A compendium of existing and planned Australian wildlife corridor projects and initiatives, and case study analysis of operational experience.

A report for the Australian Government Department of Sustainability, Environment, Water, Population and Communities

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Art Langston (CSIRO Ecosystem Sciences) provided spatial analysis and specialist input to linking ecological and social data sets. Art has extensive skills in assembling and analysing descriptive data sets of the type required to assess ecological and landuse characteristics across spatial scales within conservation initiatives.

Important Disclaimer

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Initiative	***Author (institution)***
Great Eastern Ranges Initiative	Rob Dunn (GER Director), Gary Howling (NSW office of Environment and Heritage) and David Freudenberger (Greening Australia)
Great Eastern Ranges - Slopes to Summit focus area	Sam Niedra (Nature Conservation Trust of NSW, S2S coordinator), Veronica Doerr and Erik Doerr (CSIRO)
Gondwana Link	Paula Deegan (Gondwana Link), David Freudenberger (Greening Australia), and Keith Bradby (Gondwana Link Director)
East meets West NatureLink	Carina Wyborn (ANU), Emma Coates (SE DNER), David Freudenberger (Greening Australia)
Wild Eyre component of East meets West Naturelink	Carina Wyborn (ANU), Emma Coates (SE DNER), David Freudenberger (Greening Australia)
Habitat 141º/ 'Outback to Ocean'	Ben Carr (Greening Australia), Carina Wyborn (ANU)
Bunya Biolink component of Birdsville to Hervey Bay	David Freudenberger (Greening Australia)
Tasmanian Midlandscapes	Stuart Cowell, Andrew Cameron (Tasmanian Land Conservancy
Kimberley to Cape	NAILSMA, ILC, and TNC who are partners in the initiative.

Others have commented on compendium entries, reviewed or otherwise input into the report including the DSEWPaC project team, Simon Ferrier (CSIRO), Andrew Bridges (NT DNREAS), Andrew Willson (SA DENR), Robert Taylor (Office of Environment and Heritage NSW), Jody Gates (SA DENR), Doug Human (Australian Bush Heritage), and Sarah Legge (Australian Wildlife Conservancy).

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Executive Summary

The objectives of this report were to:

1. Compile a descriptive compendium of existing and planned wildlife corridor initiatives
2. Analyse the operational experiences of corridor initiatives, particularly their governance arrangements, on-ground achievements and planning processes that account for climate change impacts and adaptation.

Operational Definition

'Corridor' and 'connectivity conservation' are used in multiple ways across multiple scales. In this report the term 'corridor' or 'large-scale corridor' is being used as defined for *evolutionary connectivity* (Worboys *et al.*, 2010a). Evolutionary connectivity requires habitat and connectivity on a scale sufficient to permit gene exchange and range expansion, and *inclusive* of scales necessary to support trophic relationships, disturbance processes and hydro-ecological flows. Our resultant working definition of Australian wildlife corridor initiatives is:

1. *Scale:* sufficient to deliver evolutionary connectivity across multiple ecological communities, and in most cases, consideration of opportunities to manage climate connectivity
2. *Scope – jurisdictional and tenure:* typically achieving evolutionary connectivity will involve multiple jurisdictions at the local, natural resource management region, state and occasionally national or continental level
3. *Scope – partnerships:* effective connectivity management will require collaborations across multiple forms of tenure including public, private, Indigenous and other tenure arrangements. Effective collaborations are likely to involve organisations that can best engage and leverage values across these tenures including governments, regional NRM groups, non-government organisations (NGOs), businesses and others (such as statutory authorities)
4. *Institutional development:* our emphasis will be on those corridor initiatives that have been formally identified and which are moving towards a formalised structure (though not necessarily with formalised governance or widespread implementation).

Compendium of corridor initiatives

We identify eight 'corridor' or 'connectivity conservation' initiatives underway in Australia that meet our working definition. EcoFire does not necessarily meet our multi-jurisdictional criteria, but it is included due to its large spatial extent across (>5 M ha) and multiple partnerships. Midlandscapes is relatively small in geographic space but links Tasmania's major contiguous protected areas. Several further initiatives are also identified that meet some aspects of our working definition.

Corridor and connectivity conservation initiatives identified

Program	Scale	Location
1. Great Eastern Ranges initiative*	Continental	Victoria, NSW, ACT, Queensland
2. Gondwana Link*	Regional	Western Australia
3. Habitat 141º / 'Outback to Ocean'*	Regional	Victoria, South Australia
4. Trans-Australia Eco-Link Corridor	Continental	South Australia, Northern Territory
5. NatureLinks*	Regional	South Australia
6. Birdsville to Hervey Bay	Regional	Queensland
7. Tasmanian Midlandscapes*	Regional	Tasmania
8. Kimberley to Cape Climate Change Corridor*	Continental	Queensland, Northern Territory and Western Australia
9. Ecofire	Regional (>5 M ha)	Western Australia

* A more detailed case study has been undertaken focusing on the initiative or component which is presented in the Appendix.

Key conclusions from Australian wildlife corridors operational experience

Nine case studies across different elements of seven corridors were compiled for this project as set out below. A more detailed summary of each case study is provided in the Appendices. The case studies also include a wide range of stakeholder organisations, and differing development histories. The variation is a result of the differences in context, history, organisational involvement, and the nature of institutional and government support in the development of each initiative.

Case Studies contributing to this report
Great Eastern Ranges (GER)
Slopes to Summit (a focus region in GER)
Habitat 141º
Gondwana Link
East meets West Naturelink (SA)
Wild Eyre (a focus region in East meets West Naturelink)
Midlandscapes project (Tasmania)
Bunya Biolink (component of Birdsville to Bay)
Kimberley to Cape Climate Change Corridor

The key messages that we draw from the case studies are:

1. Diversity

We found a striking diversity across organisational structure, governance, objectives and processes. Connectivity conservation is now well recognised in Australia. The National Wildlife Corridor Plan (NWCP) does not need to 'seed' the concept, but rather support the many years of planning, promotion and implementation that have gone into many of the described initiatives.

2. Leadership and vision

The common thread across all the corridor initiatives is *building leadership* (rather than management) and coordination across the finer scales of conservation plans, projects and stakeholders. There is a motivating and compelling vision articulated by the initiative supporters to create a 'whole that is greater than the sums of the parts'.

3. Science

Australian science is an early leader in the study of landscape-scale fragmentation and the need for various forms of connectivity conservation but ecological understanding of patterns and processes at the scale of the Great Eastern Ranges or Gondwana Link is poorly understood. We are unaware of any ecological modelling or comprehensive spatial analysis at this 'mega' corridor scale. There is clearly a need for research to contribute to a continuous improvement in whole-of-initiative planning, coordinated implementation and evaluation of strategies and outcomes.

4. Governance

Governance and institutional arrangement for such cross-jurisdictional corridor initiatives will always be a challenge because there is such a diversity of tenures, partners and stakeholders. The collective experience suggests arrangements need to be:

- ***Evolutionary***: initiatives often start small and evolve into effective organisations across their eventual scale and range of programs over many years
- ***Coordination oriented***: linking stakeholders to create a 'whole greater than it's parts'
- Flexible in their ***formalisation***: informal coordination tends towards institutionalised structures through time
- Flexible in accommodating ***Diversity***: which is evident at all scales in approaches to conservation and programs
- ***Participatory in their planning processes***: to develop cohesion across these spatially extensive initiatives
- Partnership oriented: which offers a ***low cost operating model*** as it leverages in-kind (pro bono) time and expertise
- Support mixed implementation approaches: ***project based implementation*** is commonly managed by a diversity of initiative partners rather than by the overarching initiative.

Corridor initiatives are unlikely to need large, separate bureaucracies. All are partnerships involving organisations with mature systems and processes to manage and account for large financial investments.

5. Mechanisms

Initiatives tend to follow a boundary institution model brokering resources and mechanisms through partners and other organisations where possible. A diverse set of instruments is applied by partners (and occasionally initiatives themselves) including information, engagement, incentives, conservation covenants and other approaches.

6. Funding

Financial security remains a challenge in delivering lasting management change and connectivity conservation outcomes. There appears to be some need for government support via information and expertise that is difficult to gather or interpret at the individual corridor level; and potentially via support of the governance and basic operations of the initiatives themselves.

Synthesis into DPSIR framework

The Driving-forces, Pressure, State, Impact, Response (DPSIR) Framework is a conceptual construct for describing the causal interactions between society and the environment. The initiatives in this compendium can be seen as large scale Responses to the Pressures and Impacts on the State of the environment at the scale of multiple NRM regions. Initiatives have planned strategies (Responses) such as revegetation in prioritised areas, control of grazing in remnant vegetation, as well as integrated pest control. Many of the reviewed corridor projects also identified policy measures (Responses) such as the development of markets for ecosystem services (for example carbon bio-sequestration) that could help fund conservation activities, or landuse protection or re-zoning. Several initiatives identify the importance of identifying new and more sustainable income generating activities, particularly in the context of maintaining cultural connection and values on country.

We suggest that a broad application of the DSPIR framework, or an equivalent such as Conservation Action Planning, is needed as part of the initial planning process for each and every large scale corridor initiative. Our review of each initiative indicates that Drivers, States, Pressures, Impacts and

effective Responses differ from project to project. To date, most of the initiatives, at the scale of zones and projects have utilised participatory processes, including input of scientific expertise to the application of a generic planning process such as DSPIR. However, the rigour in analysis of likely causal relationships is limited to date.

Conclusions from Australian wildlife corridors operational experience

Large scale and well coordinated on-ground conservation and restoration are needed to address the large scale threats affecting Australia's natural and cultural history. Rapid climate change is simply one pervasive pressure in addition to invasive species and over a century of land use intensification. These corridor initiatives recognise, mostly implicitly, that much greater financial resources and human energy is needed than has been invested to date in reducing these continental scale pressures. One of the challenges for the Australian Government is to create the enabling conditions needed to attract far greater investment in time, talent and financial capital to match the scale of need and ambition. The enabling condition that is already in place is the desire to act ambitiously. That is the core result of this compendium.

1. INTRODUCTION

1.1 Terms of reference

The Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) is preparing a set of information to support the development of the NWCP. The NWCP is intended to support a more strategic, landscape-scale approach to managing biodiversity. The landscape-scale focus requires the consideration of a mix of land-uses, stakeholders, and management practices to deliver the desired critical linkages to allow species movements and protect biodiversity in a changing climate.

DSEWPaC is requesting two linked tasks be undertaken within this compendium and case study review:

1. Compilation of a compendium of existing and planned wildlife corridor projects and initiatives which sets out (for each corridor):
    - The underlying context in each case inclusive of the ecological land use characteristics of the corridor region and the threatening processes or factors driving the need for a corridor
    - The objectives of the corridor initiative (inclusive of changes through time)
    - The biophysical design principles underpinning corridor design and any implementation evidence including consistency with Mackey *et al.* (2010) and other best science available (for example Doerr *et al.* 2010, 2011; Gilbert-Norton *et al.* 2010; Crooks and Sanjayan 2006; and Hilty *et al.* 2006)
    - The resultant planned physical characteristics of the corridor.
2. Analysis of operational experience with existing and planned Australian wildlife corridor projects and initiatives for a subset of more advanced case study corridor projects. Case studies will cover:
    - Governance and institutional arrangements
    - Type of spatial analysis (if any) used to operationalise objectives
    - Degree to which corridors involve integrated management across spatial scales and types of existing land uses
    - Degree to which objectives, design principles or their operations take account of climate change impacts and adaptation.

The compendium and case study results are synthesised in a generic form using the DPSIR framework.

Interpreting the conclusions presented in this report will strongly benefit from reading the results of a related parallel project (Parris *et al.*, 2011) examining the economic and social considerations in corridor initiatives.

1.2 Our approach

What do we mean by corridors and connectivity conservation?

Any document or project that deals with the terms ‘corridor’ and ‘connectivity conservation’ needs to clearly define its use of these terms because both can be used in multiple ways across multiple scales. This proliferation of definitions arose when the terms ‘corridor’ and ‘connectivity conservation’ were

first used in relation to biodiversity conservation because they were largely theoretical. In other words, they seemed like good ideas, but no research had been done to show exactly what physical characteristics a landscape might need to have in order to deliver connectivity conservation. Thus, an early distinction arose between 'structural connectivity' – the physical characteristics of a landscape that can be managed – and 'functional connectivity' – the degree to which the landscape actually is connected and can support ecological processes like dispersal, migration, and evolutionary adaptation (Taylor *et al.*, 1993).

More recently, Worboys (2010) has used a different set of terms, referring to structural connectivity as 'landscape connectivity' and has used separate terms to refer to various types of functional connectivity that differ in scale and scope (see Box 1). A recent related concept is that of connectivity conservation for climate change (or climate connectivity), which is intended to make it easier for plants and animals to shift their ranges in response to climate change.[1] These scales and concepts are nested, such that managing for habitat connectivity may best be done at landscape or even local scale (1s to 10kms), while management for ecological connectivity may best be done at regional scales but should also incorporate landscape-scale habitat connectivity (perhaps 10s to 100kms). Finally, management for evolutionary connectivity may need to occur at supra-regional or even continental scales (100s to 1000s of km), but should also incorporate regional-scale and landscape-scale management to support the other types of functional connectivity which are required for long-term sustainability of ecological communities.

