e.g. narrow-leaf mallee, KI conesticks, leafless pink bells and big-headed riceflower.
- » *Direct social and community benefits* — there are many obvious benefits associated with physical attributes such as shade (especially in residential areas), windbreaks, oxygen production and dust suppression. Mental health and wellbeing are also associated with high quality natural environments.
- » *Maintaining a resilient and adaptable landscape* — when native vegetation is intact and healthy, not only are current benefits retained, but so are future use options. This contributes to social, economic and environmental resilience and allowing the best chance to adapt to climate change.



⁴ Glatz, RV. 2014. *Native Vegetation on Kangaroo Island: landscape resilience and the triple bottom line*. Draft report to Department of Environment, Water and Natural Resources, South Australia, Kingscote.

⁵ Grains Research and Development Corporation (GRDC) Fact Sheet: *Pest Suppressive Landscapes* May 2014.

⁶ Austin, P. 2014. *The economic benefits of native shelter belts*. Report 2/14, Basalt to Bay Landcare Network, Warrnambool, Victoria.

- » *Prevention or mitigation of salinity* — dryland salinity is one of the most serious forms of land-scape degradation. It reduces the productive capacity and value of land as well as causing long-term and significant changes to biodiversity. It largely results from wide scale vegetation clearance and its replacement with shallow-rooted plants.
- » *Habitat provision* – Native vegetation supports Kangaroo Island’s wildlife by providing shelter and essential habitat for feeding, nesting and roosting. Many iconic or rare species (including the Green Carpenter Bee, Glossy Black Cockatoo, Southern Brown Bandicoot, KI Dunnart, new-ly discovered moth species *Aenigmatinea glatzella*, Rosenberg Goanna, etc.) are reliant on the quality and quantity of native vegetation on KI.
- » *Water quality* — filters water and maintains aquatic ecosystem health (particularly wetlands).
- » *Flood prevention and mitigation* — reduces runoff and acts to prevent and mitigate flooding.
- » *Erosion prevention* — holds soil in place.

Factors Affecting the Health of Native Vegetation on KI

The key physical variables that determine the distribution of ecosystems and hence native vegetation on KI are geology, soil type and rainfall. Topography also plays a minor role in some cases, such as for alluvial and drainage systems. Key drivers or processes that determine the health of native vegetation are:

- » fire regime
- » landscape modification and clearing for agricultural production, residential purposes, roads, etc.
- » grazing pressure
- » weeds
- » changes to physico-chemical processes (particularly dryland salinity).

An example of how these factors affect native vegetation can be seen in the state of narrow-leaved mallee (*Eucalyptus cneorifolia*) on the island, which is critical habitat for five nationally threatened plant species (listed under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*), four of which are endemic to KI and found only in the Eastern Plains area. Another 25 plant species are of conservation concern in the region (State or regionally listed) and the narrow-leaved mallee community (that is almost entirely restricted to KI) has recently been listed as a threatened ecological community under the EPBC Act.

Key drivers of continued decline of the narrow-leaved mallee community are habitat loss, habitat fragmentation and fire [exclusion](#)⁴. Mallee was extensively cleared in eastern KI with the intensification of agriculture after the Second World War. Native vegetation on KI has been progressively subdivided into smaller and more isolated fragments with 16% (15,198 ha) of the original 95,205 ha cover now remaining in the Eastern Plains. One outcome of this fragmentation has been the effective restriction of wildfire spread. This has contributed to a situation where most narrow-leaved mallee patches have not been burnt for approximately 35-70 or more years.

The exclusion of fire has created a senescent landscape where long-lived over-storey species have become dominant at the expense of shorter lived understorey plants. Many remnants, including roadside strips, support as few as three to eight perennial species, and vegetation structure is a canopy of mallee trees with a few shrub species and very little diversity or cover in the understorey. The condition of remaining patches would seem to be related to the size of the patch, its edge to area ratio, and adjacent land use practices e.g. [fertiliser drift](#)⁷. Thus the Eastern Plains and parts of Dudley Peninsula are currently dominated by senescent mallee remnants, which has been the focus of investigations by the Eastern Plains Fire Trial (EPFT) (2008-2013) and habitat restoration by the Kangaroo Island Nationally Threatened Plants Project.



