



Fitz-Stirling Conservation Action Plan



View of the Stirling Range from the centre of the Fitz-Stirling area.

Gondwana Link stretches across 1000 km of south western Australia, from the tall wet forests of the SW corner to in semi-arid woodlands towards inland Australia.



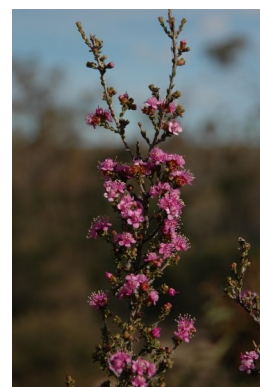
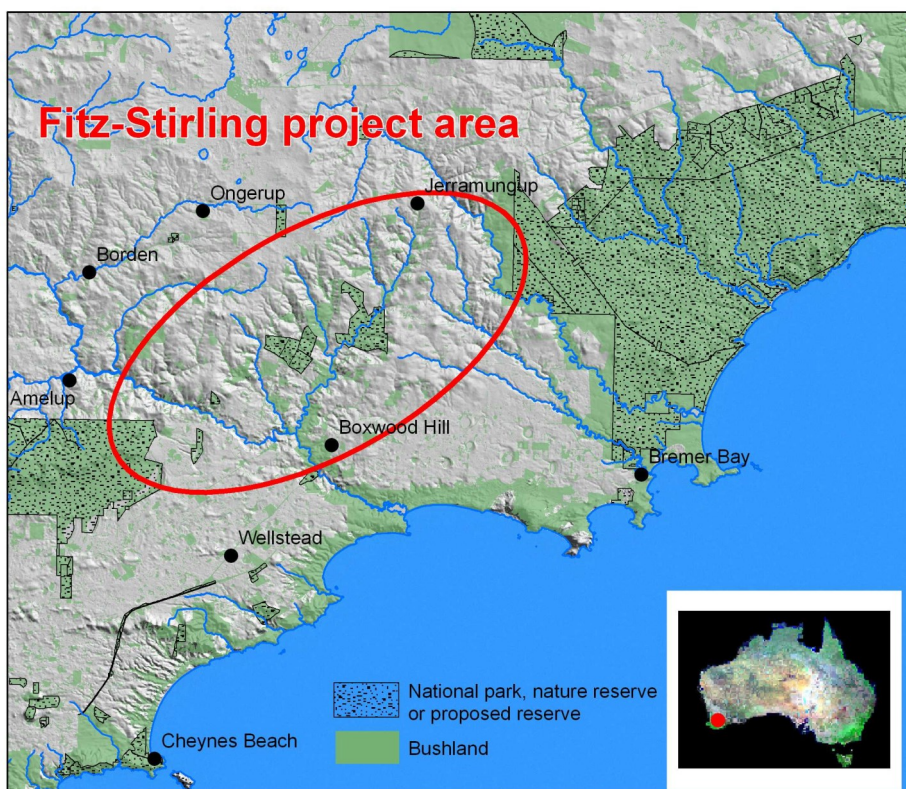
The Fitz-Stirling section of Gondwana Link between the Stirling Range and the Fitzgerald River National Parks.

Gondwana Link is the largest and most ambitious ecological program 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.

A key focus area is between the Fitzgerald River and the Stirling Range National Parks, or what we call the Fitz-Stirling area. The biological richness of the parks is well known; 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. More than 1800 plant taxa have been recorded from the Fitzgerald River National Park, including 62 endemic to the park and another 48 endemic to the park and nearby areas. Equally remarkable is that these two parks only have about 40% of their species in common despite being only 70 km apart. It is not surprising therefore that the Fitz-Stirling section is so rich in diversity and endemism.