One of the challenges of implementing corridor or connectivity conservation initiatives is that the objectives are usually to achieve one or more of the forms of *functional* connectivity, but government and NRM managers and planners can most easily recognise and manage *structural* connectivity – the physical characteristics of the landscape. Fortunately, unlike in the early period of connectivity and landscape conservation, research has begun to show exactly which aspects of structural connectivity provide which types of functional connectivity. Thus, there are evidence-based leading-practice approaches to managing structural connectivity in a way that achieves functional connectivity objectives, but they are quite recent (summarised in Section 3.2 of this report).

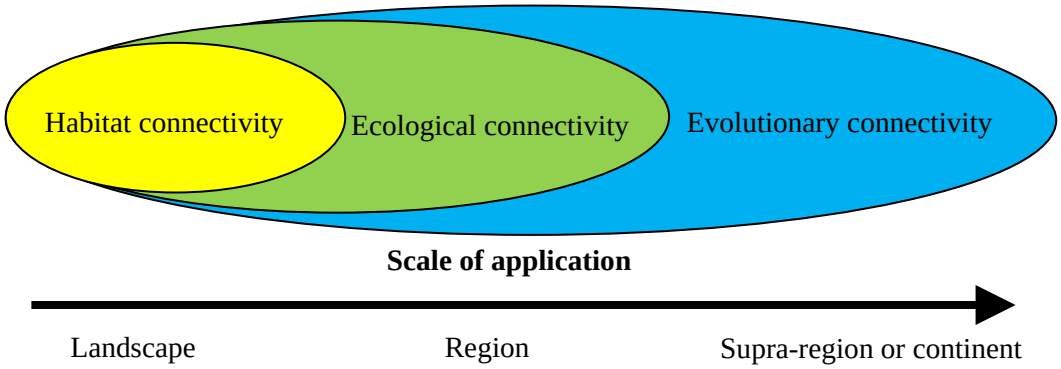
Furthermore, it is widely recognised that connectivity conservation is primarily of value in a landscape when it links relatively high quality 'patches' or areas of relatively intact ecological communities. In other words, landscape-scale conservation must focus on supporting and buffering these patches and the populations they contain at the same time that it provides functional links between them. This integrated approach has been termed 'connectivity conservation' (IUCN WCPA, 2006), and it involves a great deal more than managing corridors and connectivity.

This study recognises that the NWCP aims to achieve 'connectivity conservation' – protected, buffered and functionally linked native ecological communities, all accomplished using evidence-based leading-practice approaches. Furthermore, the emphasis is on managing 'landscape connectivity' to achieve 'evolutionary connectivity', and thus on supporting those large-scale evolutionary processes as well as the smaller-scale processes nested within this concept. Thus, the term 'corridor' or 'large-scale corridor' is being used as defined for *evolutionary connectivity* in Box 1.

[1] However shifts in response to climate change don't always have to be long distance / large scale. In regions of high topographic complexity (such as much of Australia's Great Eastern Ranges) many species may need to move only short distances (for example up slope) to track changes in climate.

Box 1: Types of connectivity per Worboys (2010a), and associated types of corridors and scales of application.

1. *Landscape connectivity*, which is a human view of the connectedness of patterns of vegetation cover within a landscape. A *corridor* in this context is any physical structure(s) in the landscape that appears to connect disjunct areas of native vegetation (for example linear corridors like riparian areas, stepping stone corridors like scattered paddock trees, and landscape corridors like strips of mosaic habitat of varying quality — see Figure 13 in Section 3.2 for detailed descriptions).
2. *Habitat connectivity*, which is the connectedness between patches of habitat that are suitable for a particular species. A *corridor* in this context is any physical structure(s) that runs between disjunct areas of native vegetation and that supports dispersal and foraging movements of particular species between those areas.
3. *Ecological connectivity*, which is the connectedness of ecological processes across many scales and includes processes relating to trophic relationships, disturbance processes and hydro-ecological flows. A *corridor* in this context may be either any physical structure(s) that runs between disjunct areas of native vegetation and that supports these processes, and/or a swath of land containing a series of areas of native vegetation and corridors for habitat connectivity that collectively supports these larger-scale processes.
4. *Evolutionary connectivity*, which identifies that natural evolutionary processes, including genetic differentiation and evolutionary diversification of populations, need suitable habitat on a large scale and connectivity to permit gene flow and range expansion. Ultimately, evolutionary processes require the movement of species over long distances. A *corridor* in this context is a swath of land containing a series of areas of native vegetation and corridors for habitat connectivity that collectively supports these larger-scale processes.



A working definition of large scale corridors for inclusion in this study

This study synthesises information on existing corridor and connectivity conservation initiatives of the scope and intent underlying the NWCP. While there are a wide range of 'corridor' initiatives across Australia, scale is the key delineator between those that that fall within the scope of the NWCP and other initiatives. Evolutionary processes require a scale that facilitates gene flows and range expansion, typically (but not always) requiring long distances where multiple ecological communities are the consideration. The NWCP extends to the concept of 'climate corridors' but is not exclusively oriented towards climate change. Furthermore, our terms of reference explicitly identify the human

perception and management aspects of corridor initiatives. That is, we are specifically tasked with describing existing corridor initiatives for which at least some form of specific planning and organisation has been undertaken.

The resultant working definition of Australian wildlife corridor initiatives is used for inclusion in the compendium:

1. *Scale:* sufficient to deliver evolutionary connectivity across multiple ecological communities and in most cases consideration of opportunities to manage climate connectivity.
2. *Scope—jurisdiction and tenure:* typically achieving evolutionary connectivity will involve multiple jurisdictions at the local, natural resource management region, state and occasionally national or continental level.
3. *Scope—partnerships:* effective connectivity conservation management will require collaborations across multiple forms of tenure including public, private, Indigenous and other tenure arrangements. Effective collaborations are likely to involve organisations that can best engage and leverage values across these tenures including governments, regional NRM groups, NGOs, businesses and others (such as statutory authorities).
4. *Institutional development:* our emphasis will be on those corridor initiatives that have been formally identified and which are moving towards a formalised structure (though not necessarily with formalised governance or widespread implementation).

The first definition is required for all initiatives for inclusion. The remaining elements are not essential but highly likely for corridor initiatives of interest to the compendium.

A subset of the initiatives identified in the compendium will be used as case studies to deliver detailed analysis. These initiatives already have in place, or have seriously explored, formal governance, planning and the nature of partnership arrangements. The set of case studies includes examples of government initiated and led projects, non-government initiated and led projects and projects with mixed leadership. The objective of the detailed case study analysis is to identify the operational experiences across a range of contexts. We analyse what clear lessons can be identified for informing new and existing corridors. We examine how planning tools have been linked to development of project objectives, designs and on-ground actions. In addition we review governance and institutional arrangements, as well as experience in implementation to date.

1.3 Structure of this report

The main body of the report comprises two parts. A set of supporting appendices completes the report.

Part one contains the compendium including a brief description of the approach to identifying conservation corridor and connectivity conservation initiatives in Australia, a summary of the initiatives identified which meet the full set of criteria, and a brief template setting out the key descriptors for each initiative.

Part two then presents the synthesis of the findings from the case studies, and to a lesser extent other corridor initiatives described in the compendium. In section three the findings are assessed according to conservation objectives, methodology employed in identifying critical linkages, governance arrangements, institutional arrangements, and funding. The major findings from the compendium and case studies are assembled into a DPSIR model in section 4. A brief summary of the main findings from the study along with some discussion of knowledge gaps and opportunities to foster corridor initiatives completes the main body of the report.

A set of appendices supporting the report contains the set of detailed case studies from which Part two is assembled. These case studies are:

- The Great Eastern Ranges (GER) initiative and a separate case study focusing on the Slopes to Summit (S2S) component of the GER
- Habitat 141º initiative
- East-West Naturelink in South Australia and a separate case study focusing on the Wild Eyre component of that initiative
- Gondwana Link
- The Bunya Biolink which is the most active component of the Birdsville to Hervey Bay initiative
- Tasmanian Midlandscapes initiative
- The Trust for Nature Conservation experience in developing the Kimberley to Cape concept.

PART 1: A COMPENDIUM OF EXISTING AND PLANNED CORRIDOR INITIATIVES AND PROJECTS

2. APPROACH TO COMPENDIUM

2.1 Corridor descriptors

There are a number of existing and planned 'corridor' and connectivity conservation initiatives across Australia, some of which are well developed and widely publicised, while others are relatively new initiatives and still others have failed to develop to any significant extent beyond the articulation of a visionary concept. Our objective in this section is to set out the range of initiatives in Australia that meet the first three elements of our working definition in that the selected initiatives:

1. Target connectivity conservation at the evolutionary process scale
2. Require the coordination of multiple jurisdictions
3. Involve or are moving towards partnerships.

Many initiatives included in this compendium do not call themselves a 'corridor', since this term often refers to small scale physical linkages. In this report we use the term 'corridor' as shorthand for those initiatives that meet our working definition. In this section we identify the range of 'corridor' initiatives that have been identified, and for which at least some organisational structure is in place.

We describe each initiative by a set of consistent descriptors:

- Initiative name (along with principle component names where relevant)
- Coordinating body or host and organisational form
- The objectives of the corridor initiative where clearly set out as a goal or similar
- An assessment of the extent to which detailed planning has been undertaken
- Ecological land use characteristics of the corridor region and the threatening processes or factors driving the need for a corridor
- Corridor location (via a map in most cases) and website for further information.

2.2 Major initiatives underway in Australia

Our assessment of the major 'corridor' initiatives underway in Australia that meet all of the requirements of our working definition is set out in Table 1 and shown in Figure 1. We have included one initiative (EcoFire) that does not necessarily meet our multi-jurisdictional criteria, but it is included due to its large spatial extent across (>5 M ha) and multiple partnerships.

These emerging but less developed initiatives are described in less detail following the compendium:

- The Ecosystems = Murray Mouth to Mountains (E=M3C3) initiative
- Wunambal Gaambera Healthy Country Plan
- Victorian Biolinks concept
- Western Woodlands Way (WWW)
- Queensland Climate Change Corridors for Biodiversity.

Several additional concepts have been identified for which there is no evidence of organisational or planning development at this point under the Wild Country initiative of The Wilderness Society. We have not included the large number of smaller projects across Australia that appear to address structural connectivity conservation at intra-regional or landscape-scales.

Table 1: Name and primary geographic location of large scale initiatives

Program	Scale	Location	Sub-Components
Great Eastern Ranges initiative*	Continental	Victoria, NSW, ACT, Queensland	Slopes to Summit (NSW and NE Victoria)* Kosciusko to Coast (NSW & ACT) Southern Highlands Link (NSW) Hunter Valley (NSW) Border Ranges (NSW & SE Queensland)
Gondwana Link*	Regional	Western Australia	Margaret River Forest to the Stirling Ranges Link: Stirling to Porongurup Stirling to Fitzgerald ("Fitz-Stirling') Fitzgerald Wilderness Ravensthorpe Connection Great Western Woodlands
Habitat 141º / 'Outback to Ocean'*	Regional	Victoria, South Australia	Greater Glenelg Western Wimmera Wimmera Mallee Tatiara Murray Mallee Kanawinka Coast Rangelands River Floodplain Grampians Gariwerd Coorong
Trans-Australia Eco-Link Corridor	Continental	South Australia, Northern Territory	Territory Eco-link comprises: Kakadu link; Darwin link; Litchfield link; Gregory link; Tanami link; and Central Desert link. Trans Australia Eco-link: South Australia (including Arid Lands and Flinders-Olary NatureLinks).
NatureLinks*	Regional	South Australia	Arid Lands NatureLink Cape Borda to Barossa NatureLink East meets West NatureLink* Flinders-Olary NatureLink River Murray-South East NatureLink
Birdsville to Hervey Bay	Regional	Queensland	Bunya Biolink* No information on further components.
Tasmanian Midlandscapes*	Regional	Tasmania	N/A – effectively regional scale but links biomes across whole of Tasmania.
Kimberley to Cape*	Continental	Queensland, Northern Territory and Western Australia	N/A not sufficiently developed at this point in time.
Ecofire	Regional (>5 M ha)	Western Australia	

* A more detailed case study has been undertaken focusing on the initiative or component which is presented in the Appendix.