⁷ Taylor, D. 2011. *Eastern Plains Fire Trial: Progress Report, Preliminary Findings and Future Recommendations*. DEWNR

It is important to note that a number of studies have suggested that if native vegetation cover across a landscape falls below 30%, biophysical processes start to change and critical habitat functions for dependent [flora](#)⁸ and [fauna](#)⁹ are compromised. The resilience of the landscape as well as the ecosystem services it is able to deliver are simultaneously diminished. This is of particular relevance to the eastern plains and parts of Dudley Peninsula, and to a lesser degree parts of the north coast of KI (see section below *Assessment of Priorities for Landscape Level Conservation*).

Some Management Challenges

Implementing the Native Vegetation Act

A number of challenges exist in relation to the management of native vegetation on KI, including legal and regulatory issues, lack of scientific knowledge, lack of resources, practical/logistical issues and real or perceived conflicts of interest.

Whilst there is no doubt that the Native Vegetation Act has had an important role to play in arresting native vegetation clearance in South Australia, many stakeholders on the island have expressed frustrations with the Act and its accompanying regulations, which are perceived to be overly prescriptive, time consuming and costly to implement. The regulations may also impede positive management of the vegetation by landholders. Whilst fire (appropriately used) and pollarding may be necessary vegetation management tools, the Act views these as clearance and prevents them from being applied without a permit. Many primary producers feel that their ongoing efforts to host and manage native vegetation on their property, and even to revegetate areas in some instances, are not adequately acknowledged by the authorities. Furthermore, there is a loss of local knowledge as older generations who were used to working with fire pass on, and younger generations potentially becoming increasingly inexperienced. The situation is exacerbated by an increasing number of buildings in the landscape, the risk-averse nature of our society which is also reflected in the current regulations, as well as a decline in manpower and resources for undertaking burns.

The native vegetation regulations are currently being reviewed and reworked, and the main focus of the review is to amend the permitted clearing regulations (the exemptions) to improve their clarity, as well as simplifying the regulatory requirements and processes to administer them. It is expected that this will assist with addressing some of the management issues. For example, activities that aim to restore and manage restoration of vegetation, such as use of fire and pollarding in the case of the narrow-leaved mallee, could potentially occur in accordance with a single management/restoration plan developed for the whole vegetation community. With a management plan in place, a simple process for landholders to gain consent could be administered by NRM staff on KI, with appropriate checks and balances.

There has been a strong push for a more regionalised approach to managing native vegetation protection and clearance laws and this is likely to come into effect, providing the necessary opportunity for a more tailor made approach. In conjunction with the review of regulations (above), if such an approach can be designed and implemented across the landscape, there is some promise for improved outcomes with respect to the management of native vegetation on KI.

Management of Roadside vegetation

Due to the removal and fragmentation of native vegetation in the agricultural landscapes of KI, road reserves form critically important habitat. They are home to some of our rarest natural assets from a regional, State and National perspective and support agricultural pest suppressive insects. Roadside vegetation also provides important pollinator habitat and corridors for the movement of wildlife.



⁸ McIntyre S and Hobbs RJ. 1999. *A framework for conceptualising human effects on landscapes and its relevance to management and research models*. Conservation Biology 13 (6), 1282-1292.

⁹ Radford JQ, Bennett AF and Cheers GJ. 2005. *Landscape-level thresholds of habitat cover for woodland-dependent birds*. Biological Conservation 124, 317-337.

Whilst NR KI has a regulatory role in protecting these roadside reserves, KI Council and Department of Planning, Transport and Infrastructure (DPTI) (major roads) are responsible for the management of the vegetation on roadsides and the maintenance of the roads, with an obligation to ensure that roads are safe and user-friendly. Ongoing collaboration is required to ensure that all parties are able to fulfil their statutory obligations in an effective manner that is of benefit to KI and that takes the full value of native vegetation, the requirement to effectively conserve it, as well as the costs and practicalities of road maintenance, into account.

Leading on from this is the question of what should be done about the degraded (and declining) patches of remnant vegetation that are narrow, have a degraded understorey, etc., e.g. restoring appropriate fire regimes in the short term. Ensuring the long term viability of these patches in the long term will probably require increasing their size, e.g. through establishing buffers, enlarging and connecting remnants with high quality vegetation — or accepting that they are likely to slowly disappear over time.