What's at stake

The Fitz-Stirling section covers more than 250,000ha and has lost about two thirds of its native vegetation cover. It extends from the ancient Archaean Yilgarn granites, across the sedimentary Eocene deposits (the Pallinup siltstones which form the spectacular breakaways so characteristic of this landscape), and includes parts of the Pallinup, Bremer and Gairdner river systems. The vegetation includes yate woodlands, mallee heaths and stands of moort, including some that only occur in restricted distributions within this area. The Fitz-Stirling is home to many species of wildlife including tammar, black-gloved wallabies, echidnas and western whipbirds. Twelve species of mammal, seven species of bird and one reptile that occur here are considered threatened at a state and/or national level. Many of the flora species and communities are found nowhere else, and are very restricted in their extent even within the Fitz-Stirling area.



Our conservation vision

The long term vision for the Fitz-Stirling area is the conservation of an ecologically resilient area where wildlife flourishes alongside a vibrant human community. Connectivity will be restored across the landscape, greatly increasing the chances of species and genes adapting to both long and short-term disturbances, including climate change. Essential landscape processes, such as water, sediment and nutrient cycles, predator-prey relationships and population dynamics, will support healthy natural systems and human environments. Land uses and practices will support the continued evolution of natural systems.





Creek



Yate woodland



Proteaceous rich communities



Black-gloved wallaby



Mallet woodland



Freshwater pool

What we want to conserve

We used The Nature Conservancy's "Conservation Action Planning" process (<http://www.conservationgateway.org/ConservationPlanning/ActionPlanning/Pages/conservation-action-plann.aspx>) to identify six key ecological 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.

Since the original plan was developed, targets, their viability ratings and the threats have been re-assessed as our knowledge has improved. The objectives and strategies are also regularly reviewed.

Conservation Targets with nested targets

CREEK SYSTEMS

- Water rat
- Freshwater crustaceans and other aquatic invertebrates
- Long-necked turtle
- Frogs
- Permanent pools

FLAT-TOPPED YATE (OR SWAMP YATE) WOODLANDS

- Upland Yate woodlands
- Swamp Yate woodlands
- Valley and riparian woodlands

OBLIGATE SEEDING PROTEACEOUS-DOMINATED SHRUBLAND

- Chittick community
- Western Whipbird
- Honey Possum
- Western Mouse
- Carnaby's Cockatoo
- Pollinators

TAMMAR AND BLACK-GLOVED WALLABIES

- Tammar
- Black-gloved Wallaby
- Brush-tailed Possum
- Woylie

MALLET AND MOORT WOODLANDS

- Rock Sheoak
- Corackerup Moort
- Chillinup Mallet
- Red-tailed Phascogale

FRESHWATER SYSTEMS

- Frogs
- Seed eating birds
- Freshwater crustaceans and other aquatic invertebrates

The Conservation Targets

Creek systems

Creeks within the Fitz Stirling area flow into the Pallinup, Bremer or Gairdner Rivers. They are important natural corridors for fauna movement and have distinctive communities that are not found elsewhere within the landscape. The permanent river pools provide habitat for fish, invertebrates and aquatic plants, and function as refugia for many species during dry seasons. While the main river systems have in some cases been badly degraded, some of the tributaries including parts of Corackerup, Chereninup and Peniup Creeks, still contain pools that support native fish species, water rats and long necked turtles. Extensive clearing in the catchments has disrupted the water and nutrient cycles however, and many pools have already been completely inundated by sediment.



Flat topped Yate woodlands



Flat-topped Yates (*Eucalyptus occidentalis*), also known as Swamp Yates, are the most common large tree in the Fitz Stirling area and one of the few species that provides hollows for native animals such as possums, bats, cockatoos and owls. Flat-topped Yates can occur in three very different parts of the landscape: along creek lines, in and around wetlands (swamps), and in the upland granite country. Within each of those situations, they are associated with a different suite of understorey and ground cover species. About half of all the original Flat-topped Yate woodlands have been cleared, with the upland Yate woodlands suffering even more extensive clearing. The remaining yate woodlands are suffering severe degradation from a combination of stresses including rising saline water tables, fire, waterlogging, insect attack, weed invasion and possibly some other causes that have not yet been identified.