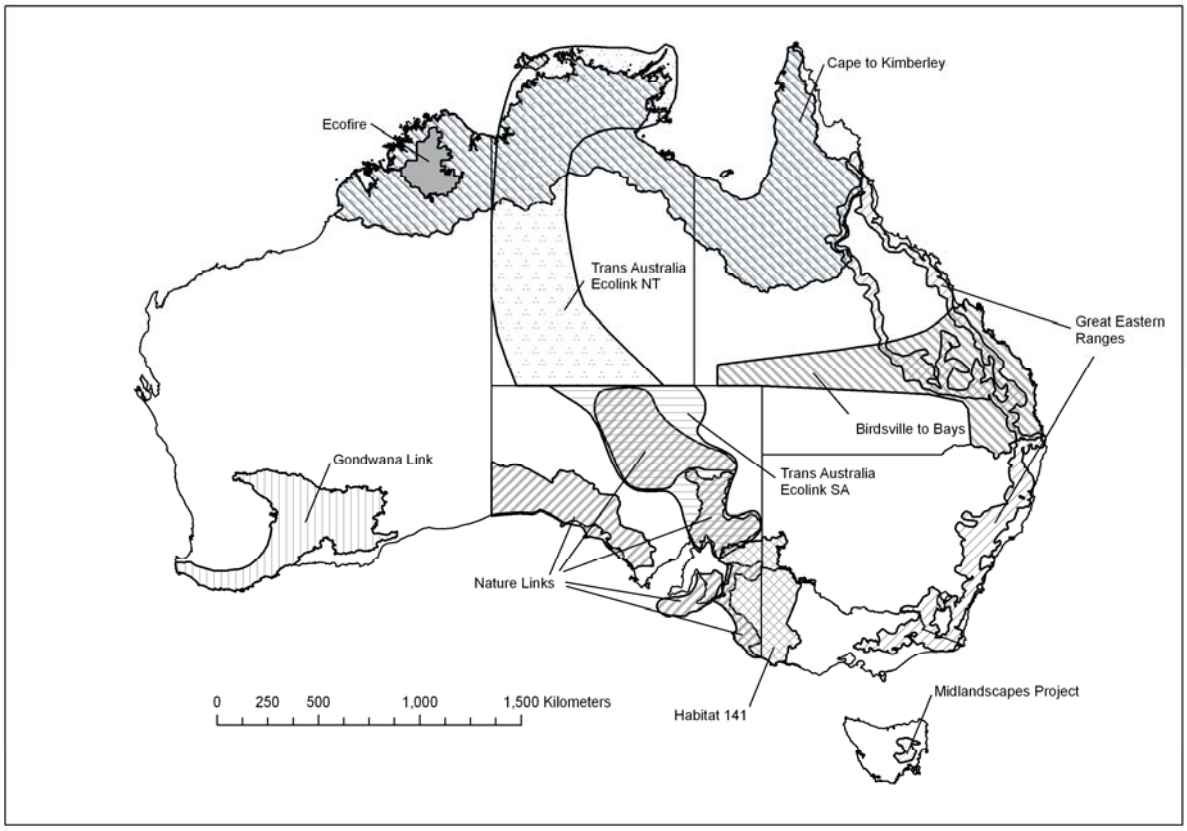


Figure 1: Major corridor initiatives in progress or planned in Australia

Source: Created from individual project GIS and line mapping where not available.

2.3 Compendium of Conservation Corridor Initiatives

A standard approach is used for each corridor identified in summarising a set of consistent information for each of the initiatives identified in Table 1. Additional information on those initiatives for which a case study has been prepared is set out in Appendix 2. The following information is supplied for each of the corridor initiatives identified in the compendium:

- Lead organisation and contact point
- Assessment of drivers for the creation of the corridor initiative
- Objectives of the activities proposed within the corridor
- Status and use of biophysical design principles
- Summary of the ecological and landuse characteristics of the corridor region
- A map if available.

Case studies draw heavily on the information provided by publicly available material (generally available through the 'further information' link) and the contact person within each of the initiatives. While the source material is usually not cited we clearly acknowledge the source of material.

Great Eastern Ranges Initiative

The Great Eastern Ranges (GER) Initiative's mission is "To conserve and manage a 2,800km 'continental lifeline' of habitats, landscapes and people that will support the continued survival of native plants and animals along the great eastern ranges from the Australian Alps to the Atherton Tablelands and beyond, and maintain the natural processes on which they depend". The Initiative covers three states and the ACT with a current focus in five targeted areas, each with their own Regional Partnerships (Slopes to Summit, Kosciusko to Coast, Southern Highlands Link, Hunter Valley and Border Ranges).

Lead organisation: A Lead Partners Group has been established comprising Greening Australia, National Parks Association NSW, Nature Conservation Trust of NSW, OzGREEN and NSW Office of Environment and Heritage, Climate Change, and Water. The Regional Partnerships involve more than 100 additional partners.

Drivers for creation of corridor initiative: The corridor is intended to combat the threats posed by climate change, land clearing and other environmental stresses to biodiversity and ecosystem services in the GER. While much of the corridor lies on public lands, large areas do not. The GER provide opportunities for evolutionary connectivity due to the wide range of elevations, aspect, climate zones and other habitat attributes provided by the ranges.

Objectives/Goals:

Linking landscapes & people

People working together in locally organised and managed regional partnerships to improve the connectedness and resilience of landscapes:

- 10 functional regional partnerships in priority areas
- 20 'emergent regional partnerships' comprising existing local community networks, project efforts or emerging partnerships
- Collaborative projects established (or maintained) in each partnership to deliver an integrated mix of conservation mechanisms
- Funding obtained in each regional partnership for seed projects to stimulate collaborative action to improve connectivity conservation in highest priority locations.

Communicating effectively

Transfer of knowledge and insights between regional partnerships:

- Structures and programs to enlist broad-based community engagement and ownership through inclusive, participatory action research and learning
- Mechanisms to transfer learning and improve collaborative efforts both within and between regional partnerships
- Greater capacity for local leadership in the context of the wider vision for the Initiative, matched by improved understanding and ability to measure community capacity for involvement.

Applying knowledge

Improving understanding of species, ecosystems and local landscapes in the context of the wider GER, and their requirements for long term health:

- Joint projects with research institutions to improve understanding of the species, ecosystems, landscapes and processes that comprise the great eastern ranges, and the values that people attribute to them

- The ability to measure the functional condition of targeted ecosystems and landscapes and changes relative to management actions, to demonstrate the type and scale of change achieved.

Status and use of biophysical design principles: Principles were designed by Mackey et al (2010) and have been further refined as the basis for pilot spatial analysis undertaken in 2010 and to underpin ongoing planning. These data validated the selection of the original five partnership areas, and ongoing interpretation has already started to influence selection or contextualising of future partnership and affiliate activities in NSW, Queensland and Victoria. Principles are implemented through the Conservation Action Planning (CAP) process which has been applied at the Regional Partnership level.

Ecological and landuse characteristics of the corridor region: In NSW 48% of the proposed corridor covers national parks and reserves, 37% is on private land and 16% is on other public land. The GER contains over 60% of NSW's listed threatened species, three World Heritage Areas, and provides the water catchment for over 90% of the population in the eastern States. It is a major recreation resource, protects cultural values, and provides significant ecosystem services to sustain production and healthy livelihoods for nearby populations.

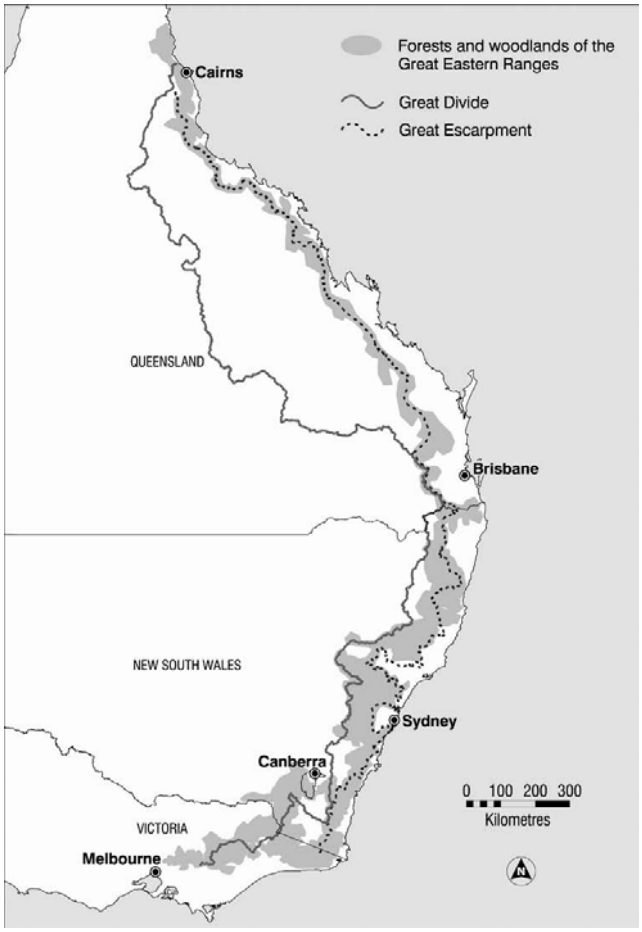


Figure 2: GREAT EASTERN RANGES INITIATIVE

Source: NSW Environmental Trust (2007), Fig 1, p. 4.

Further information: www.greateasternranges.org.au

Gondwana Link

The Gondwana Link vision is: 'Reconnected country across south-western Australia, from the wet forests of the far south west to the woodlands and mallee bordering the Nullarbor Plain, in which ecosystem function and biodiversity are restored and maintained'.

Lead organisation: Gondwana Link Limited, a not for profit company based in Albany, provides the hub for the collaborative effort driving the initiative. Major groups involved include Bush Heritage Australia, Fitzgerald Biosphere Group, Friends of Fitzgerald River National Park, Greening Australia, The Nature Conservancy, Greenskills, Cape to Cape Catchments Group, the Ranges Link (Stirling to Porongurup) group, Gillamii Centre, Pew Environment Group and The Wilderness Society, with many other groups and individuals also having some involvement.

Drivers for creation of corridor initiative: Gondwana Link is more opportunity based than threat based. Across south-western Australia large scale agricultural clearing and the resultant habitat fragmentation and disturbance of ecological processes are significant threats facing biodiversity in Australia's only global biodiversity hotspot. Secondary threats from salinisation, introduced pest species, imbalances in trophic relations, poorly integrated management across tenures, and other issues are being exacerbated by the onset of accelerated climate change. Gondwana Link works across those areas of south western Australia where there are the greatest opportunities to protect and restore biodiversity and ecological processes at scales large enough to enable continued evolutionary adaptation to future climatic conditions. The real driver for Gondwana Link is therefore a compelling vision that motivates a broad spectrum of people to use those opportunities, and to work across a larger geographical and temporal scale than had been attempted previously.

Objectives: Gondwana Link's mission is to restore ecological resilience across southwestern Australia. This requires that the ecological processes that maintain biodiversity are restored and protected at appropriate scales (from patch to regional), and that this is embedded in cultural values and processes. The main objectives therefore include:

- Articulating a compelling vision of the future that motivates people to act through "imagining and acting for the best instead of just preventing the worst"
- Demonstrating empathy and compassion for both people and nature to "mainstream" nature conservation within society (but not being captured by industry views – nature has the lead here)
- Working through decentralised conservation approaches that build from the power of place
- Identifying and implementing the 'no-regrets' actions that give beneficial and tangible outcomes while also building the momentum we need to achieve the larger Gondwana Link
- Building astuteness and common sense approaches through open and rigorous discussion
- Demonstrating the power of good will and good work.

Status and use of biophysical design principles: Biophysical design principles are developed at both "operational area" and "all of link" scales using the framework of Conservation Action Planning and are extremely important in helping to identify strategies and priorities. However, Gondwana Link has always been built on the recognition that they are establishing a 'conservation change process' that has self sustaining characteristics, rather than just investing in meeting some biophysical design. Therefore a set of ten ecological and social implementation principles have been developed to support Gondwana Link and are listed in the relevant case study in the Appendix.

Ecological and landuse characteristics of the corridor region: The Gondwana Link area includes over 75% of the flora species in south western Australia and over 20% of Australia's flora species. It has the largest habitat areas remaining in the temperate parts of southern Australia and the most

complete faunal assemblages in southern WA (and possibly southern Australia), along with 17 of Australia's 23 main vegetation groups (ANVA). It holds the world's least disturbed portion of Mediterranean habitat and straddles the climatic divide between wet forests and arid ecosystems of south western Australia. Gondwana Link includes numerous climatic refugia, the highest landforms in southern WA, and is arguably the most climatically buffered part of the south west Australian biodiversity hotspot.

