

gondwana link

Ranges Link Conservation Plan - Stirling to Porongurup -

Photo — Lucia Queary



Linking two islands of biodiversity

Photo — Peter Luscombe



Photo — Peter Luscombe



This conservation plan was developed by the Ranges Link—Stirling to Porongurup group with the assistance of Gondwana Link Ltd. The plan focuses on the landscape between the Stirling Range and Porongurup National Parks.

What's at stake – the broader context

Gondwana Link is one of the largest and most ambitious ecological programs in Australian history. Designed to protect and restore ecological resilience within one of the world's biodiversity hotspots, the completed Gondwana Link will stretch for 1000 kilometres across south western Australia, from the wet karri forests of the far south west to the mallee and woodland on the edge of the Nullarbor plain to the east.

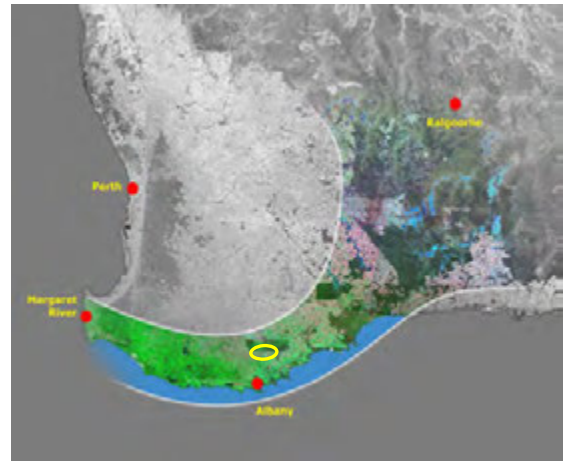
The area encompassing the Stirling Range and Porongurup National Parks is an important landscape in the Gondwana Link pathway.

The Stirling Range was originally home to the Mineng and Goreng people whose name for it was Koi Kyeunu-ruff. The biological richness of the two national parks is well known; the Stirling Range National Park contains more than 1500 plant species, including 87 found nowhere else, and at least 138 orchid species or 38% of Western Australia's total.

The nearby Porongurup National Park, although much smaller in extent is also ecologically very valuable. It is the largest inland remnant of native vegetation between the Stirling Ranges and the coast. It contains a disjunct flora association of the karri (*Eucalyptus diversicolor*) forest community – considered a relic of several thousand years ago when karri covered a larger area of the south west of Australia.

The combination of raised hills and granite soils of the Porongurup National Park supports a range of plant communities and associated fauna, from tall open karri forest to low herblands. Over 700 native species of vascular plants have been recorded in the Porongurup National Park to date (one of the richest concentrations of plant species in Australia) and the area has been recognised as a separate vegetation system in its own right.

Both the Stirling Range and Porongurup National parks provide damp refuges for Gondwanan relictual species such as certain spiders, which are more closely related to groups in mountainous areas of eastern Australia, Tasmania, New Zealand and other Gondwanan continents, than to the surrounding lowlands in the region. It is not surprising therefore that the Stirling to Porongurup area is so rich in biological diversity and endemism.