Obligate Seeding Proteaceous-dominated shrubland

These communities are rich in plants from the Proteaceae family, such as Adenanthos, Banksia, Conospermum, Dryandra, Grevillea, Hakea, Isopogon, Lambertia, Persoonia, Petrophile, Stirlingia, Synaphea and Xylomelum. These remarkable communities are extremely diverse and contain many endemic and threatened species that have evolved over millions of years to thrive in the nutrient-poor sands and gravelly sands of this region. Their nectar and pollen production provides an important food source throughout the year, and particularly during summer and autumn, for native birds, mammals and insects. These communities were amongst the most easily cleared during agricultural development and subsequently very little remains—perhaps as little as 16% of the original extent. They are very susceptible to the plant pathogen *Phytophthora cinnamomi* and to other disturbance factors such as fire, weeds, fertiliser drift and sand and gravel extraction.



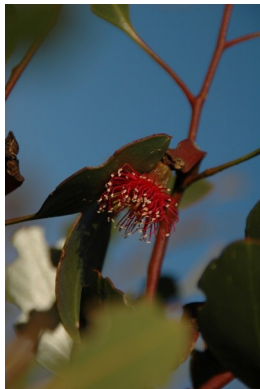
The Conservation Targets (continued)

Tammar and Black-gloved wallabies

Both the Tammar Wallaby (*Macropus eugenii*) and the Black-gloved Wallaby (*M. irma*; also known as the Brush Wallaby or Western Brush Wallaby) were abundant and widespread within the Fitz-Stirling area until relatively recently. Both are dependent on suitable habitat (low dense vegetation for shelter and more open areas for foraging) and freedom from introduced predators such as foxes. By including the wallaby species as a target and addressing the stresses that are limiting their populations, we will also see benefits to other “critical weight range” species (ie those weighing 35g-5500g) such as the common brush-tailed possum (*Trichosurus vulpecula*) and, in time, perhaps be able to reintroduce threatened species such as the Dibbler (*Parantechinus apicalis*) and Woylie (*Bettongia penicillata*)..



Mallet and moort woodlands



These are terms used to describe certain Eucalypts that don't produce a lignotuber, the woody structure at the base of the stems that allows vegetative recovery after fires. They are also distinct from the mallees (multi-stemmed Eucalypts) in being single stemmed. Moorts tend to grow in more or less pure and often dense stands of presumably similar age. Moort species include *Eucalyptus platypus* subsp *platypus*, *E. platypus* subsp *congregata*, *E. nutans* and *E. vesiculosa* (the locally endemic Corackerup Moort), and have rounded leaves, strap-like down-turned flower stems or peduncles, and spreading branches. Mallets are slender trunked with steeply angled branches, with the main species in the Fitz-Stirling being *E. astringens* and the locally endemic Chillinup Mallet (*E. melanophitra*). These woodlands were included as a target because of their localised occurrence and their specific fire dependencies.

Freshwater systems

The Fitz-Stirling area appears to have significant numbers of widespread small occurrences of freshwater in the past. These occurred either adjacent to creeks, in granite systems or in clay pans and most seem to have been lost due to clearing and subsequent land uses. These freshwater sites are believed to play a critical role in the survival of many species, including some dragon flies, mammals, frogs and seed-eating birds and could be expected to also support any species that are sensitive to salinity. While some of those species could now be supported by artificial sources (dams, road drains), it is believed that the loss of the naturally occurring systems may be associated with the loss of some frog species. The aquatic plants and invertebrates that may be associated with the freshwater systems are not well known and further survey work is planned to help us to understand these systems better.



Identifying stresses and their sources

All of the conservation targets suffer from multiple ecological stresses, which together reduce their viability. Our process identified these critical stresses, then drilled deeper to determine the sources of those stresses. Strategies are aimed at removing those sources, rather than only addressing the symptoms.