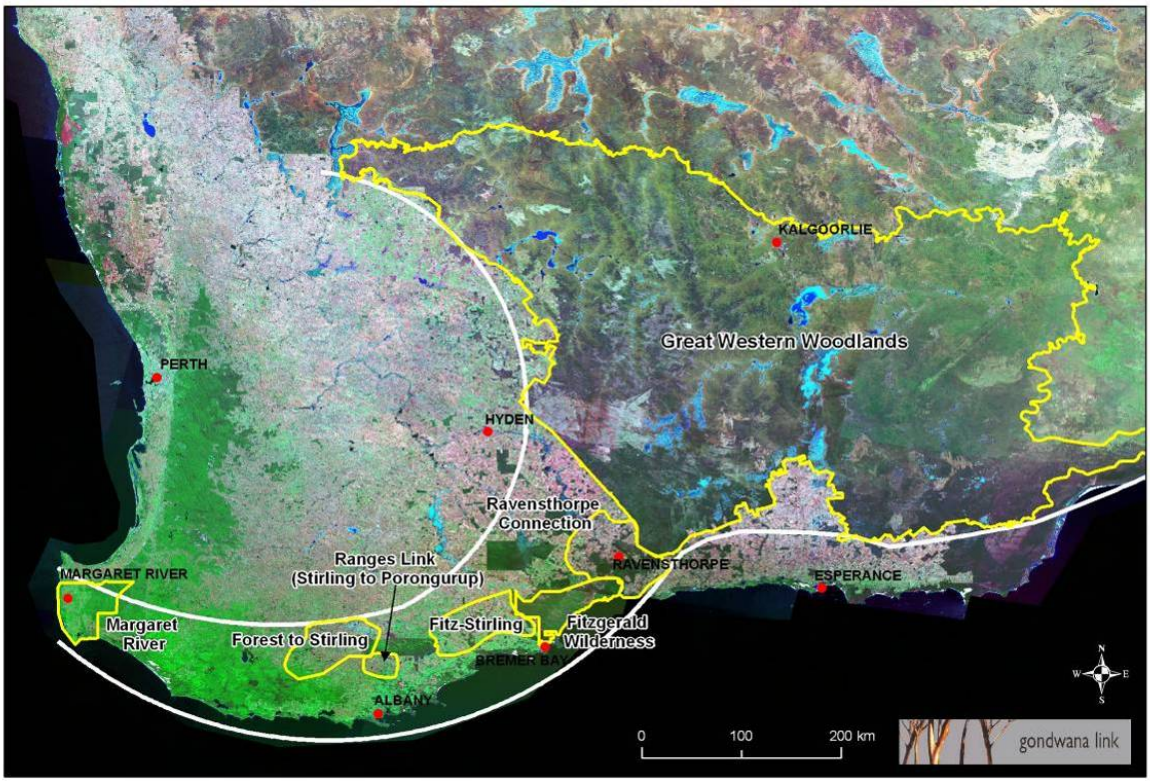


Figure 3: GONDWANA LINK INITIATIVE INCLUDING PLANNED LANDSCAPE PROJECTS

Source: A. KEESING, GONDWANA LINK LTD 2011.

Further information: www.gondwanalink.org

Habitat 141º (Outback to the Ocean)

The Habitat 141º vision is "to work with communities to conserve, restore and connect habitats for plants and wildlife on a landscape-scale from the outback to the ocean." It stretches 700 km along the 141st meridian of longitude iconic landscapes that straddle the SA and Victorian borders to the NSW rangelands, encompassing a nationally recognised biodiversity 'hot spot'.

Lead organisation: Habitat 141º is in the process of incorporation as a member based association comprising 20-30 member organisations including multiple government agencies, NGOs, Indigenous communities, and regional natural resource management agencies.

Drivers for creation of corridor initiative: Protecting one of Australia's most diverse landscapes and promoting sustainable agriculture for generations to come in the face of demographic, climatic and economic change. Specific identified threats are habitat fragmentation, invasive species, habitat decline and future climate change.

Objectives: The primary objective is to conserve, restore and reconnect ecosystems and habitats within the Habitat 141º initiative through five principles:

- Seek collaboration and alignment between groups and individuals working towards the vision
- Mobilise rural and regional communities through partnership and collaboration between private and public groups and landowners, land managers, investors, and volunteers
- Promote a lasting philosophy of environmental stewardship in communities
- Utilise the strengths, skills and knowledge of member groups through collaboration to apply resources efficiently to achieve high yield, value-for-money outputs and significant enduring outcomes
- Focus investment and action by partners on priority areas identified through rigorous scientific assessment.

Status and use of biophysical design principles: Habitat 141º is in the process of constructing 'Conservation Action Plans' across nine zones in which activities will take place. The Conservation Action Planning process incorporates core steps that are described in Section 3.3 below:

Ecological and landuse characteristics of the corridor region: Habitat 141º is located in one of the very few places in Australia where extensive wilderness areas form a series of 'stepping stones' from the southernmost coastal areas right to the arid zone. Habitat encompasses heathland, mallee country, red gum forests, flood plains, grassy woodlands and our southern most coastal areas. Similarly landuse varies greatly encompassing large areas of conservation, intensive forestry and cropping landuse through to extensive grazing dependent on rainfall and soils.

Figure 4: Habitat 141º

Source: Habitat 141º information summary.

Further information: www.habitat141.org.au

Trans Australia Eco-Link

This initiative spans the Australian continent linking the tropical savannahs and Arnhem Land in the north with the red centre and on into the South Australian rangelands. The corridor stretches some 3,500 km encompassing activities in the Northern Territory linking into the South Australian NatureLinks.

The Trans Australia Eco-Link is comprised of the Territory Eco-link in Northern Australia, and the Trans-Australia Eco-Link: South Australia. Organisational arrangements for each component are undertaken by separate state co-ordinators and detailed separately.

Territory Eco-link (Northern Territory)

The Territory Eco-link forms the northern part of the Trans-Australia Eco-Link. Territory Eco-link extends 2000 km connecting the tropical savannahs of the north to the desert of the centre. It is comprised of five key links between existing protected areas.

Lead organisation: The Northern Territory Government is leading but it is envisaged to move towards a broader delivery partnerships approach with stakeholders. A strong emphasis is on developing early landholder partnerships to underpin momentum and community support.

Drivers for creation of corridor initiative: Buffering protected areas and the species they conserve in the face of changes in rainfall, fire and temperature, and allowing re-colonisation following disasters such as disease, fire, or other disasters.

Objectives: Support the continuation of ecological processes amidst external pressures, create new jobs by driving regional development and the conservation economy, and instigate tourism opportunities by strengthening the art, culture and history of the Territory.

Status and use of biophysical design principles: The path and focus of the Territory Eco-link has been chosen to maximise impact around 34 existing sites which can be linked to create managed corridors. The initiative encompasses: 41,437 km^2 of Northern Territory Parks and Reserves; 69,854 km^2 of Indigenous Protected Areas; 2610 km^2 of Private Conservation Reserves; and 20,906 km^2 of Commonwealth Government managed land. Since commencement of the Territory Eco-link project on 1 July 2009 almost 2500 km^2 (over 1.8% of the Territory) of additional lands are now managed to protect their conservation values.

Ecological and landuse characteristics of the corridor region: The Eco-link is dominated by various forms of protected areas, primarily with extensive landuse such as grazing in the intervening space. Habitat clearing and fragmentation is a relatively lesser threat than in southern Australia with the exception of small parts of the proposed corridor linkage.

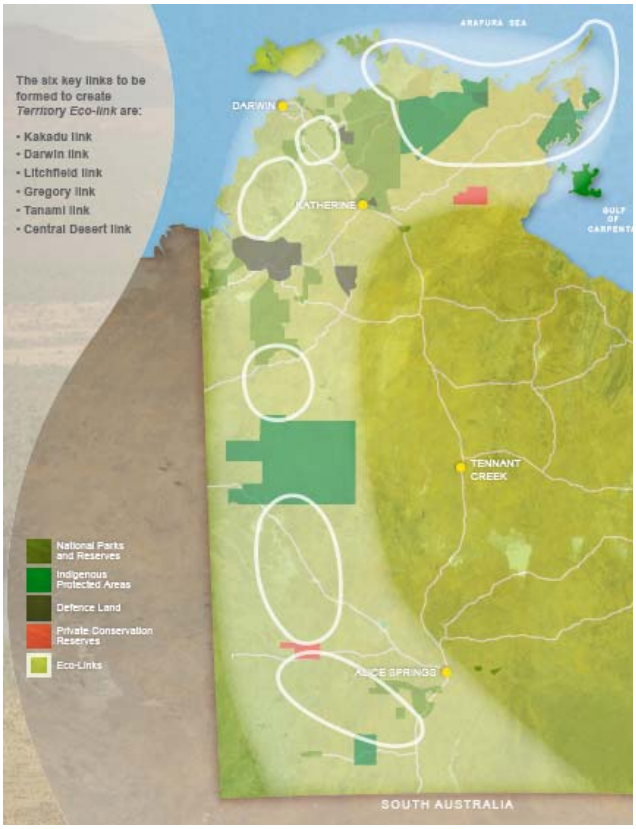


Figure 5: Territory Eco-link

Source: Territory Eco-link prospectus.

Further information: www.greeningnt.nt.gov.au/ecolinks/eco.html

Trans-Australia Eco-Link: South Australia

The Trans-Australia Eco-Link: South Australia (TAEL SA) forms the southern part of the Trans-Australia Eco-Link. TAEL SA extends and links the Arid Lands and Flinders-Olary NatureLinks to the Territory Eco-link.

Lead organisation: South Australian Department of Environment and Natural Resources (DENR) is leading and intends to partner with relevant pastoral community, other government agencies, and NGOs.

Drivers for creation of corridor initiative: Sustainably managed landscapes to build resilience to climate change, fire, drought and disease.

Objectives: The objectives of TAEL SA are to:

1. Increase functional landscape connectivity
2. Determine and facilitate opportunities for landholders to diversify their sources of income
3. Develop complementary land management policies and mechanisms that have both primary productivity and biodiversity conservation outcomes
4. Increase private or public protected areas.

There are four primary implementation themes for TAEL SA:

- Developing new stewardship options

- Investigating opportunities for landholders to engage in carbon markets
- Enhancing sustainable property planning and management
- Developing ways to improve prioritisation and planning to achieve functional landscape connectivity in the SA rangelands.

Status and use of biophysical design principles: TAEL SA encompasses over 300,000 km^2 from Port Augusta to the SA/NT border and includes Lake Eyre and the Western Simpson Desert. TAEL SA on-ground activities will focus in the priority Stony Plains Biogeographic Region.

Ecological and landuse characteristics of the corridor region: The primary tenure in TAEL SA is crown land, mainly under pastoral lease managed by a diverse range of landholders (mining, family and pastoral company holdings, NGOs).

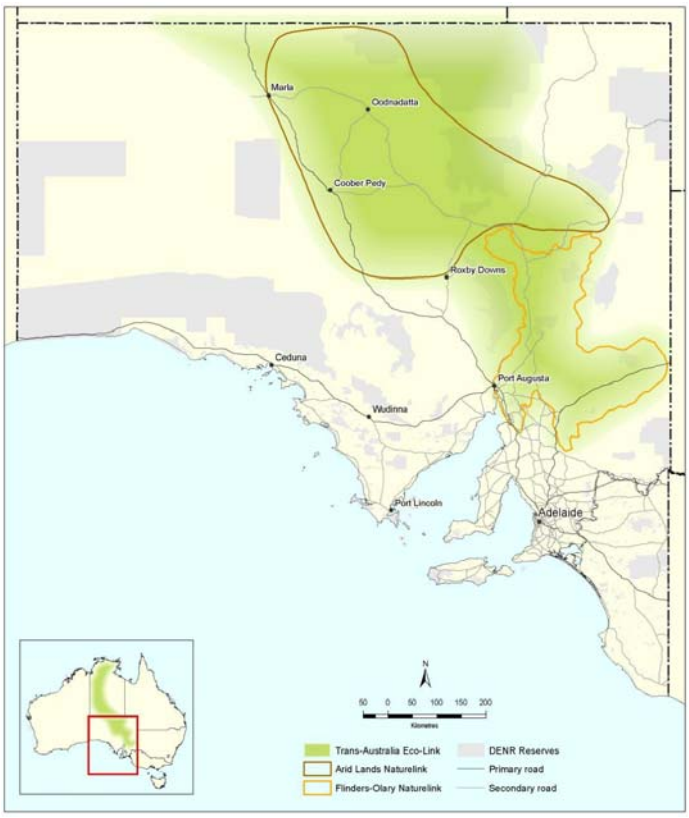


Figure 6: Trans Australia Eco-Link: South Australia

Source: Andrew Willson, DENR SA.

Further information: http://www.environment.sa.gov.au/naturelinks/ecolink.html

NatureLinks

NatureLinks is an overarching South Australian State Government policy that aims to restore habitat at a landscape-scale. It is comprised of six corridors:

1. *Arid Lands NatureLink* — encompassing the Stony Plains bioregion and inland lakes on the western and southern margins of the Lake Eyre Basin
2. *Cape Borda to Barossa NatureLink* — west edge of Kangaroo Island, northeast across Backstairs Passage, north through the Adelaide region to Barossa Valley
3. *Flinders-Olary NatureLink* — Southern Flinders ranges, north to Gammon Ranges and north-east to Olary Ranges
4. *River Murray-Coorong NatureLink* — encompassing the River Murray in SA, the Lower Lakes, the Coorong and the interlinking watercourses of south eastern South Australia
5. *East meets West NatureLink* — central Eyre Peninsula to WA border, including the Nullarbor Plain and Great Australian Bight.