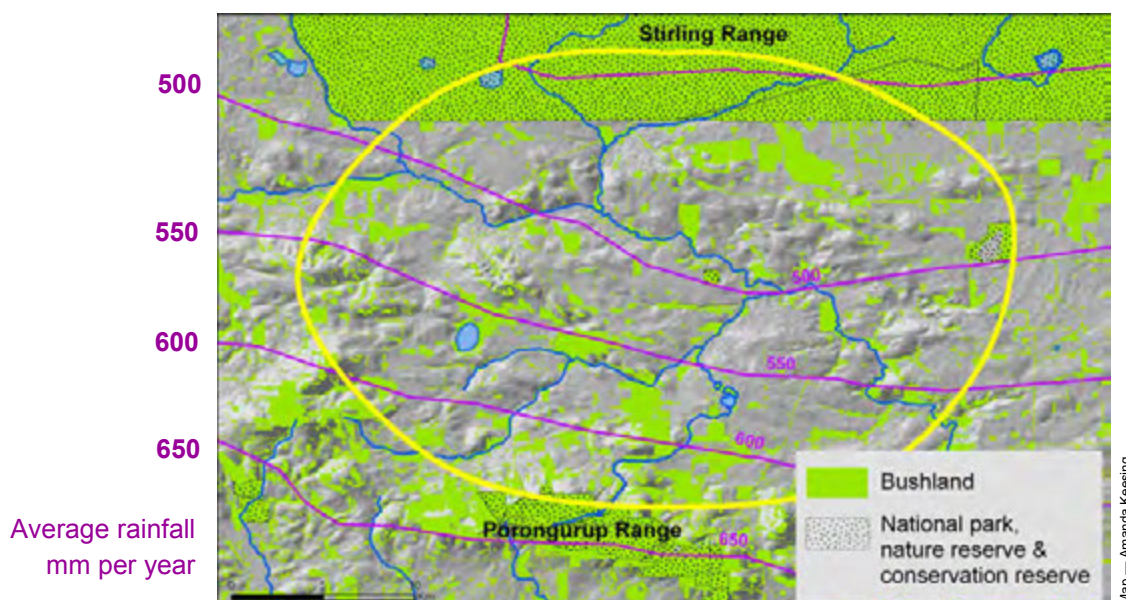


The Ranges Link focus area

The area shown below, of over 40,000 hectares, is the focus for the work of the Ranges Link group. It is situated in the Upper and Middle Catchment of the Kalgan River and is a transitional zone, characterised by extreme variation in rainfall, geology, soils and vegetation. The rainfall gradient is intense, declining by around 25 mm per kilometre in areas north of the Porongurup National Park. The soils range from young primary soils in the vicinity of the Porongurup to ancient, heavily weathered and redeposited soils to the north. The vegetation systems change from the tall karri forests on the slopes of the Porongurup Range to mallee-heath within 10 km to the north.

Approximately 65% of the native vegetation of the area has been cleared for agriculture with cropping/ grazing being the predominant land use, and some viticulture and plantation forestry in the south.

A number of interesting fauna species are found within the Ranges Link area, from Gondwanan relics such as Mygalomorph spiders, land snails and giant earthworms associated with the wet-sclerophyll forests to wheatbelt-associated species such as the rare Western Whipbird and the endangered Carnaby's Black Cockatoo that nests in hollows of large trees such as Wandoo (white gum). The two well known national parks attract high numbers of tourists who enjoy sightseeing and nature-based recreation.



Our groups



The Oyster Harbour Catchment Group (www.ohcg.org.au) was established in 1992 from the former Kalgan Land Conservation District Committee with the aim of improving water quality in the Kalgan River Catchment area, (approximately 3,000 km² or 300,000 ha) spanning the Great Southern and South Coast regions of Western Australia.



The Ranges Link-Stirling to Porongurup group is a subcommittee of the Oyster Harbour Catchment Group. We are all committed and passionate volunteers with many years of landcare/natural resource management experience. We work closely with other farmers and landowners in the area to raise awareness of environmental conservation, as all our on-ground works take place on private property.

Our aim is to continue identifying, protecting and enhancing wildlife corridors between the Stirling Range and the Porongurup National Parks. Native vegetation with high biodiversity values currently exists along waterways and in remnants on private properties (mainly broadacre farms). There are areas under threat from livestock grazing, wind and water erosion, salinity and nutrification. The biodiversity of the plants/animals in some areas is under threat due to isolation. We use our extensive local knowledge and experience to target individual areas at risk and work with the individual landholders to plan and implement on-ground works. To date we have facilitated hundreds of kilometres of stock exclusion fencing to protect native vegetation, and have been involved with the establishment of over 200 ha of native revegetation using seed mixes/seedlings of local provenance. We get together for discussions and decision making at bimonthly meetings.



Photo — Heather Adams

Who we work with

The Ranges Link group owes its success to good community support which is integral to achieving good conservation outcomes across the Stirling to Porongurup landscape. In this regard the most important people that we work with are the landholders, and also enjoy good support from the broader community.

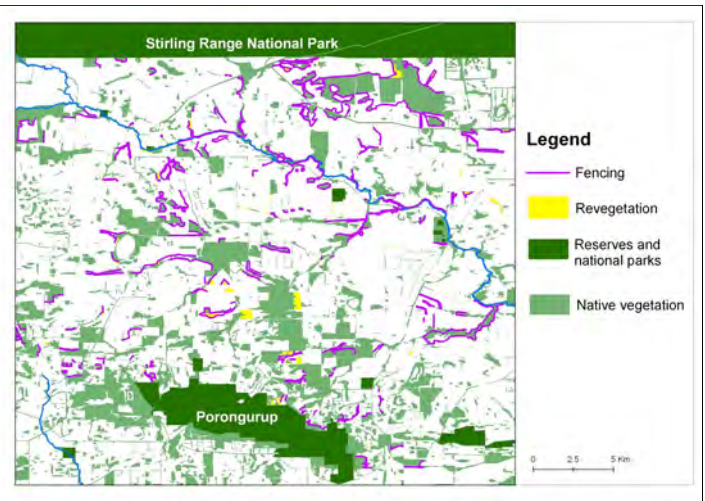
We consult with a range of stakeholders who provide information, guidance, technical expertise, passion, dedication, commitment and the range of skills needed to help us achieve our conservation goals, which includes:

Birds Australia – Contractors - Co-operative Research Centres - Department of Agriculture & Food (WA) - Department of Environment & Conservation - Department of Planning & Infrastructure - Department of Water – Gondwana Link - Greening Australia - Green Skills - Land for Wildlife – Landholders – Nurseries - Seed suppliers - Timber Plantation Companies - Shire of Plantagenet - South Coast Natural Resource Management – Twin Creeks Conservation Reserve – University of Western Australia (Albany Campus).



Photo — Lucia Quearry

A typical day at the 'office' for members of the Ranges Link group.



Map — Amanda Keesing

Some of the group's on-ground achievements (2007 - 2011).

Our conservation vision for the Ranges Link - Stirling to Porongurup

To increase the amount and quality of bushland between the Stirling Range and Porongurup National Parks to enable the area's rich biodiversity to persist across the agricultural landscape into the future.

The Kalgan River is a key biodiversity link across our landscape.



Photo — Mark Waud

How we developed our plan

We used the *Conservation Action Planning** methodology to identify eight key conservation “targets”** as the focus for our protection and restoration efforts. If we improve the viability of each of these targets, we believe we will improve the ecological condition of the entire system. Each target includes “nested” targets (species or communities with similar needs, threats or situation) and has different characteristics or attributes that need to be considered when developing strategies for their protection.

Note: The word **target** in the context of conservation target can be substituted by conservation/biodiversity **asset**.

* Conservation Action Planning (CAP) is a powerful tool to guide conservation teams to develop focused strategies and measures of success. CAP is The Nature Conservancy's (www.nature.org/) version of the Open Standards for the Practice of Conservation (www.conservationmeasures.org/initiatives/standards-for-project-management)



** Focal Conservation Targets – A limited suite of species, communities and ecological systems that are chosen to represent and encompass the full array of biodiversity found in a project area. They are the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness. In theory, conservation of the focal targets will ensure the conservation of all native biodiversity within functional landscapes.

Our key conservation targets with “nested” targets

1) Wandoo Woodland Ecosystem

Black cockatoos, Brush-tailed possum, Mistletoe Bird, Rufous tree Creeper

2) Kalgan River, tributaries and wetlands

Invertebrates (e.g. worms, slaters, spiders, etc.); Purple-crowned lorikeet; Rufous tree Creeper; Porongurups Karri System; Python; Yate (*Eucalyptus occidentalis*) swamps

3) Rock Sheoak

Upland *Eucalyptus cornuta* (yate)

4) *Banksia attenuata* shrubland

Honey possum; Honey eaters

5) Mallee heath

Malleefowl; Kamballup Dryandra; Proteaceous species; Myrtaceous species; Epacridaceous species
Blue Wrens & other small bird species; Ephemeral plant species

6) Jarrah & Marri Woodland

Black Cockatoos; Brush tail possum; Echidna

7) Black Gloved Wallaby

8) Black Cockatoos

Red tailed black; Baudin’s white-tailed black & Carnaby’s white-tailed black cockatoo

Photos — Peter Luscombe



Photos — Lucia Quearry



Viability of conservation targets

This is an estimation of the current condition of the targets and how feasible or easy it will be to improve this condition. During the process of developing this plan viability assessments have been made for the targets, with all targets and the overall biodiversity health of the Stirling to Porongurup landscape having been ranked as “fair”.

A description of our Conservation Targets

Wandoo Woodland Ecosystem

Wandoo woodlands occur on duplex soils of the region and are characterised by a few tree species, most notably Wandoo (also known as white gum, *Eucalyptus wandoo*) with a dominant ground layer of Restionaceae (restios), Liliaceae (lilies), Orchidaceae (orchids), Poaceae (grasses), Asteraceae (daisies) and a scattered shrub understorey of hakeas, acacias & gastrolobiums (poison peas). In healthy wandoo woodlands this variety of trees and shrubs, flowering at different times of the year, provides an almost constant source of nectar for birds such as honeyeaters. Insects that feed in the canopy are eaten by insectivorous birds such as the western yellow robin, golden whistler and the rufous tree creeper. Seeds and fruit of canopy trees are another valuable food source. A number of species such as the endangered Carnaby's cockatoo rely on old trees with hollows for breeding and nesting. In addition phascogales, bats and birds utilise the upper branches and hollows of standing wandoo trees and possums often rest in tree hollows during the day and come out at night to feed on the leaves. Old Wandoo trees with their large branches also provide nesting sites for a range of birds including ducks, owls and eagles. Mistletoe (*Amyema* sp.) is known to be an important element of this system, with a delicately-balanced web of interactions between this parasite, its wandoo host and possums, ants, honeyeaters, mistletoe birds, the Azure butterfly/caterpillar & parasitic wasps.