We ranked the main sources of stress for each conservation target in the Fitz-Stirling area and the highest ranking sources include:

1. *Fragmentation*
2. *Predation by feral species*
3. *Climate change*
4. *Inappropriate land uses & management, including fire*
5. *Phytophthora cinnamomi dieback and other pathogens*

Fragmentation of the landscape was caused initially by clearing for agriculture, but can be made worse through loss of bushland to salinity, excessive fires, roads and other infrastructure, or continued invasion by weeds. As bushland becomes more fragmented, its resilience to climate change is reduced, native fauna become more vulnerable to predation while other ecosystem processes, such as nutrient cycling, water cycling and population dynamics are disrupted. Inappropriate land management such as overstocking and poor soil management adds to fragmentation by removing native plant cover which in turn increases erosion, sedimentation of the creeks and weed invasion.

Other stress sources include invasive weed species and disruptions to the water cycle. All have direct impacts on the terrestrial and aquatic ecosystems within the Fitz-Stirling area.

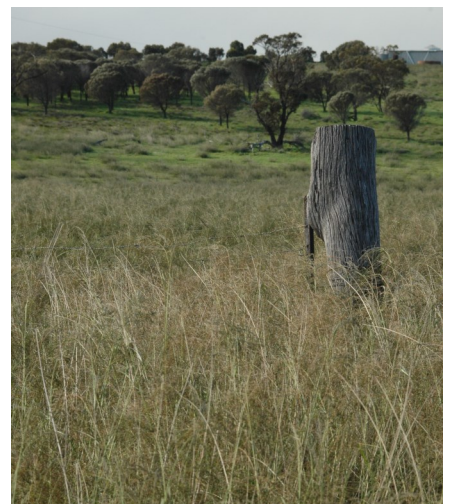
Part of our analysis identifies where the stresses are most severe and where action is therefore most urgently required.



Sand slug from erosion higher in the catchment begins to fill a creek pool.



Phytophthora cinnamomi kills many of the plants found in the Fitz-Stirling, especially the proteaceous plants.



Love grass, a weed originating in South Africa, has the potential to dominate much of the Fitz-Stirling landscape.

Our goals and objectives

Conservation Objectives

By protecting targets and reducing threats in the Fitz-Stirling area, we will be able to achieve the vision for this part of Gondwana Link. To focus our work further, we identified five objectives.

For each objective, one or more Strategies have been developed and will be implemented as resources become available. Most will require collaboration between two or more organisations or individual land managers.



CONSERVATION OBJECTIVES FOR THE FITZ-STIRLING AREA

RESTORATION

By 2018, restore at least 12,000ha of native vegetation, including at least 2000ha of proteaceous-rich communities that support native insect, bird and other vertebrate pollinators.

CONSERVATION MANAGEMENT

By 2015, exclude stock grazing and manage foxes, other feral predators, plant pathogens (including *Phytophthora cinnamomi*), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.

WATERWAYS

By 2015, significantly improve the condition of at least 60% of the creeks within the Corackerup catchment and, by 2020, within the Monjebup and Mid-Pallinup catchments.

WILDLIFE

By 2020, increase the populations of Tammar and Black-gloved wallabies within the Fitz-Stirling area by at least 30%*.

(* The baseline level is still unclear, so this objective may be revised again. The important aim is to gain a measurable increase in populations.)

IMPLEMENTATION

By mid 2011, have a clear implementation model developed to clarify roles and support improved integration in the Fitz-Stirling area.

Our strategies

Implementation & coordination strategies

Collaboration and cooperation between several groups and with land managers across the Fitz-Stirling area is needed to achieve the degree of change required. For other strategies to be effective, this requires plans to be regularly updated and for everyone involved to be clear about their roles. Priority areas for implementation need to be defined for all strategies in a dynamic plan that also allows new opportunities to be taken.

- ***Develop a spatially explicit landscape plan which identifies key areas for implementation of all strategies***
- ***Revise and get endorsement for a protocol/MOU between groups on implementation of Fitz-Stirling strategies***

Restoration strategies

The primary aim of re-establishing connectivity means that restoring native vegetation in priority areas is a critical strategy. The target ecological systems (yate, mallet and moort woodlands and proteaceous-rich communities) are priorities for expansion through the restoration work. The viability of other targets, such as the wallabies, will be improved by the inclusion of dense thickets for cover and by planting species such as *Gastrolobium* that are poisonous to introduced predators. Restoration at large scales can be expensive and difficult, but great advances have already been made by people applying scientific understanding with practical experience and adapting to the local needs. To ensure that restoration is aimed at the best conservation outcomes, standards have been developed.