Lead organisation: The NatureLinks program is being led by the South Australian Government Department of Environment and Natural Resources. While initiated and led by the SA Government, broad ownership is being sought as implementation requires a range of partnerships in each NatureLink, including NRM organisations, NGOs, Indigenous communities, private landholders, and others.

Drivers for creation of corridor initiative: NatureLinks is based on the The Wilderness Society's WildCountry program including adoption of the biodiversity corridor target in South Australia's Strategic Plan. The primary focus is to ‘enable native wildlife to survive and adapt to environmental change’ by addressing habitat clearing, fragmentation and degradation.

Objectives: NatureLinks is built on leading conservation practices implemented via a flexible approach incorporating six ecological principles:

- Biodiversity conservation activities should be planned at the landscape-scale
- Habitat restoration should be undertaken at large spatial scales
- Species in fragmented landscapes should be managed as metapopulations (populations linked by the exchange of individuals)
- An ecological community approach to biodiversity conservation should be encouraged
- Ecological restoration should be planned over long time scales
- Biodiversity conservation activities should be underpinned by sound ecological knowledge.

Status and use of biophysical design principles: The East meets West NatureLink is the most developed of the NatureLinks and is built on the objectives above. The McIntyre and Hobbs (1999) landscape classification, that identifies “intact, variegated and relictual” landscape condition was a key basis used. At conception the fundamental principle applied was to create linkages between, and buffers around, existing remnant vegetation or including Parks and Reserves. Since 2008 the focus for NatureLinks has shifted to broadly encompass landscape-scale conservation and restoration practices, including sustainable production. Each landscape has different conservation issues, goals and targets, and therefore conservation activities are context specific, and connectivity is only one of many issues being addressed.

Ecological and landuse characteristics of the corridor region: The characteristics of each corridor vary dramatically as they are located across a variety of major ecosystems in South Australia. NatureLinks explicitly incorporate private landuse which differs depending on rainfall, irrigation opportunities, and other landform characteristics.

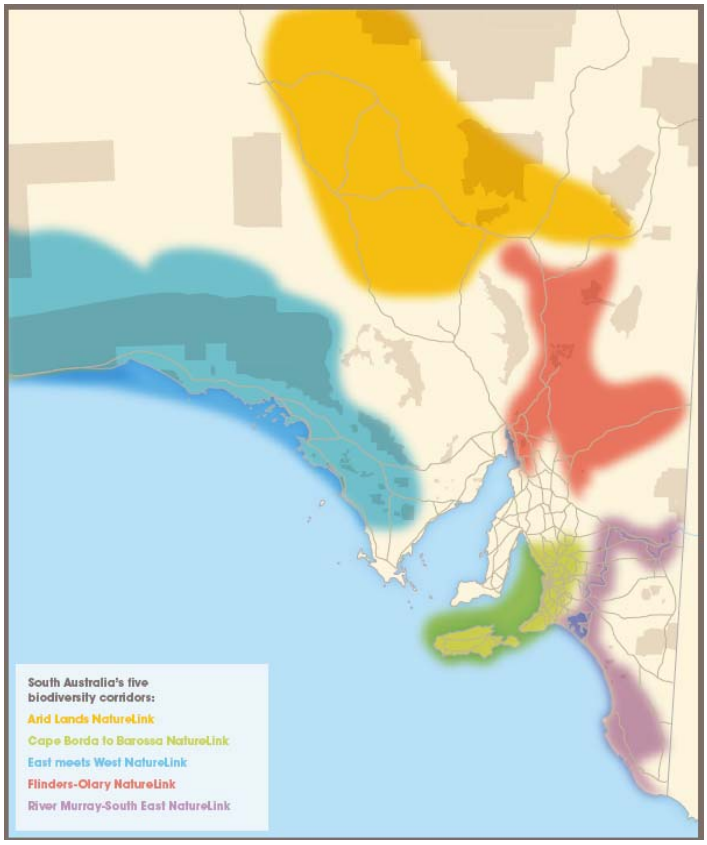


Figure 7: SOUTH AUSTRALIA'S FIVE NATURELINKS CORRIDORS

Source: www.environment.sa.gov.au/naturelinks/pdfs/state-map.pdf (accessed 20/5/2011)

Further information:
www.environment.sa.gov.au/Conservation/Ecosystem_conservation/NatureLinks

Birdsville to Bay

The Birdsville to Bay initiative stretches from Birdsville in Queensland's far west to Harvey Bay and Moreton Bay in the east. The initiative is in the early formative stage and is envisaged to connect scattered patches across a 1,570 km length.

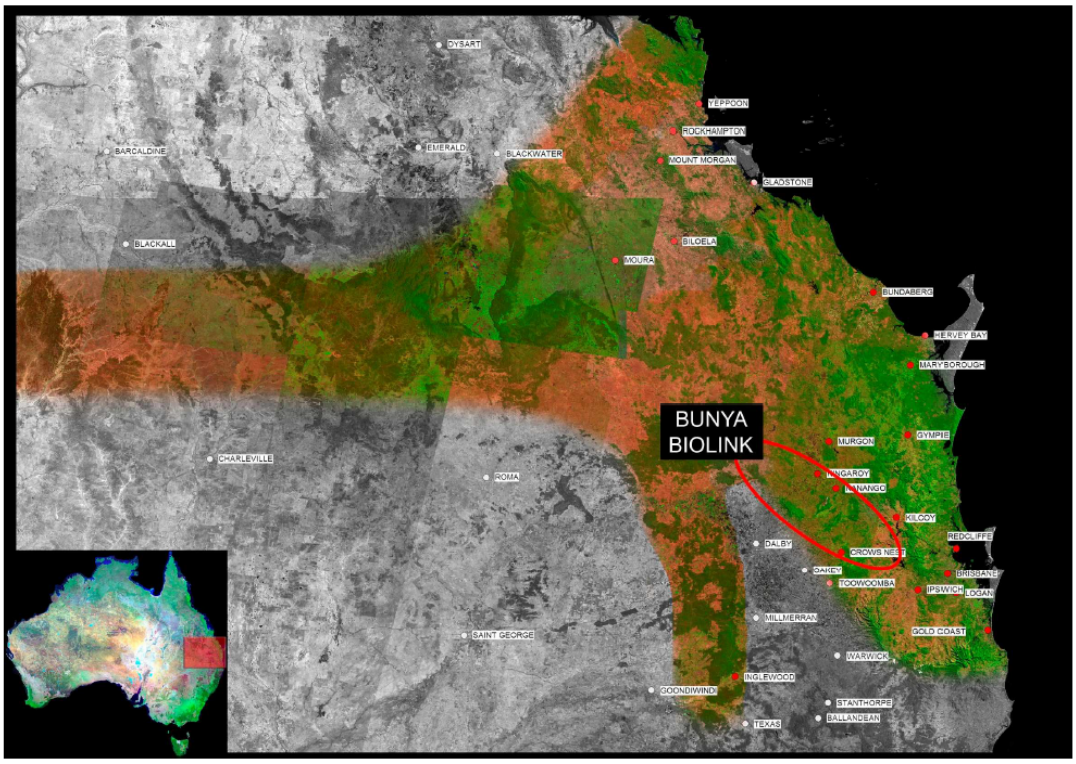
Lead organisation: Greening Australia (Queensland) is leading the initiative playing a facilitative and enabling role in developing partnerships with other stakeholders, resource managers and governments. The majority of activity to this point is within the Bunya Biolink component linking three national parks in the eastern ranges.

Drivers for creation of corridor initiative: Birdsville to the Bay is one of just two vegetation corridors connecting the outback with the coast. The corridor is to address fragmentation (due to land clearing), land degradation and declining landscape function, and impacts of climate change.

Objectives: The key focus is on habitat protection and restoration, potential alternative income generating land uses, and connectivity to facilitate species movement under climate change. Other aims are improved landscape resilience and function, broader biodiversity conservation, and enhanced water quality.

Status and use of biophysical design principles: Relatively little detailed planning has been undertaken for the corridor as a whole. The Bunya Biolink component applies a Conservation Action Planning process building on Queensland Environment Protection Agency Biodiversity Assessment Mapping and Methodology and SEQ Catchments biodiversity corridors.

Ecological and landuse characteristics of the corridor region: The corridor passes close to some of Australia's most productive agricultural lands in the Darling Downs however the corridor itself targets less productive lands with the aim of protecting and enhancing ecosystem services that extend into prime agricultural landscapes. The corridor explicitly encompasses conservation lands, lands used for grazing, and to a lesser extent cropping and forestry.



Birdsville to Bay map with the initial phase,The Bunya Biolink, highlighted in red. The Darling Downs area(grey area south of Bunya Biolink) is excluded due to the presence of intense agriculture.

Figure 8: Birdsville to Bay initiative

Source: Ralf Reeger, Greening Australia (Qld)

Further information: http://www.derm.qld.gov.au/register/p02721aa.pdf

Tasmanian Midlandscapes

The Midlandscapes project is a central part of an initiative to connect the major conservation areas in eastern and western Tasmania across the midlands which are 98% privately owned (as well as extending to other major conservation nodes).

Lead organisation: Tasmanian Land Conservancy, Bush Heritage Australia and the Department of Primary Industry, Parks, Water and Environment (via the Private Land Conservation Program lead the project initiative as a partnership.

Drivers for creation of corridor initiative: Sixteen critical threats were identified for the Tasmanian Midlands Biodiversity hotspot (including land clearing/conversion and intensification, climate change, invasive species, and hydrology and riparian disturbance).

Objectives: The vision for Midlandscapes is "Healthy natural ecosystems within the working landscapes of the Tasmanian Midlands". With a specific conservation objective of: "10% of the Tasmanian Midlands Biodiversity Hotspot managed primarily for biodiversity conservation by 2020, comprising 64,000 ha of six ecological communities and one fauna habitat which we have been identified as the Key Conservation (CAP) Assets."

Status and use of biophysical design principles: Midlandscapes has applied Conservation Action Planning, business planning and participatory planning in developing conservation objectives. The Conservation Action Planning process identified 16 critical threats to biodiversity and ranked them. The Business Planning identified ownership, financial values, feasibility, funding sources and fund holding strategy. Participatory processes sought to link the two strategies through considering the social and economic aspects that impede or assist connectivity activities. Eight Conservation Assets comprising the essential elements of the landscape for long term conservation were identified for which targets were set.

Ecological and landuse characteristics of the corridor region: The Tasmanian Midlands are highly cleared for agriculture and forestry, with increasing subdivision and tree change settlement. It is also a biodiversity hotspot that is recognised as under-represented in the conservation estate.

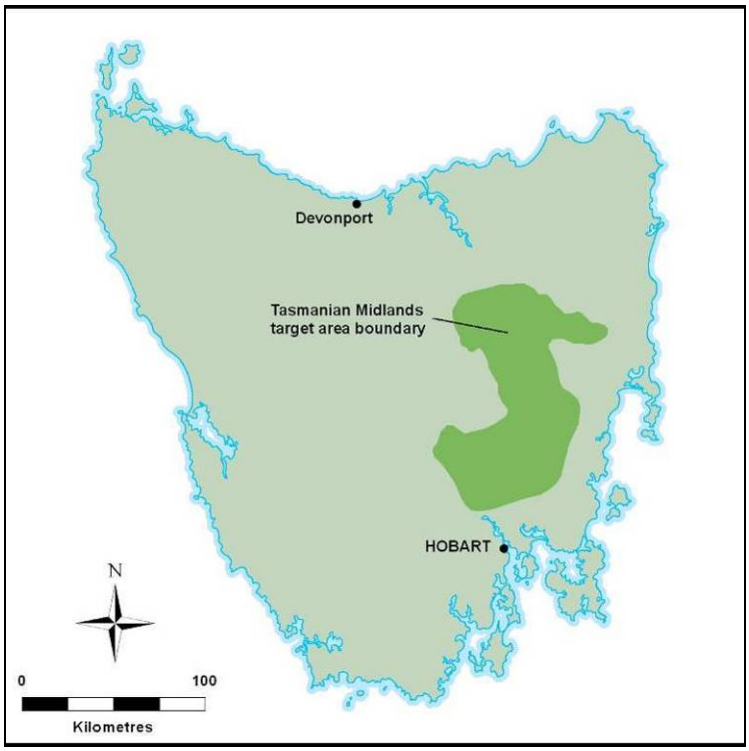


Figure 9: Midlandscapes priority area

Source: Richard MacNeill, Bush Heritage Australia.