Wandoo woodlands occur on soils that have a high value for agriculture and as a consequence have been largely cleared. Past clearing has greatly diminished and fragmented the distribution of wandoo, leading to a loss of habitat for wildlife. In addition, selective logging of wandoo in the past, inappropriate fire regimes and agricultural practices have modified stand density and canopy cover, further damaging the associated plant and animal communities. Although clearing has largely ceased, degradation of habitat fragments continues. Many remaining trees are dying while natural regeneration and tree planting efforts are not keeping pace with this loss. Furthermore, competition for sought after hollows (that only start to form when the trees are between 150 and 200 years old) by feral bees and non-native bird species is seriously diminishing the habitat value of existing trees.



Photo — Peter Luscombe



Photo — Stefanie Griebel

Photo — Rolf Scholze



Photo — Heather Adams



Photo — Andy Taylor



Photos — Peter Luscombe



Photo — Harald Hauser

Kalgan River, tributaries and wetlands

The Kalgan River, its tributaries and wetlands, is a large and complex focal target representing a range of nested targets including vegetation types and species. The target is reliant on healthy, functioning aquatic ecosystems, and hydrological balances of the waterways and its associated vegetation communities. It includes the upper Kalgan River and tributaries including the Young River, Boonawarrup Creek, Gaalegup Creek and Stoney Creek and the fresh and saline wetlands of the system. It includes aquatic elements and the riparian fringe. The Kalgan River is the major river system of the Oyster Harbour catchment that terminates in a regionally significant estuary near Albany, over 100 km from its source. The Oyster Harbour and associated tidal wetlands have been recognised as nationally important by the Directory of Important Wetlands. The Kalgan River and associated tributaries and wetlands provide habitats for a large variety of plants and animals, particularly those which are restricted to moist or aquatic environments, and can also be useful as ecological corridors for movement of species between larger patches of bush. Past clearing and conversion to agriculture across the catchment have seen significant changes in the hydrology of the area's wetlands and waterways. This has resulted in a loss of fringing vegetation (& its associated biodiversity), and increases in sediment and nutrient run-off, which has caused problems for the waterways and the Oyster Harbour estuary. Fencing of streams and wetlands from livestock and revegetation of riparian areas can help to improve the condition of this target.

This target includes the outliers of the Porongurup-Karri forest which system follows water courses to the north east of the Porongurup National Park.

Many of the understorey components found in the Porongurup Karri System are at their inland range limits (*Hibbertia serrata* & *Senecio ramossisimus*) as are some species along the small creeks in the forest (*Carex appressa*, *Rorripa dicyosperma* and *Gonocarpus diffusus*). This target also includes the nested target of Flat Topped Yate (*Eucalyptus occidentalis*) and Yate (*Eucalyptus cornuta*) shrubby woodlands, which occur in small pockets on heavy loams, or granite-associated watercourses, usually on the eastern side. There are a range of fish, amphibians, reptiles such as long-necked turtles and crustaceans (e.g. gilgies) in the Kalgan system waterways and wetlands, even in saline water, and although degraded to some extent, with appropriate management the system has the capacity for improving biodiversity, water quality and hydrological flows.

Rock Sheoak

Rock Sheoak (*Allocasuarina huegeliana*) occurs in small pockets on heavy loams or granite-associated ridges and creeklines (often on the eastern side of waterways) and is sometimes associated with Yate (*Eucalyptus cornuta*) and shrubby woodlands. These communities occur on good soils that have largely been cleared for agriculture and are susceptible to the influx of weed species. They are also threatened by climate change (can dry out easily). They contain a number of interesting ephemerals and terrestrial orchids and they provide valuable habitat and food for a number of fauna species. Sheoak trees with their rough bark are important for housing invertebrates.



Photo — Peter Luscombe

Banksia attenuata shrubland

Banksia attenuata - dominated shrubland grows on deep white or grey sands. This biodiverse system includes species such as *Melaleuca thymoides*, *M. striata*, *Calytrix flavescens*, *Banksia nutans* v. *cernuella*, *Jacksonia horrida*, *Adenanthos cuneatus*, *Scaevola striata*, *Anigozanthos rufus* & *Petrophile longifolia*.