Maintaining Appropriate Fire Regimes

Fire is an essential driver of recruitment in mallee ecosystems. Fire frequency appears to have declined in fragmented vegetation in agricultural landscapes over the last [40 years](#)¹⁰. However, there are large areas of remnant native vegetation on the Island, both within and outside of protected areas, with significant fire history. Species are adapted to a fire regime rather than fire *per se*, this being defined by the frequency, season, intensity, and type of fire events¹¹. Fire management strategies on DEWNR managed lands on the Island are targeted towards landscape scale management for biodiversity and asset protection objectives. The critical focus is upon minimising the risk of reserves burning out in single fire events, and protecting built assets on and adjacent to reserve boundaries (Anthea Howard, *personal communication*).

The most significant challenge facing fire management is the need for it to occur across tenures. Large scale landscape fires move across public and private land boundaries, and without cooperation between all parties, appropriate regulation and adequate resourcing, genuine landscape scale fire management cannot be achieved. Ongoing research and monitoring needs to be undertaken at a regional and state level to continue to improve the use of fire as a management tool and to support adaptive management.

Impact of grazing and browsing (stock and over-abundant native species)

The impact of stock on the condition of native vegetation is of concern, e.g. through trampling and debarking (a particularly serious issue for stringybark remnant vegetation in central KI). Many paddocks contain isolated patches of vegetation (of varying sizes) that are not fenced off from stock, resulting in a gradual decline in its condition and in some cases its eventual disappearance. Where riparian vegetation has been fenced off on KI, not only is the vegetation in better condition but there have been improvements in the condition of aquatic ecosystem health and water quality.

[Over-abundant native species](#)¹² also impact native vegetation and this is particularly pronounced in areas that are re-establishing post fire or post restoration/replanting. In this respect, the [ongoing management of koala populations](#)¹³ on the island is critical given their significant impact on manna gums in particular (with knock on impacts on associated species such as native bees, and riverine habitat through bank erosion).



¹⁰ Dowie, D. 2006. *Age Class Distributions of Seven Vegetation Groups on Kangaroo Island*. Department for Environment and Heritage, Kingscote, South Australia.

¹¹ Gill, AM. 2012. *Bushfires and biodiversity in southern Australian forests*. In: *Flammable Australia. Fire Regimes, Biodiversity and Ecosystems in a Changing World* (eds. R.A. Bradstock, A.M. Gill and R.J. Williams). CSIRO Publishing, Collingwood, Vic.

¹² <http://www.environment.sa.gov.au/haveyoursay/kangaroo-island-big-issues>

¹³ <http://www.naturalresources.sa.gov.au/kangarooisland/plants-and-animals/native-animals/koala-management>

Threatened Species Conservation

Finally, many native plants are reliant on native pollinators, including 'buzz' pollinators such as the iconic and [endangered green carpenter bee](#)¹⁴ (GCB). Formerly occurring in suitable areas from KI to northern New South Wales, the GCB is now extinct from mainland South Australia and Victoria. The ongoing contraction of the species on KI is likely to be linked to fire history and land clearing, both of which influence the availability of [nesting sites](#)¹⁴. Stable populations are now only known in long unburnt banksia habitats of southern Flinders Chase National Park (FCNP) and Kelly Hill Conservation Park. While some nests have been found in suitable fragmented habitat along the North Coast, it needs to be verified whether these, now isolated remnants are of sufficient size to support viable [populations](#)¹⁴. Other native pollinators (including insects and birds) are negatively impacted by the use of insecticides and other agrochemicals, with implications for native vegetation.

Further Challenges

- » Due to the efforts of many people our understanding has greatly improved and adaptive management is a useful approach to this challenge, however, there is an ongoing need to better understand how the island's ecosystems work.
- » [Weeds](#)¹⁵ have a major impact on native vegetation and preventing their introduction as well as their control or eradication (where possible) is crucial.
- » NR KI and partners have developed a wealth of knowledge and capacity around habitat restoration and revegetation. Maintaining this capacity in the future is key to ongoing management efforts.
- » Consideration needs to be given to the potential impact of clearing up fallen branches and trees as these provide increased habitat heterogeneity, contributing to species diversity. Given that at least 5,000 tons of firewood are probably collected across KI each year, the impact of the net removal of nutrients from various ecosystem warrants investigation (with balanced consideration for reduced fuel loads reducing risk).