- ***Develop restoration standards and protocols for implementation of restoration under the Gondwana Link badge***
- ***Develop and implement a restoration plan for Fitz-Stirling***



Conservation management strategies

Some properties have been purchased by groups and individuals who share the Gondwana Link vision. On most there has been some restoration of habitats but they also require further work to manage threats such as invasive weeds, plant diseases, feral animals and fire. Management of these threats will be most effective if they are undertaken across the landscape in collaboration with other land managers, rather than just on individual properties.

Strategies for wildlife and waterways will also be most effective if applied collaboratively across the landscape.

- ***Demonstrate effective conservation practices in the Fitz-Stirling area through the management of properties owned by Gondwana Link member groups and supporters***
- ***Develop and implement ecologically-informed fire management across Fitz-Stirling.***
- ***Manage *Phytophthora cinnamomi*, grazing and priority invasive weeds in extant native vegetation and restored habitat***



Wildlife strategies

Restoring appropriate types of native vegetation in the right places and in sufficient amounts is one of several strategies needed for the re-establishment of viable populations of native animals across the Fitz-Stirling area. Introduced predators, including foxes and cats, need to be managed and we need to get a better understanding of other requirements and threats to a range of species and fauna communities.

- ***Manage feral animals across extant vegetation and restored habitat***
- ***Improve our understanding of habitat requirements and population drivers***



Waterways strategies

The spatial landscape plan will identify the main areas that are contributing sediment and nutrients into the creek systems. Where these occur on properties owned by the Gondwana Link partners, property plans will identify works, including revegetation and earthworks, to reduce the erosion. Where the sources of sediments and nutrients are identified as coming from other land, the Gondwana Link partners will work wherever possible with those landowners and other organisations to develop solutions.

- ***Reduce sediment and nutrient loads into creeks by rehabilitating erosion prone surfaces***



Additional Strategies

This plan will be reviewed regularly as we learn more about the responses of the landscape and ecosystems to our management. With additional participating groups and individuals there may also be opportunities to expand the range of strategies to improve the conservation outcomes and to enhance the other important component of the landscape—the area's human residents and visitors. **The area is of great cultural importance to Noongars, and supporting their continued presence in and stewardship of this land is essential to Gondwana Link.**



Measuring our success

Measures and Monitoring

The fundamental question facing any team is: “Are our strategies working?” To answer this question, data is being collected on a number of indicators that gauge how well the critical threats are being managed and, in turn, whether the viability of our conservation targets is improving. A monitoring framework for the viability of targets has been developed and is now being implemented on Bush Heritage Australia's properties. The framework is periodically reviewed and modified to make sure it can inform management decisions.



Ecologists from Bush Heritage Australia and the Centre for Excellence in Natural Resource Management (CENRM) monitor fauna in pools.

VIABILITY MONITORING	
Landscape Context	INDICATORS
Creeks	Percentage of catchment under perennial vegetation
Proteaceous-rich communities Mallet and moort woodlands	Distribution of fire age classes
Freshwater systems	Distribution in the landscape
Condition	
Creeks	<ul style="list-style-type: none"> • Permanent pools affected by sedimentation • Riparian zone condition • Water quality
Proteaceous-rich communities	<ul style="list-style-type: none"> • Community condition (structure, floristics) • Presence of bird pollinators
Mallet and moort woodlands	Community condition
Yate woodlands	<ul style="list-style-type: none"> • Age classes present • Species richness • Crown condition
Size	
Proteaceous-rich communities Mallet and moort woodlands Yate woodlands	Percentage of original extent remaining or restored
Tammars and Black-gloved wallabies	Habitat occupancy
Freshwater systems	Populations of nested target species
THREAT MONITORING	
Proteaceous-rich communities Tammars and Black-gloved wallabies Mallet and moort woodlands	Fire return interval
Creeks	Erosion and sand slugs
Proteaceous-rich communities Mallet and moort woodlands Yate woodlands	Invasive species (weeds) and pathogens