Healthy banksia shrubland provides copious amounts of nectar and pollen, an important food source for native birds, mammals and insects throughout the year, but particularly during autumn and winter when other food sources are limited.

These communities were historically small in extent and being easy to clear for agriculture in the past, are now highly fragmented and further reduced in size. In addition they are very susceptible to the plant pathogen *Phytophthora cinnamomi* and to other disturbances such as fire, weeds and fertiliser drift.

Owing to their high value as habitat and a food-rich resource, Banksia shrublands are important for a range of species, even if they are limited in area, and should be a priority for protecting and restoring.



Photo — Peter Luscombe



Photo — Amanda Keesing



Photo — Cas Liber



Photo — Stefanie Griebel

Mallee Heath

Mallee Heath occurs on a range of soil types including clay-loams and duplex soils. There are four or more eucalyptus/mallee systems, all of which are highly diverse.

Overstorey species include *Eucalyptus decipiens*, *E. phaenophilla*, *E. aff. angulosa*, *E. pleurocarpa*, *E. tetraptera*, *E. preissiana*, *E. pachyloma*, *E. falcata*, *E. uncinata*, *E. xanthonea*, *E. macrandra*, *E. talyuberlup* & *E. buprestium*.

This target also includes species-rich low heath particularly proteaceous, myrtaceous and epacridaceous genera and a range of ephemerals.



Photo — Peter Luscombe

Jarrah & Marri Woodland

Jarrah/Marri forest-to-low woodland is found on a range of soil types including granites, laterites and deep sands. The main understorey species are *Banksia gardneri*, *B. grandis*, *Allocasuarina humilis*, *Bossiaea linophylla*, *B. ornata*, *Xanthorrhoea platyphylla*, *Hibbertia sp.*, *Acacia leioderma*, *Acacia browniana v. intermedia*, *Agonis theiformis*, *Taxandria parviceps*, *Myoporum tetrandrum*, *Leucopogon revolutus*, *L. verticillatus* and *Hakea undulata*. Moist pockets contain *Astartea spp.*, *Kunzea recurva*, *Banksia littoralis*, *Melaleuca preissiana*, *Agonis theiformis* and *Taxandria parviceps*. This woodland is susceptible to a range of threats including dieback, rabbits and kangaroos, climate change (e.g. halfway between the Porongurup and the Stirling Ranges this vegetation type is retreating from a drying trend). Jarrah & Marri woodlands offer a diverse range of habitat and food sources for fauna (e.g. Jarrah – red-tailed black cockatoo, Marri – Carnaby's cockatoo). Black cockatoos, brush tail possum and echidna have been listed as nested species for this target.



Photo — Peter Luscombe

Black Gloved Wallaby

A number of the original mammal species have been lost from the Porongurup-Stirling Ranges Link area. Both fragmentation of habitats and introduced predator pressures are likely to be responsible for the decline of the black-gloved wallaby (*Macropus irma*). Local knowledge tells us that wallabies used to occur in large numbers in the area to the north of the Porongurup – but it is believed that hunting pressures up to a few decades ago has diminished the species in this area. In addition stories of large numbers of dingoes prior to the 1960s (where 200 dingoes were reported to be trapped per year in this period along the Gaalgegup creekline north of the Porongurup), indicate the predator pressures that this species has been under in the past. These days, threats to these wallabies include stray dogs that wander about in this area in small packs of 2-3 individuals. As a result wallabies are currently only known from the central and northern part of the Ranges Link. It has been noted that they intermingle with kangaroos and do not venture into paddocks much (will forage up to about 200m from bush) and are dependent on having a healthy understorey cover of native vegetation. This is thought to provide protection from predators.

Little is known about the density of wallabies. It is known that they drink water every day and occur in small family groups of 2-4 individuals.



Photo — Stefanie Griebel

Black Cockatoos

This target includes the three black cockatoo species, the two white-tailed black cockatoos, Carnaby's (*Calyptorhynchus latirostris*) & Baundin's (*Calyptorhynchus baudinii*) and the red-tailed black cockatoo (*Calyptorhynchus magnificus*). All are reliant on old trees (> 150 years) for the provision of hollows in which to nest and rear their young. All three species occur in the Ranges Link (Stirling to Porongurup) area, and owing to the steep climatic and vegetation gradients across the area, two of these species, Baundin's cockatoo and the red-tailed black cockatoo are probably close to the eastern-most extent of their range, both being more of a forest than a woodland species. The Carnaby's cockatoo, however, is more of a woodland/shrubland species, reliant on large trees, in particular Wandoo (*Eucalyptus wandoo*) and sometimes Karri (*Eucalyptus diversicolor*) for the provision of nesting hollows, that during the breeding season should ideally be located within 12 km of its favoured food source - proteaceous-rich shrublands. Owing primarily to this species' requirement for both large old trees (which are at risk of dying or being removed on many farms) and healthy proteaceous rich shrublands (which are at risk from fragmentation, phytophthora dieback etc.) it is perhaps not surprising that Carnaby's cockatoo is listed as an endangered species.