Assessment of Priorities for Landscape Level Conservation

Based on an assessment of factors affecting native vegetation on KI, [Pisanu et al. \(2013\)](#)¹⁶ identified priority landscapes for conservation on KI. Three landscapes were defined, namely the West and South Coast, the Central Plateau and North Coast, and Eastern Plains and Dudley Peninsula.

As discussed above, the Eastern Plains and Dudley have had the most prolonged and intensive land use history on KI and they are now largely cleared and heavily fragmented. This coupled with alteration of the pre-European fire regime has resulted in widespread senescence of remnant mallee communities. The analysis indicated that at least six bird species are declining, a further signal of changed ecological conditions on this part of the island. Other threats associated with intensive land use, such as increasing salinity, weeds, changed soil conditions and grazing pressure, are also apparent. This landscape requires urgent attention and restoration to prevent it from crossing thresholds into an undesirable state that will either be impossible or incredibly costly to recover from.



¹⁴ Glatz, RV, Leijts, R and Hogendoorn, K. 2015. *Biology, distribution and conservation of Green carpenter bee (Xylocopa aeratus: Apidae) on Kangaroo Island, South Australia*. DEWNR Technical Report.

¹⁵ Natural Resources Kangaroo Island. 2014. *Big Issues discussion paper No 2: Biosecurity, Weeds, Pest Animals and Disease*

¹⁶ Pisanu, P, Rogers, D, O'Connor, J, Thompson, D and Peters, D. 2013. *Identifying priority landscapes and ecosystems for nature conservation in the Kangaroo Island NRM region*, DEWNR Technical Report 2013/14.

The Central Plateau and North Coast landscape is divided into variegated and fragmented sections from west to east, and the fire regime in more disturbed areas is characterised by longer periods since the last fire dominated by older age classes. No major declines in ecological function were detected by the analysis but the report recommends that fragmented areas should be the focus of further assessment and management effort to prevent future declines. Where ecosystems have been cleared preferentially, such as on ironstone soils, further evaluation of the need for maintenance and restoration should be undertaken.

Of the three landscapes, the West and South Coast is currently relatively intact with coastal mallee and shrublands having a high degree of ecological function and resilience overall. The fire regime is, on average, operating within acceptable limits but the report suggests that care is needed to ensure that older age classes are reinstated in areas of the west and south coasts affected by the December 2007 fires, as too frequent fire is also detrimental to [biodiversity](#)¹⁷. In this regard there is a strong focus on reinstating an age class mosaic in FCNP and the Gosselands and managing these areas to mitigate the risk of them re-burning in a single event as well as protecting critical long unburnt areas in Cape Bougueur and Western River as part of [fire management strategies](#)¹⁸.

Climate Change

A key adaptation response to climate change is to increase the resilience of the landscape and its ability to adapt to changing conditions. This can be achieved through various means including reducing the stress on ecosystems (e.g. grazing pressure, weeds, agrochemical use), [rehabilitating landscapes](#)¹⁹ (e.g. reconnecting fragments and isolated patches, forming corridors for migration of species and gene flow), ensuring the protection of [refugia](#)²⁰ (i.e. bioclimatic areas where the maximum number of species will be able to persist into the future) and by buffering intact, healthy vegetation/ecosystems.

[A recent study](#)⁹ concluded that restoring landscapes to approximately 30% native vegetation would tend to improve the likelihood of persistence for native species (and decrease the likelihood of persistence for key invasive species) across a range of plausible futures, and that this factor is more important than detailed spatial configuration to counteract declines in biodiversity (and hence ecosystem services delivered) from climate-related changes in land use and suitable habitat. Restoring agricultural landscapes obviously requires a balanced approach that aims to maintain/restore the effective functioning of ecosystems and counteract deleterious processes, such as increasing salinization, whilst meeting production and financial viability considerations.

Climate adaptation responses such as restoration of landscape connectivity, refugia protection and managed relocation may change weed dispersal pathways. Similarly, as native species shift their distributions in response to climate change or managed relocation, they have the potential to negatively impact other native species in their newly expanded range, thus becoming weeds/pests themselves. Adaptation responses to combat invasion from corridors include monitoring to recognise negative impacts when they arise, pinch points and translocation. Refugia have an increased risk of invasion under climate change with potentially greater consequences for biodiversity and current invasive plant quarantine, surveillance and control measures should be maintained and enhanced to [deal with this](#)²¹.