Further information: www.tasland.org.au/about/index.html

Kimberley to Cape

The Kimberley to Cape (the full name is the Kimberley to Cape York Culture and Climate Change Corridor or K2CCCC) spans roughly 3,700 km of contiguous terrestrial, freshwater and near shore marine habitat from Broome in the far west to Bamaga at the tip of Cape York in the far northeast. It is a landscaped joined by vast largely intact tropical savannas, freshwater and marine habitats, where natural ecological processes of fire and flood continue, and where people and nature are strongly linked through culture. The initiative is built around a unique nexus of opportunity and scale jointly encompassing terrestrial and aquatic connectivity.

Lead organisation: North Australia Indigenous Land and Sea Management Alliance (NAILSMA). Steering group comprises: NAILSMA, Indigenous Land Corporation (ILC), The Nature Conservancy (TNC).

Drivers for creation of corridor initiative: The key driver is supporting the Indigenous goals, approaches and practices across the landscape which maintain the ecology and cultural linkages both within and across terrestrial, freshwater and saltwater environments. A primary driver is to support integrated management of fire in concert with broad-scale threat abatement (removal of feral herbivores, stock and other invasive species) to support connectivity conservation.

Objectives: The initiative is built around cultural, social and connectivity conservation of land management objectives. Cultural objectives are to maintain connections to country. Social objectives are to connect to emerging economies, enterprises and jobs (beyond the government sector). Connectivity conservation of land management objectives are a continuum of activities including promoting dry season fire management to intensive grazing with late dry season wildfires to maintain pastures, and threat abatement associated with invasive and feral species, and sustainable grazing practicies. Ultimately activities are intended to combat the impacts of climate change on fire, rainfall and consequently flooding and sedimentation.

Status and use of biophysical design principles: Kimberley to Cape is driven by Indigenous partnerships intended to maintain and apply Indigenous cultural knowledge of management of connected landscapes. The relatively connected landscape and culture mean that the management objective is maintenance oriented rather than reconstruction and reconnection oriented.

Ecological and landuse characteristics of the corridor region: Indigenous ownership and landuse dominate the north, covering approximately 40% of the land north of the Tropic of Capricorn including a large portion of the coastline with Native Title (pending and determined) extending coverage. Other significant land uses include extensive grazing, mining and conservation reserves.

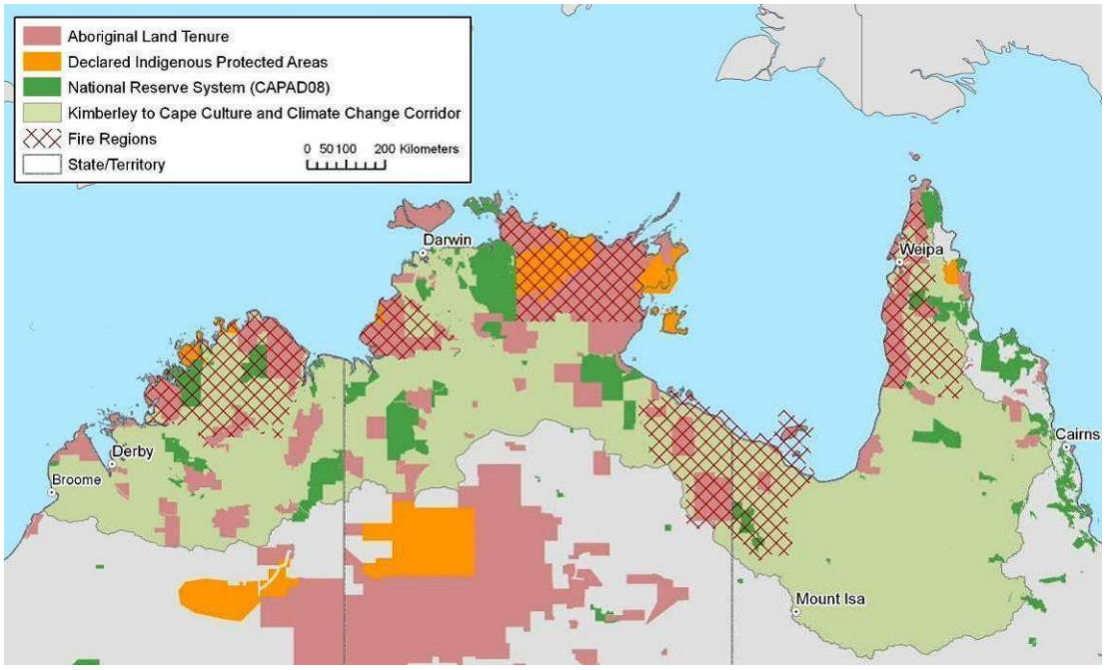


Figure 10: Kimberley to Cape Culture and Climate Change Corridor (pale green)

Source: Map by Nate Peterson (TNC)

Further information: Contact NAILSMA.

EcoFire

The EcoFire initiative targets the problem of large destructive fires in the Kimberley through a regional scale coordinated approach over five million hectares. This initiative differs from others by focusing on a single threat: mid to late season fire 'damaging biodiversity, degrading soil health and pasture for cattle, affecting cultural sites, and resulting in higher greenhouse gas emissions' (Legge *et al.*, 2010). The link between fire management and connectivity conservation objectives make EcoFire a regional scale initiative.

Lead organisation: The project is run from the Australian Wildlife Conservancies' base at Mornington Wildlife Sanctuary in the central Kimberley and involves a partnership of Indigenous communities, landholders, government, and NGOs.

Drivers for creation of corridor initiative: Fire regimes have shifted from small and cooler early dry season burns that create a mosaic environment, to a mid to late season and larger scale hot burns with adverse consequences for biodiversity, grazing and cultural values.

Objectives: The EcoFire initiative delivers a strategic regional prescribed burning program coordinated across property boundaries and tenures which is monitored through satellite imagery.

Status and use of biophysical design principles: Legge *et al.* (2010) describe a logic train linking fire event frequency and intensity to woodland savannah structure, consequent impacts on ground cover composition, habitat succession and functional niches, water and nutrient cycling, and finally impacts on resource availability and fauna species. Fire management is underpinned by substantial analysis of the impact of fire on regional ecology, and a strategic, monitored and evaluated approach to fire management (Legge *et al.*, 2009, Legge *et al.*, 2008, Murphy *et al.*, 2005).

Ecological and landuse characteristics of the corridor region: Landuse is predominantly extensive grazing of relatively intact natural landscapes across large pastoral holdings, conservation holdings and Indigenous values (via ownership of pastoral holdings and other forms of tenure).

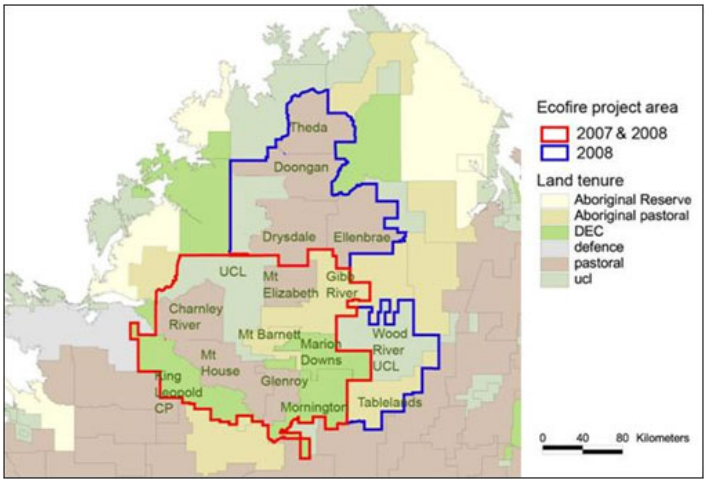


Figure 11: EcoFire project area

Source: www.australianwildlife.org/images/image/Mornington/EcoFire/ecofire-project-area.jpg (accessed 1/6/11)

Further information: www.australianwildlife.org/AWC-Sanctuaries/Mornington-Sanctuary/EcoFire-Project.aspx

Other emerging large scale initiatives

The Ecosystems = Murray Mouth to Mountains (E=M3C3)

An early stage initiative which aims to protect, enhance and reinstate native vegetation which builds on and create linkages between the Murray Mouth in South Australia to the Australian Alps (crossing NSW, Victoria and South Australia). The project is housed by Murrumbidgee Catchment Management Authority (CMA) (NSW) partnering with a wide range of CMAs across the target region. It is intended to combat threats posed by habitat loss and fragmentation, weeds, pest animals, excessive grazing, inappropriate fire regimes, and increasing population and development, all exacerbated by climate change. Key objectives are healthier riverine systems, maintenance of ecological processes, migration opportunities, and key habitat for threatened and endangered species. The project has identified priority biodiversity corridors.[2]

Wunambal Gaambera Healthy Country Plan

This project represents an attempt by the Wunambal and Gaambera people to manage all of their lands holistically. At 2.5 M ha the Wunambal Gaambera Country is as large or larger than many NRM regions in south eastern Australia, with the entire area to be managed towards broad cultural and conservation objectives. Wunambal Gaambera Country overlaps the Kimberley to Cape concept (and could be considered a zone within that initiative) and abuts the EcoFire initiative. The plan is based on the knowledge of traditional owners, supported by western science and modern equipment (including assistance by Bush Heritage Australia in compiling the plan and for its implementation). The strength of the approach is the integration of Indigenous cultural knowledge, Wunambal and Gaambera people priorities, and a structured conservation planning approach. The plan identifies the ten most important cultural and conservation assets in managing their home, assesses the health of these assets, describes and ranks threats to assets, sets objectives for threat management and strategies to deliver on the objectives, completed by a monitoring strategy.[3]

Victorian Biolinks

The Victorian Government has identified the concept of biolinks as a key strategy in managing the impacts of fragmentation, climate change and other threats to biodiversity in its recent Biodiversity White Paper. The aim of biolinks is increase the potential for plants and animals to disperse, recolonise and adapt to climate change. The connectivity conservation principles envisaged for biolinks are similar to those in existing major corridor initiatives: they cover private and public land, will involve different land uses over broad areas, target a variety of management actions, and have the primary aim of improving ecological connectivity by improving the condition of existing habitat including streams, wetlands, bushlands, and marine and estuarine systems. A rule of thumb suggests that of a third of the land in each biolink region will eventually form part of the biolink. An early biolink project will be an extension of the Great Eastern Ranges initiative through central Victoria to the Grampians.

Western Woodlands Way (WWW)

This is an early stage initiative for landscape reintegration of the terrestrial ecosystems in the north of the sheep–wheat belt in NSW. It is centred along a chain of conservation reserves and associated remnants running in a north-south spine from Weddin Mountains National Park in the south to the Queensland border. It incorporates several potential link points to the Great Eastern Ranges initiative. The premise is that the greatest benefit in highly fragmented ecosystems will result from concentrating on areas where a threshold level of native vegetation (woody and/or non-woody) remains to building

[2] Primary source: www.murrumbidgee.cma.nsw.gov.au/services/biodiversity/m3c3.aspx

[3] Wunambal Gaambera Aboriginal Corporation (2010). Wunambal Gaambera Healthy Country Plan – Looking after Wunambal Gaambera Country 2010 –
2020.

upon existing remnants to improve permeability, connectivity and habitat diversity. Early prioritisation has been undertaken for parts of the plan with the concept further developed in the Namoi CMA area.

Queensland Climate Change Corridors for Biodiversity

The Queensland Climate Change Corridors for Biodivesity (QCCCB) initiative announced in 2009 is scheduled to commence in 2011, focusing on the protection and management of landscape corridors, by purchasing areas of high potential biodiversity value and restoring vegetation. The aim of the QCCCB initiative is to combat the impacts of landscape fragmentation by reconnecting ecosystems building resilience to climate change. Several potential corridors have been identified including the Queensland component of the Great Eastern Ranges initiative.[4]

[4] Source: Queensland Climate Change Corridors for Biodiversity factsheet.

PART 2: OPERATIONAL EXPERIENCE WITH EXISTING AND PLANNED AUSTRALIAN WILDLIFE CORRIDORS

3. ANALYTICAL STRUCTURE

In this section we analyse the development and operational experience of existing Australian wildlife corridor initiatives and some projects (zones) within initiatives. Nine case studies across different elements of seven corridors were compiled for this project. The case studies are set out in Table 2 and a more detailed summary of each case study is provided in the Appendices. The case studies also include a wide range of stakeholder organisations, and differing development histories. The variation is a result of the differences in context, history, organisational involvement, and the nature of institutional and government support in the development of each initiative as is further discussed in the analysis. To capture this diversity we have ensured that the case studies represent a diverse cross-section of experience, encompassing the overarching organisational view and subcomponent experiences (Slopes to Summit, Wild Eyre and Bunya Biolink). Interested readers are encouraged to also consult (Worboys and Pulsford, 2011) "*Connectivity Conservation in Australian Landscapes"* which presents connectivity conservation in a broader context and includes a more general analysis of a range of Australian connectivity conservation initiatives.