Photo — Susie Luscombe

Threats to our targets

All of the conservation targets suffer from multiple ecological stresses, which together reduce their viability. During the process of developing this conservation action plan critical stresses were initially identified and in a two step process the specific “sources of those stresses” (direct threats) were identified and ranked. Identifying the source of the stress means that strategies are aimed at removing that source, rather than only addressing the symptoms.

Twenty project-specific threats to the conservation targets have been identified with climate change, fragmentation, weeds, phytophthora dieback and wildfire being the highest ranked.

Other threats identified during this process include grazing; past and current clearing (which has severely changed hydrological regimes), prescribed burning, predation by carnivores and some threats specific to Carnaby's cockatoo such as competition for hollows & loss of food resources. Predation by carnivores affects numerous species, including many of the smaller native mammals and birds that pollinate local plants. Fragmentation of the landscape was caused initially by clearing for agriculture but can be made worse through loss of bushland to salinity, excessive fires, road and other development, or continued invasion by weeds.

As bushland becomes more fragmented, native fauna becomes more vulnerable to predation while other ecosystem processes, such as nutrient cycling, water cycling and population dynamics are disrupted. While fires are a part of natural landscapes in Australia, inappropriate fire regimes can destroy some vegetation types completely, particularly when fires are too frequent or too severe to allow seed to set between fires. Many of the protea family are susceptible to fire, but the biggest threat to this family is the spread of *Phytophthora cinnamomi* because it will kill many of the species that are both ecologically important as well as being spectacular and characteristic of the area.

Photo — Linda Morrison



Photo — Peter Luscombe



Photos — Klaus Braun



Photos — Klaus Braun



Photo — Sandra Gillilan



Summary of threats for different targets in the Stirling to Porongurup Landscape

Threats \ Conservation Targets	Wandoo Woodland Ecosystem	Kalgan River, tributaries and wetlands	Rock Sheoak	Banksia attenuata shrubland	Mallee heath	Jarrah & Marri Woodland	Black Gloved Wallaby	Black Cockatoos	Overall Threat Rank
Climate change	High	High	Medium	High	Low	High		Very High	Very High
Fragmentation due to historical clearing	Medium		Low	High	Medium	Medium	High	Very High	High
Weeds	Medium	High	High	High	Low	Medium		Low	High
Phytophthora dieback				High	Medium	High		Medium	High
Wildfire	High	Medium	Low	Medium	Medium	Medium	Medium	Medium	High
Grazing (rabbits, kangaroos, livestock & feral pigs)	Medium	Medium	Medium	High	Low	Medium			Medium
Current Clearing (development, infrastructure, farming)	Medium	Medium		Medium		Medium	High		Medium
Historical clearing causing hydrological change	Medium	High		Medium		Low			Medium
Prescribed burning (current practices)	Low			High	Low	Medium			Medium
Competition for hollows								High	Medium
Loss of food sources within foraging distance of nesting sites								High	Medium
Marri canker						High			Medium
Carnivores (foxes, dogs, cats, pigs, kookaburras)	Low						Medium	Medium	Medium
Barriers (fences and roads)		Medium					Medium		Medium
Current Removal of Paddock Trees	Medium							Medium	Medium
Deaths by vehicles							Medium	Medium	Medium
Accumulation of nutrients						Medium			Low
Loss of mycovores (fungi eaters such as woylies & quenda)	Medium								Low
Illegal culling								Medium	Low
Agricultural impact		Medium							Low
Threat Status for Targets and Project	High	High	Medium	Very High	Medium	High	High	Very High	Very High

Our objectives and strategies

Our conservation goal in the Ranges Link — Stirling to Porongurup area is to enhance the viability of each conservation target, which means we need to improve the condition, the size and/or the processes that maintain these targets and eliminate or reduce the threats to them.

By doing this for our eight conservation targets, we should also improve the ecological health of the rest of the system because many of the processes and threats are common to many components of the ecosystem.

A range of objectives and strategies (shown as bullet points) have been developed to enhance the status of the identified conservation targets as follows (only highest ranked strategies listed here):

Overall enabling strategies for all conservation targets

Objective: Ensure that enabling strategies (in particular for funding & capacity building) for the Ranges Link & Oyster Harbour Catchment groups are scoped and developed by 2012, to ensure the effective implementation of conservation strategies through to 2020 and beyond.