¹⁷ Department for Environment Water and Natural Resources. 2013. *Ecological Fire Management Guidelines for Native Vegetation in South Australia*. DEWNR Technical Report 2013.

¹⁸ http://www.environment.sa.gov.au/firemanagement/Fire_Planning/Fire_management_plans/Adopted_fire_mgt_plans

¹⁹ Doerr, VAJ, Williams, KJ, Drielsma, M, Doerr, ED, Davies, MJ, Love, J, Langston, A, Low Choy, S, Manion, G, Cawsey, EM, McGinness, HM, Jovanovic, T, Crawford, D, Austin, M and Ferrier, S. 2013. *Designing landscapes for biodiversity under climate change: A validation. The architecture of resilient landscapes: scenario modelling to reveal best-practice landscape design principles*. Supplementary report to 'Designing landscapes for biodiversity under climate change', National Climate Change Adaptation Research Facility, Gold Coast.

²⁰ Reside, AE, VanDerWal, J, Phillips, BL, Shoo, LP, Rosauer, DF, Anderson, BJ, Welbergen, JA, Moritz, C, Ferrier, S, Harwood, TD, Williams, KJ, Mackey, B, Hugh, S, Williams, YM and Williams, SE. 2013. *Climate change refugia for terrestrial biodiversity: Defining areas that promote species persistence and ecosystem resilience in the face of global climate change*. National Climate Change Adaptation Research Facility, Gold Coast.

²¹ Scott, JK, Murphy, H, Kriticos, DJ, Webber, BL, Ota, N, and Loechel, B. 2014. *Weeds and Climate Change: supporting weed management adaptation*. CSIRO, Australia.

Climate change is increasing the frequency and severity of very hot days and driving up the likelihood of heightened fire danger weather. This will potentially cause modifications of native species distributions and vegetation composition, significantly affecting fuel dynamics and fire regimes. Managing fire for biodiversity is challenging due to complex interactions between a range of biophysical, social and economic drivers. Climate change will increase this complexity and probably limit management options as time goes on. Increasing the connectivity of native vegetation will also potentially aid the spread of fire and pinch/control points need to be factored into the design of [rehabilitation/restoration works](#)²¹.

Finally, there is likely to be an increased drive for carbon plantings nationally in the coming years. The emphasis on KI should rather be on biodiversity plantings that are aimed at maintaining ecosystem services and increasing resilience. It is unlikely that any mono-specific plantings would be approved by the KI Council or be granted a Water Affecting Activity permit given their impact on water resources and agricultural land, but a significant increase in the price of carbon could increase the pressure for such.

Strategies and priorities

It is important to note that the NRM plan is intended to guide and coordinate the efforts of all stakeholders in the region and responsibility for its implementation is a joint one.

- » Develop a 'whole of landscape' collaborative approach to actively managing native vegetation on KI. To this end, develop a tenure-blind (including private, public and Crown lands) landscape level management plan for native vegetation to achieve clearly defined outcomes (e.g. to ensure that resilience is maintained and improved over time), and addressing considerations relating to:
 - ~ priority areas for restoration/rehabilitation
 - ~ buffers, corridors and connectivity
 - ~ potential exposure of biodiversity to future climates
 - ~ protection of refugia
 - ~ fire regime, grazing pressure, weeds and salinity
 - ~ the multiple ecosystem services delivered by native vegetation.
- » The plan should also:
 - ~ guide and prioritise on-ground works (building on work already done in this regard)
 - ~ identify management tools and approaches (e.g. appropriate use of fire, fencing, appropriate use of pollarding)
 - ~ seek to identify meaningful offsets
 - ~ identify risks, ways of minimising or mitigating risks, and trade-offs that may be required
 - ~ identify resourcing and capacity requirements, considering different delivery models
 - ~ consider ways of reducing the costs and maximising the benefits to landholders, particularly primary producers, in order to encourage and incentivise their participation in such works.
- » Continue to improve the scientific understanding of potential thresholds and synergistic impacts of different drivers and threats on native vegetation. This type of knowledge can then be used to ensure explicit links between on-ground works and ecological outcomes, to review NRM management targets, and to determine the cost-effectiveness and expected impacts of investments. Extension of this type of approach could form a model for an adaptive management framework for other ecosystems of concern. There are opportunities to make better use of existing data and expert knowledge in a structured way.