Table 2: Case studies

Case Study
Great Eastern Ranges (GER)
Slopes to Summit (a focus region in GER)
Habitat 141º
Gondwana Link
East meets West NatureLink (SA)
Wild Eyre (a focus region in East meets West NatureLink)
Midlandscapes project (Tasmania)
Bunya Biolink (component of Birdsville to Bay)
Kimberley to Cape Climate Change Corridor

We structure this section as follows. First, in section 3.1 we describe the way in which most case studies have set conservation objectives and linked them to actions. In section 3.2, we then describe a comprehensive set of leading practices and principles to underpin connectivity conservation design, as these provide a standard for how objectives might be linked to actions. We then compare the case study experience against these to identify trends in actual implementation in section 3.3. The experience of the case studies organisational approach, institutional environment and support offered by government are set out in section 3.4. Finally we describe the operational experience of case studies including the nature of the landscape mix of measures, the mechanisms that have been applied for achieving implementation, and the funding model including future funding models.

The structure employed should not imply that the implementation process is linear. It is critical to distinguish between "fundamental objectives" (that is precisely which biological entities and/or ecological / evolutionary processes do we most want to maintain as a result of a given connectivity conservation initiative) versus "means objectives" (that is the management and design principles that are listed in section 3.2). The CAP approach discussed in Section 3.1 starts by ensuring that fundamental objectives are clearly identified early in any given process. We then move to talking about the best means (management and design principles) for achieving these. Why is this important? Because translating principles (all worthy individually, but conflicting or interacting in complex ways

when combined) into concrete priorities for on-ground actions demands clarity in fundamental objectives.

3.1 What should connectivity conservation deliver? How will it be delivered?

We begin our analysis by analysing the overarching approach to identifying "fundamental objectives" for what the initiative is intended to achieve along with the process by which a set of "means objectives" that are the management and design principles by which actions and activities are intended to deliver. The most common planning framework used by the case studies was Conservation Action Planning (CAP) which was applied as a participatory planning process and tool by:

- Gondwana Link (4 zones)
- Habitat 141º (5 zones)
- WildEyre (component of EastWest Naturelinks)
- Great Eastern Ranges (Koscuisko to Coast and Slopes to Summit components)
- Bunya Biolink section of the Birdsville to Bay concept (Qld).

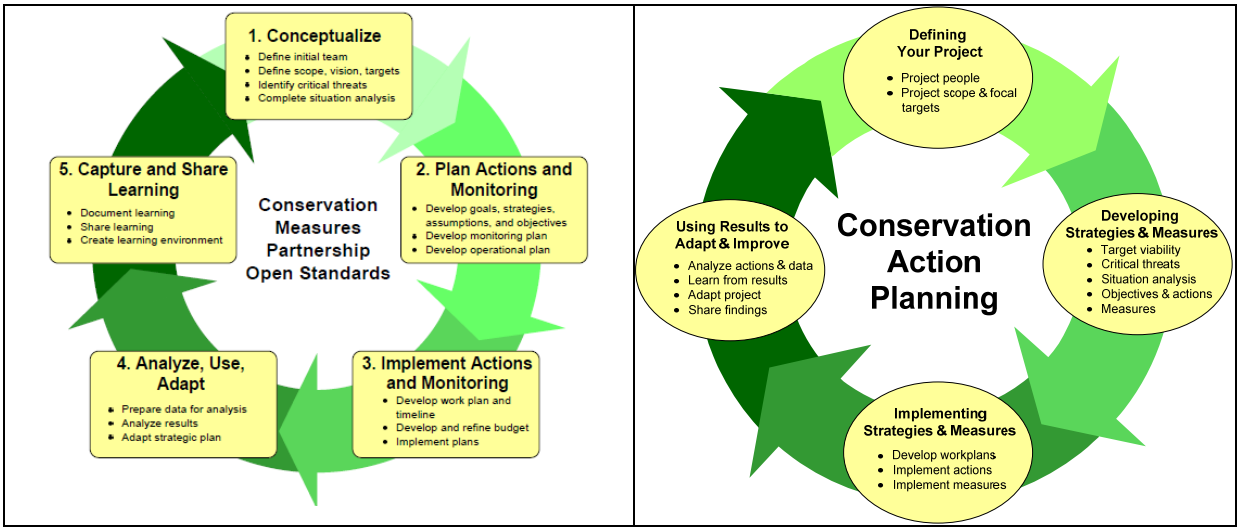


Figure 12: Conservation Action Planning and Open Standards frameworks

Notes: a) The planning cycle for 'Open Standards for Conservation' and b) The Nature Conservancy's version of Open Standards known as Conservation Action Planning.

Source: www.conservationmeasures.org/wp-content/uploads/2010/04/CMP_Open_Standards_Version_2.0.pdf; www.conservationgateway.org/sites/default/files/CAP_2pg_Description.pdf

Conservation Action Planning is The Nature Conservancy's implementation of *Open Standards for Conservation* that has been developed and endorsed by the African Wildlife Foundation, Conservation International, Defenders of Wildlife, Foundations of Success, The Gordon and Betty Moore Foundation, Keith Campbell Foundation for the Environment, The Leona M. and Harry B. Helmsley Charitable Trust, Margaret A. Cargill Foundation, National Audubon Society, National Fish and Wildlife Foundation, Rainforest Alliance, Rare Conservation, The Nature Conservancy, Walton Family Foundation, Wildlife Conservation Society, and WWF-International.

The Nature Conservancy's version of Open Standards simply uses slightly different language, but the same planning and adaptation cycle (Figure 12). The Nature Conservancy's Conservation Action Planning (CAP) process has been supported by a data capture and reporting tool based on Excel Microsoft software (http://conserveonline.org/workspaces/cbdgateway/cap/resources/index_html). Both CAP and Open Standards planning processes are now supported by customised software called Miradi (http://www.conservationmeasures.org/initiatives/miradi-software).[5]

While CAP approaches are by far the most common in connectivity conservation initiatives in Australia other approaches are also available which share many of the same attributes. One relevant approach by Worboys and Lockwood (2010) describes a set of tasks specifically tailored for connectivity conservation management as set out in Table 3. While all of Worboys and Lockwoods tasks are necessary in connectivity conservation the degree to which they are centralised and their relative priority varies significantly in Australian initiatives (see sections 3.4 – 3.6) illustrating the difficulty in describing a unifying approach (especially given that their approach is based on a number of international studies). Finally, each of these approaches is a specific manifestation of the more general, widely promoted, adaptive planning or management approaches.

Table 3: Connectivity conservation management tasks

Foundational tasks	Delivery tasks	Cross-cutting tasks
1. Undertake feasibility and scoping studies 2. Establish a community vision 3. Undertake pre-planning 4. Establish governance and administration 5. Establish strategic management priorities and requirements.	1. Manage finances, human resources and assets 2. Deploy instruments 3. Manage for threats 4. Assist management of incidents 5. Strive for sustainable resource use 6. Rehabilitate degraded areas 7. Provide and manage research opportunities	1. Work with partners 2. Work with stakeholders 3. Undertake communication

Source: Worboys and Lockwood (2010) p. 309.

CAP Coaches

The Nature Conservancy's version of Open Standards has been adopted by NGOs and their partners in Australia primarily because The Nature Conservancy has widely supported training in Conservation Action Planning in Australia over the past ten years. An important element to the widespread adoption of CAP is the involvement of a trained facilitator, particularly at the early stages of developing a CAP. The Nature Conservancy refers to these facilitators 'coaches'. They use this metaphorical term because CAP coaches have generic facilitation skills, but like a sports coach, they know the conservation 'game' well. To date all CAP Coaches in Australia are employees of environmental NGOs including The Nature Conservancy, Australia, Bush Heritage Australia and Greening Australia. All recognised CAP Coaches are a part of an International Conservation Coaches Network that runs a conference every two years, provides on-going professional training, supports discussion groups (for example listserve), a website, etc.

[5] Conservation Action Planning and Open Standards for Conservation are tailored applications of the more general and widely applied adaptive planning approach / framework.

CAP Planning Steps

The CAP process, using the terminology of The Nature Conservancy (www.conservationgateway.org) has the following steps:

1. Identify people involved in the project

This step asks users to identify the people who will be involved in designing and implementing the conservation project (key stakeholders).

2. Define project scope & focal conservation targets

At this step the spatial and socio-political extent of the project is defined, then specific species and natural systems ('targets' or conservation 'assets') are identified. Application of relevant science literature such as systematic conservation planning theory is critical during this step. These targets are the focus of the project and should be representative of the overall biodiversity of the project area. This early step is critical in building a consensus on the overall goal and scale of the project and ultimate measures of success.

3. Assess viability of focal conservation targets

This step requires project participants to determine how to measure the 'health' or condition of each focal target. This requires "Key Ecological Attributes" of each target to be agreed upon, then to estimate the current condition or "viability" of each target (its status). Agreeing what a "healthy state" might look like is also important. This step is used to identify priority targets that are most in need of immediate attention.

4. Identify critical threats

This step identifies the various factors that immediately affect the project's focal targets and then ranks these threats in order to prioritise conservation actions where they are most needed to improve the status (condition) of each focal target.

5. Conduct situation analysis

This step asks project participants their current understanding of the projects' "situation" or reality, both the biological issues and the human context for the project occurs. This step aims to probe more deeply into the causes of critical threats, key drivers, and opportunities for successful action. This step develops a conceptual model for the system. The Miradi software tool is particularly useful to capture this conceptual model. The "situation analysis" is consistent with populating a DPSIR framework as discussed in Section 4.

6. Develop strategies: Objectives and actions

This step requires participants to specifically and measurably describe what success looks like, and to develop practical actions that will be undertake to achieve success. The Miradi software tool is now often used to assist in the development of strategic actions, particularly to test the underlying assumptions through the analysis of "results chains".

7. Establish measures

This step requires the project team to determine effective ways to measure results, impacts or success. This step develops a monitoring and evaluation plan. This "measures" plan aims to assess whether the project's strategies are working ('strategy effectiveness') and whether adjustments (adaptation) are needed. The "measures" plan should also aim to assess the status (health) of focal targets and their threats

8. Develop work plans

Here, the project team develops detailed work plans to implement strategic actions identified at step 6.

9. Implement

The work plans are implemented and inputs/actions recorded.

10. Analyze, learn, adapt, and share

This step requires the project team to systematically evaluate the actions that have implemented, and update or refine knowledge of the focal targets using the project's monitoring data. This evaluation provides insight on how actions or strategies are working, what may need to change, and what to emphasise next. This step also asks the project team to document what has been learned and to share it with others so they can benefit from successes and failures.

Utility of Conservation Action Planning

The CAP is very much a generic project management tool. It provides almost no specific guidance on exactly how to identify and rank key values, priority locations, and candidate actions, other than to say that all these things are important and should be done. Implementation of the CAP process requires the participation of people with expert ecological knowledge of the project area. The CAP process is strong in its requirement that project managers have a clear idea of what project success means and what will be monitored to gauge that success.

CAP is clearly not a prioritisation tool. There is little guidance under the CAP system about what should be considered when deciding on, or ranking, competing strategies and actions. There is no set formula for developing actions other than using the situation analysis, asking probing questions to surface potential actions and evaluating the options. The CAP tools do not provide any analytical capacity to examine likely cost effectiveness nor predict "conservation return on investment".

Neither is CAP a spatial prioritisation tool. It is essentially aspatial. However, CAP has proved to be a useful tool prior to any prioritisation process. CAP has been widely adopted as a participatory planning process to gain consensus on the 'objective functions' (Possingham *et al.*, 2001) needed for any spatial or non-spatial prioritisation. Prioritisation is a futile planning step if there is little consensus on what should be prioritised to achieve clear (quantitative) objectives. TNC's "Conservation Gateway" (http://www.conservationgateway.org) provides links to many prioritisation tools including Australian ones (for example Marxan and INFFER). Currently spatial analysis and prioritisation is being conducted for Habitat 141º in collaboration with CSIRO (N. Crossman pers. comm.). The then NSW DECCW has undertaken detailed spatial analysis and prioritisation for the *Great Eastern Ranges* initiative (G. Howling, pers. comm.).

Neither is the CAP process an effective tool for identifying critical landscape linkages or corridors. Again, CAP is a tool needed before conducting a corridor analysis. CAP helps build consensus amongst the project team and their local ecological experts on how "focal targets" may be affected by fragmentation and how restoring connectivity may improve the "status" or condition of the focal targets. CAP helps address the critical question, "Connectivity conservation for what purpose?"

Step 5 in the CAP process ("Conduct situation analysis") can populate a DPSIR framework (Smeets and Weterings 1999) – see section 4 for a synthesised DPSIR across the case study initiatives and further discussion. Similarly the CAP process can inform other analyses and processes – both spatial and otherwise – such as targeting and mapping exercises, knowledge prioritisation and so on.