FURTHER INFORMATION ON THE PROCESS

Viability Assessment of Conservation Targets in the Fitz-Stirling Area

For each target, we identified a number of 'ecological attributes' each of which related to either the Landscape Context, Condition or Size of the target. We then defined indicators for each attribute and ranked the current status of each of these. These ratings are periodically reviewed. (The rating levels roughly equate to: Poor = Imminent loss of the target; Fair = The target is vulnerable to serious degradation; Good = Minimal integrity, and the target may require some intervention if it is to be maintained in the longer term; and Very Good = Optimal integrity, with the target functioning at an ecologically desirable status with little human intervention required.)

	Landscape Context	Condition	Size	Viability Rank
Creeks	Fair	Fair	-	Fair
Proteaceous rich communities	Fair	Good	Fair	Fair
Tammars and Black-gloved Wallabies	-	-	Fair	Fair
Mallet and moort woodlands	Fair	Good	Good	Good
Flat-topped Yate woodlands	-	Fair	Good	Good
Fresh Water Occurrences	Fair	Fair	Fair	Fair

Summary of the main sources of stress, Fitz-Stirling Area

Stress sources across targets	Creeks	Proteaceous rich communities	Tammars and Black gloved wallabies	Mallet and moort woodlands	Yate woodlands	Freshwater systems	Overall stress source rank
Climate change	Medium	Very High	?	High	High	Medium	High
Predation by feral species		Low	Very High	-	-	Low	High
Fragmentation	Medium	High	High	Low	High	Medium	High
P.cinnamoni and other pathogens		Very High				Medium	High
Inappropriate fire management	Low	High	High	High	Medium		High
Cropping practices	Low	Medium		Medium	Low	Medium	Medium
Invasive Non-Native/ Alien Species	Medium	Medium			High	Low	Medium
Grazing practices	Low	Medium		Low	Medium	Medium	Medium
Hydrological imbalance	Medium				High	Medium	Medium
Summary threat status	High	Medium	Very High	Low	Low	High	High

Progress made (to June 2013)

Objective	Strategy	Progress	Scorecard
Implementation	Develop spatial plan	Version 1 produced 2012	Green
	Develop and apply agreement on implementation	Priority for completion in 2013	Red
Restoration	Restoration standards	Version 1 developed 2010, and reviewed by expert group 2011	Green
	Restoration plan	Priority areas identified 2012	Green
	Restoration—implementation	2,400ha completed; 1000ha planned or in progress. Slower than anticipated, but wild-life recolonising faster than expected.	Yellow
Conservation management	Management of properties by Gondwana Link member groups and supporters	Bush Heritage properties all have management plans linked to FLP and being managed for most, if not all, threats. Private conservation properties mostly have plans and active management. Other properties need additional effort.	Yellow
	Fire management	No landscape scale fire management plan as yet.	Yellow
	Phytophthora cinnamomi management	Some property assessment as part of South Coast NRM Project Dieback in cooperation with Bush Heritage Australia. Property plans and action still needed.	Yellow
	Invasive weeds controlled	Good property-based control of Love Grass but it remains a regional concern. Tagasaste a problem on one property but not regionally	Yellow
Conservation management, Wildlife	Integrated feral animal control program	Pilot project being conducted on Chereninup by Bush Heritage. Wider application will depend on analysis of results and further funding	Yellow
	Improve our understanding of habitat requirements and population drivers	Initial donor-funded research project on wallabies greatly improved records of occurrences, distribution and current habitat preferences. Additional work will depend on partnerships with research institutes	Green
Waterways	Reduce nutrient and sediment loads	Initial restoration of Peniup/Beringa property reduced erosion and sediment fill in Hegarty Creek (Corackerup system). Headwaters of Monjebup Creek better protected through Monjebup, Monjebup North and Yarraweyah Falls reserves.	Green

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