- » The focus of this should be on evaluating how different threats impact on ecosystems, and how these threats combine or manifest synergistically, as well as how management currently responds to these challenges.
- » Build on the preliminary investigations into the delivery of ecosystem services by native vegetation on KI (and their contribution to the triple bottom line) and investigate the implications for land use decision making, informing trade-offs, and land use management and make recommendations about how to explicitly account for and optimise the delivery of these services.
- » With respect to the use of fire as a native vegetation management tool:
 - ~ Build on the knowledge gained during the EPFT and seek to implement the recommendations from Phase 1 of the trial. Scaling up patch-scale results from the EPFT would be beneficial in terms of shaping a landscape-scale management program, but will require applying new analytical methods not previously used on KI. The lessons learnt from doing this would translate to fire management more generally and allow for better use of fire for achieving ecological outcomes.
 - ~ Develop a series of formalised guidelines for the future use of prescribed fire to stimulate the regeneration of long unburnt plant communities in eastern Kangaroo Island and expand these to include other vegetation types as more is learnt.
 - ~ Develop partnerships between key agencies including the Country Fire Service (CFS), researchers and fire managers to test new management approaches. To this end, consider the establishment of a fire learning network and a fire-management school (as a commercially run national learning opportunity) on KI that would also serve to ensure a transfer of local knowledge between generations, build the knowledge base, improve the ability to undertake prescription burns for biodiversity outcomes, and potentially provide a source of income generation for the island.
- » Encourage appreciation for and build awareness and understanding of the value of native vegetation on KI in supporting the social and economic fabric of KI (appropriately balanced with primary production), including the life-supporting ecosystem services that it delivers and the contribution that it makes to maintaining resilience and adaptive capacity in the face of a changing climate.
- » Develop a knowledge management framework that clearly identifies and prioritizes knowledge gaps and information needs, and establish research partnerships that can work together to address these.

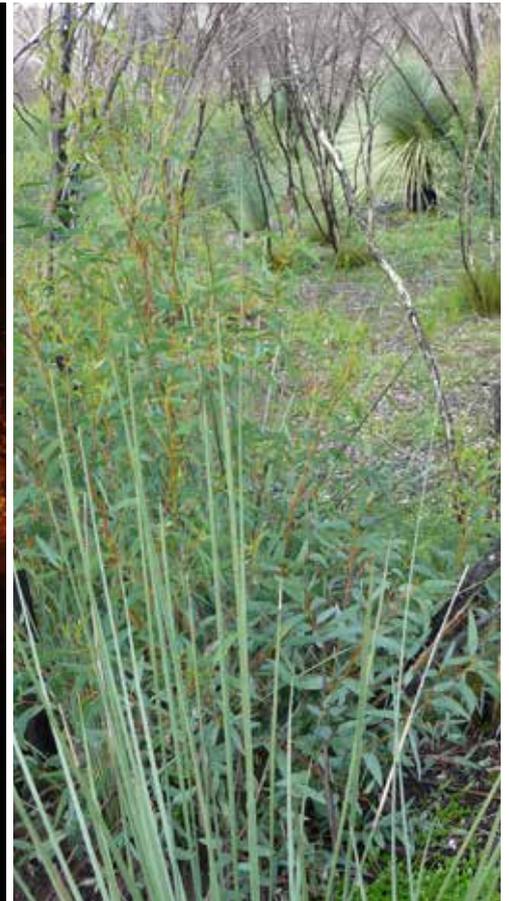
Partners

- » Department of Environment, Water and Natural Resources
- » Country Fire Service
- » Research agencies
- » Kangaroo Island Council
- » Primary Industries and Regions SA
- » Industry
- » Residents and landholders



What are your thoughts?

1. Have all the key issues relating to this **big issue** been adequately captured and understood?
2. Are there any gaps or misinterpretations?
3. What is the overall trend in relation to this issue — are matters improving or deteriorating, how fast and why?
4. In order to address this challenge, will the 'business as usual' approach work, or is adaptation (substantial change) or transformation (complete rethink of how we do business and how we tackle this issue) needed?
5. Do you agree with the strategies and priorities listed and/or do any need adding?
6. Who are the partners that need to collaborate to address this challenge?



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