- Develop and implement a long-term funding strategy for conservation interventions in the Ranges Link — Stirling to Porongurup area.
- Increase the capacity of the Ranges Link & Oyster Harbour Catchment Group to plan, implement, monitor and review conservation interventions in the Stirling to Porongurup area.

Objective: 90% of landholders & local authority representatives and 75% of visitors to the Ranges Link (Stirling to Porongurup) area exposed to information on the value of the area's unique biodiversity and opportunities to restore ecologically stronger systems by 2015

- Develop and implement strategy for communicating the value of the biodiversity of the Ranges Link to landholders, local authorities and visitors.

Target: All targets, especially vegetation systems

Objective: To undertake a mapping exercise to produce a new vegetation map for the Stirling to Porongurup Functional Landscape by 2012 that can be used further to refine and measure the extent of target vegetation systems.

- Map areas of different vegetation types from existing aerial photos, vegetation and geological maps and by undertaking field visits to ground truth areas.
- Develop short description of vegetation types of mapped areas and get the areas digitised and onto a GIS system.

Conservation strategies for each conservation target

Wandoo woodland ecosystem

Objective: To improve the condition and connectivity of Wandoo associated vegetation communities in the Stirling to Porongurup Functional Landscape by fencing all remnants and undertaking revegetation and improved management by 2015.

- Continue fencing wandoo woodland
- Continue/expand the wandoo woodland mapping by Ranges Link group
- Implement weed control strategy following wildfires
- Ensure that revegetation efforts include wandoo plantings
- Develop best practise manual for wandoo revegetation, recruitment, weed control

Kalgan River, tributaries and wetlands

Objective: 95% of Kalgan River fenced from livestock by 2012 & 95% of tributaries & wetlands fenced from livestock by 2015

- Buffer creeks with natural vegetation
- Fence off rivers & creeks (and wetlands)
- Maintain weed projects that are currently underway
- Continue with sustainable farming strategy implementation (Oyster Harbour Catchment Group)

Rock sheoak

Objective: To improve the condition and connectivity of Rock Sheoak vegetation in the Stirling to Porongurups Functional Landscape by 2015.

- Continue with mapping exercise to determine key sheoak areas and opportunities for fencing & revegetation
- Fence rock sheoak remnants
- Keep kangaroo & rabbit numbers down, especially following wildfires
- Identify further sites for possible revegetation

Jarrah / marri woodland & Banksia attenuata shrubland

Objective: To improve the condition and connectivity of Jarrah/marri associated vegetation communities in the Stirling to Porongurup Functional Landscape by 2015.

- Fencing (primarily) and revegetation of Jarrah-Marri & Banksia attenuata shrubland
- Implement coordinated rabbit baiting program
- Implement good revegetation practices
- Ensure post fire control of grazers

Mallee heath

Objective: To improve the condition and connectivity of Mallee Heath vegetation in the Stirling to Porongurups Functional Landscape by 2015.

- Fence & control weeds post fire; keep grazers numbers down
- Continuation of revegetation strategy
- Implement training & information sessions with Shire to improve hygiene with day to day activities

Black gloved wallabies

Objective: To improve the habitat and conservation status of black gloved wallabies (and fauna with similar habitat requirements/threats) in the Stirling to Porongurup Functional Landscape by 2015.

- Undertake community survey of black gloved wallaby and other fauna species (in particular quendas [bandicoots])
- Undertake habitat protection (fencing) of good quality bush that has the potential to support black gloved wallabies and create important habitat linkages
- Restoration of key areas of habitat with high linkage value on previously cleared land using high quality revegetation/ restoration practices
- Develop sponsorship for a bounty on shooting foxes & cats
- Develop a larger scale approach to make fox control do-able over regional scales (through NRM groups; Dept. Ag etc.)
- Undertake research on "wallaby friendly" fences/gates; install at appropriate locations
- Engage with Department of Planning and Infrastructure to ensure that the regional planning strategy recognises the need for habitat linkages and that this is taken into account with new subdivisions/ other changes affecting native vegetation

Black cockatoos

Objective: Identify feeding sites and nesting sites by 2013 with the view to improving the habitat and conservation status of black cockatoos in the Stirling to Porongurup Functional Landscape by 2015.

- Identify & protect key nesting sites (trees with hollows within critical distance of key feeding sites);
- Plant food sources in all revegetation
- Implement bee poison control
- Reduce competition for nesting hollows by culling galahs & other predators

Future strategies

This plan will be reviewed regularly as we learn more about the responses of the landscape and ecosystems to our management, and in particular as we become better informed by some of our further surveys and investigations. Future reviews of this plan will likely yield additional strategies. It is hoped that the strategies identified in this plan will go a long way towards abating the critical threats to our conservation targets.



Photo — Peter Luscombe



Photo — Mark Waud



Photo — Lucia Queary



Photo — Klaus Braun



Photo — Tim Mitchell



Photo — Mark Waud

Measuring our success

The fundamental question facing any conservation project team is: “Are the conservation strategies we are using having their intended impact?” To answer this question, we are collecting and planning to collect further data on a number of indicators that gauge how well we are keeping the critical threats in check and, in turn, whether the viability of our conservation targets is improving. To date a monitoring framework has been developed (see below) and the most critical and practical methods to further develop and implement the framework are being investigated.

Ranges Link (Stirling to Porongurup) Monitoring Framework:

Conservation Target	Indicator
Wandoo Woodland Ecosystem	<ul style="list-style-type: none"> • Proximity to other Wandoo woodlands and to other vegetation communities • Suite of fauna • Range of ant activity • Understorey & recruitment • Tree crown cover • Total area of (healthy) target vegetation (hectares)
Kalgan River, tributaries and wetlands	<ul style="list-style-type: none"> • Percentage of catchment with perennial vegetation cover • Pools affected by sedimentation • Foreshore assessment • Physical, chemical and biological Ausrivas indices
Rock Sheoak	<ul style="list-style-type: none"> • Species richness and composition • Presence of fertile trees and recruitment • Total area of (healthy) target vegetation (hectares)
Banksia attenuata shrubland	<ul style="list-style-type: none"> • Fire age mosaic • Seed set • Vegetation assessment
Mallee heath	<ul style="list-style-type: none"> • Presence of proteaceous obligate seeders • Total area of (healthy) target vegetation (hectares)
Jarraah & Marri Woodland	<ul style="list-style-type: none"> • Complete range of age classes of woodland species across the area • Tree crown cover • Total area of (healthy) target vegetation (hectares)
Black Gloved Wallaby	<ul style="list-style-type: none"> • Importance of movement and the effect of fences • Number/ percentage of potential suitable habitat occupied
Black Cockatoos	<ul style="list-style-type: none"> • Discrete populations within critical range • Extent and location of proteaceous rich shrublands • Availability of hollows for breeding and nearby food sources

Photo — CENRM



Photo — Lucia Quearry

Map — Amanda Keesing



Photo — Judy Hunt



Photo — Lucia Quearry



Photo — Sandra Gillian

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How can you get involved?

Please contact the Oyster Harbour Catchment Group at www.ohcg.org.au or Gondwana Link at www.gondwanalink.org

This plan is under ongoing review. To view the more detailed, most recent version of the Conservation Action Plan, please see: <http://conpro.tnc.org/1722/>

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Photo — Lucia Quearry

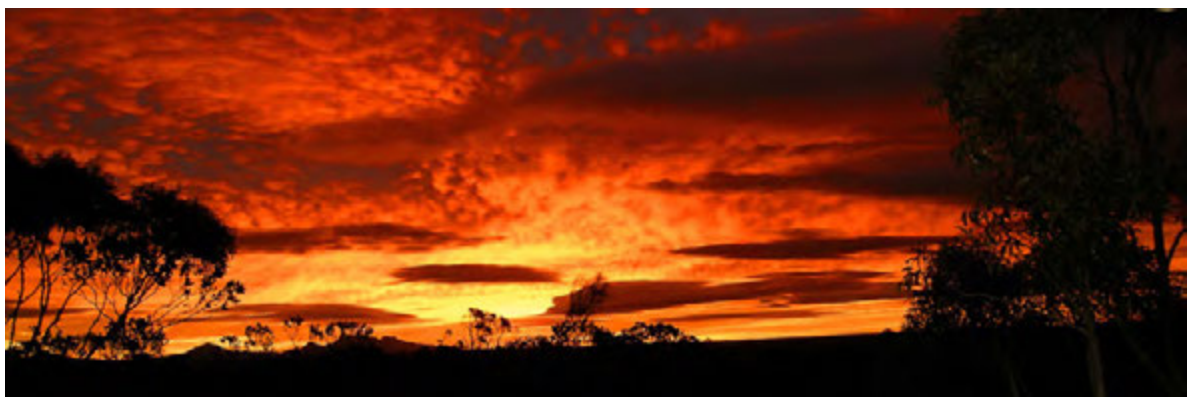


Photo — Peter Luscombe

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