3.2 Current leading-practice corridor design guidance and principles

Here we list the key management guidelines and design principles that can be considered leading-practice for large-scale corridor, or connectivity conservation projects. These are at the key strategies in linking the fundamental objectives of each initiative to on-ground activities and actions. These were derived from Mackey *et al.* (2010) as requested, but also from recent scientific literature. This is partly because Mackey *et al.* aimed to provide overarching management guidelines for connectivity conservation projects, not specific design principles that land managers require to achieve conservation objectives. Mackey *et al.* does a commendable job synthesising a large body of literature on the need for connectivity conservation – a literature in which Australia has consistently been at the forefront (for example (Saunders and Hobbs, 1991, Bennett, 1998, Soule *et al.*, 2004). However, the focus on overarching guidelines rather than design details means the Mackey report, in itself, does not provide a complete set of principles and guidance to evaluate the case study conservation corridors.

We have relied as much as possible on meta-analyses rather than individual published studies to derive more specific design principles to complement the Mackey *et al.* guidelines. Meta-analyses are quantitative syntheses of results across many different studies, incorporating different species and different ecosystems. Hence a meta-analysis can reveal relatively robust general principles. Where meta-analyses were not available, we derived design guidance from the best available information (see also Parris *et al.* 2011 for a discussion of resultant risks).

Mackey *et al.* (2010) management guidelines for connectivity conservation projects are as follows (the biophysical elements mentioned in this list are shown in Figure 13):

1. Focus on geographically extensive areas, at least supra-regional in scale.
2. Manage the landscape matrix between protected areas to provide the following functions:
    a. Buffer boundaries of protected areas
    b. Maximise ecological connectivity and permeability between protected areas
    c. Protect and restore assets found outside protected areas
    d. Maintain large-scale ecological and evolutionary processes.
3. When managing for 2a and 2b, first secure remnant vegetation that serves these purposes, then restore regrowth to serve these purposes, and then if necessary employ revegetation.
4. Facilitate 2b through conservation management of local and extensive corridors, stepping stones, refugia, riparian and stock route networks, and naturally interconnected lands of high conservation value.
5. Use various instruments and mechanisms to promote active management in the matrix to minimise or eliminate threats and strategically rehabilitate disturbed areas.
6. Develop innovative and participatory ways of working with people and communities including developing a shared vision, an agreed strategic plan, and innovative partnerships.
7. Finance the project from a diversity of sources beyond traditional Commonwealth and state government funding.

8. Recognise climate change as a prime motivating factor as well as the economic and social benefits that may stem from the project.

These management guidelines need to be complemented by robust landscape design guidance to achieve conservation objectives. The following design guidance is based on relevant scientific literature are organised according to the different landscape elements depicted in Figure 13:

Overall Corridor Characteristics:

9. Locate the corridor along climatic gradients (north-south, altitudinal, and even east-west to capture variation in precipitation as well as temperature), and/or in an area of high natural heterogeneity to encompass variable environments (Dunlop and Brown, 2008). More broadly connectivity initiatives should maximise the resilience and potential of the existing conservation network under climate change.

10. Locate the corridor in an area where at least 10% of the native vegetation remains, preferably at least 30%, because areas with less than 10% remaining may have lost too many species to recover while those with at least 30% may still contain most of their constituent native species and are thus most cost-effective to recover (Andren, 1994, Radford *et al.*, 2005). Time from clearing may also be important in impact on processes (including loss of constituent species and impact of invasive species)

11. At landscape to regional scales, buffer and connect a sufficient amount of functionally linked habitat area to support minimum viable populations of constituent native species. A recent meta-analysis suggests a minimum viable population is only achieved when a population consists of approximately 4000 actively breeding individuals (Traill *et al.*, 2007). Habitat specialists with relatively large space requirements can then be used to estimate the total amount of functionally linked area required to support most species in the community. For example, medium sized woodland birds in grassy woodlands require ~10 ha to support two breeding individuals (Higgins *et al.*, 2001, Higgins and Peter, 2002), so 20,000 ha of functionally linked area may be required to support minimum viable populations (see (Kitchener *et al.*, 1982, Kitchener *et al.*, 1980) for similar assessments concluding reserves of 30,000 – 94,000 ha for birds and 40,000 ha for mammals in Western Australia Wheatbelt).

Protected areas:

12. Protected areas will still need active management to reduce threats not fully eliminated by buffers (for example feral species) as well as to ensure maintenance of disturbance processes like fire (Parr *et al.*, 2009).

Buffers:

13. No research has been conducted in Australia to test the effectiveness of buffers to enhance the conservation value of protected areas. However, research on remnant vegetation in agricultural landscapes suggests that buffers should be designed to reduce threatening processes such as wind blown nutrient and weed incursions, reduce solar radiation at remnant edges, and restore landscape-scale hydrological balance (Hobbs, 1993, Duncan *et al.*, 2008). Buffers should be based on as many elements of locally native ecological communities as possible. Buffers should also include integrated management of threats. Buffer width should be determined by the ability to eliminate the edge effects created by threats from the surrounding matrix (for example cleared land).

Matrix management area:

14. The matrix management area (that is, the part of the corridor that is not a protected area, buffer or specific type of connectivity) should involve reduced intensity of land use and should retain as many of the compositional and structural elements of locally native ecological communities as possible, though less may be required in buffers (McIntyre and Hobbs, 1999, Law *et al.*, 2000, Fischer and Lindenmayer, 2002, Manning *et al.*, 2004).

Connectivity (linear corridors, stepping stone corridors & landscape corridors):

15. Design should rely on recent meta-analyses about the characteristics corridors may need to provide ecological connectivity at landscape and regional scales, such as Doer *et al.* (2010) and Gilbert-Norton *et al.* (2010). Thus, the design should ensure that linear corridors and stepping stone connections are no longer than ~1.5 km, ensure that gaps between stepping stones are no more than ~100 m wide, and keep linear corridors relatively narrow (<100 m) to reduce the possibility they will be population sinks. Landscape corridors are distinct from linear corridors in that they are intended to provide habitat that can be lived in, not just moved through, albeit of varying quality. They can therefore be longer than 1.5 km but should not be narrower than ~800 m to ensure some high quality core habitat (Clarke and Oldland, 2007).

16. Note that little information is available on what a landscape needs to look like to support large-scale processes like migration (and nomadism), range expansion, and evolutionary diversification. Using the precautionary principle, provide local-scale buffering, matrix management and connectivity (principles 13 – 15 above) across larger scales to support larger scale processes (see Figure 13). In other words, large-scale buffering and connectivity may best be achieved through small-scale buffering and connectivity enacted over large areas.

Planning, prioritisation and monitoring:

17. The above corridor management guidelines and design principles should be integrated by the use of a formal planning process such as the CAP or Open Standards for Conservation approach to develop a shared vision, clear objectives and strategic actions.

18. The spatial planning in principle 17 should be complemented by a spatial prioritisation analysis to help identify the most cost-effective opportunities for applying the biophysical design principles described above (see section 3.3 for linking objectives and action). Tools such as INFFER (Pannell *et al.*, 2011) can also be used to incorporate socio-economic factors into the planning process.

19. There is a great deal of uncertainty to the science and practice of connectivity conservation. Comprehensive monitoring of project inputs, outputs and especially outcomes is required to continuously improve management actions and corridor designs (Lindenmayer and Likens, 2010).

Governance, institutional structure and social objectives

Worboys *et al.* (2010b) also identify a set of broader connectivity conservation principles encompassing governance, institutional structure and social objectives. Those that which are not adequately reflected in the guidance and principles set out above or reflected by the operational definition of connectivity conservation include (adapted from Worboys *et al.* p. 344-346):[6]

[6] The parallel report by Parris *et al.* (2011) contains a much richer discussion and analysis of the rich thinking and experience supporting governance, institutions and social and economic aspects of connectivity conservation and should be read by those interested in these aspects of connectivity conservation initiatives.

20. Connectivity conservation areas should serve multiple land-use objectives including for example cultural and spiritual places and practices, maintenance of ecosystem services to other land uses and the community, and provision of recreation and tourism opportunities.
21. Good governance institutions and practice are essential for effective connectivity conservation. Institutions and individuals should have legitimacy, be accountable and operate in a transparent manner.
22. Economic considerations including distributional effects of decisions and actions, the need to obtain economic benefits from some connectivity assets all need to be appropriately considered in connectivity conservation planning and implementation.
23. Connectivity conservation champions and sustained leadership are vital for achieving the connectivity conservation vision. Leadership needs to be developed for the present and the future and dispersed across the initiative while avoiding fragmentation, competition and uncoordinated leadership.
24. Connectivity conservation needs long-term commitment and sustained effort across scales, through time, and with emphasis on fostering innovators and innovation.

3.3 Case study experience of connectivity conservation objectives

Here we discuss the degree to which the case study corridors utilise the first 19 leading practice design guidance and principles, drawing on the information they provided in the case study documents (the broader governance, institutional and structural principles 20-24 are evaluated in some detail in sections 3.4 and 3.5). In Table 4 we summarise the use of each guidance principle by each corridor initiative. Evaluation of the initiatives was very inclusive – we indicate that a guidance principle was utilised if it was mentioned anywhere in the mission statement, objectives, or specific project actions. This is partly because some corridor initiatives have not advanced much beyond planning stages, and thus their actions could not be evaluated yet. Also because the type of information and level of detail provided in the case study responses from each corridor initiative was highly variable. As Slopes to Summit is a component of Great Eastern Ranges, and Wild Eyre is a component of the East-West Nature-Links, anything adopted by the sub-component was automatically considered to be adopted by the larger initiative. Note also that Kimberley to Cape – Culture and Climate Change Corridor was not included in our analysis as the biophysical aspects of the initiative are at a very early stage and the objective setting process may be fundamentally different as the corridor lies in an area of largely intact, albeit degraded in parts.

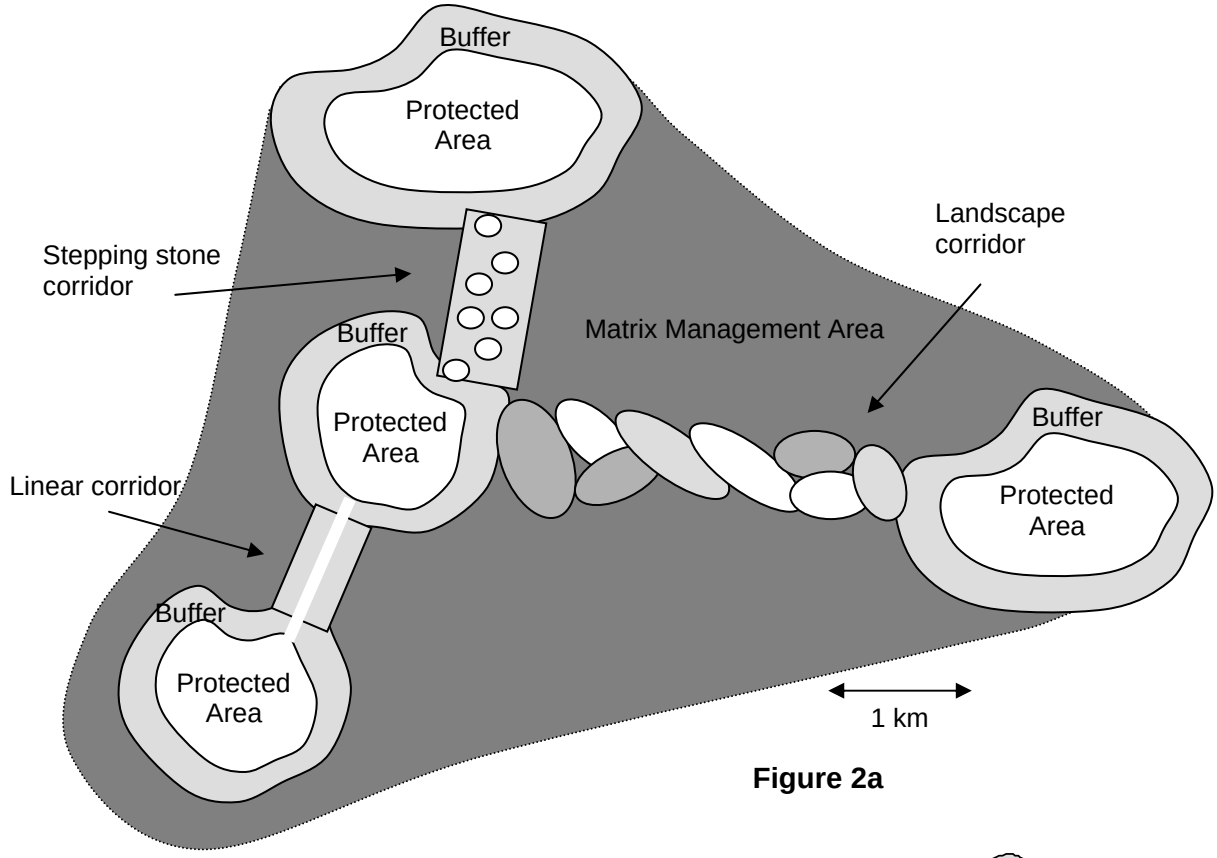


Figure 2a

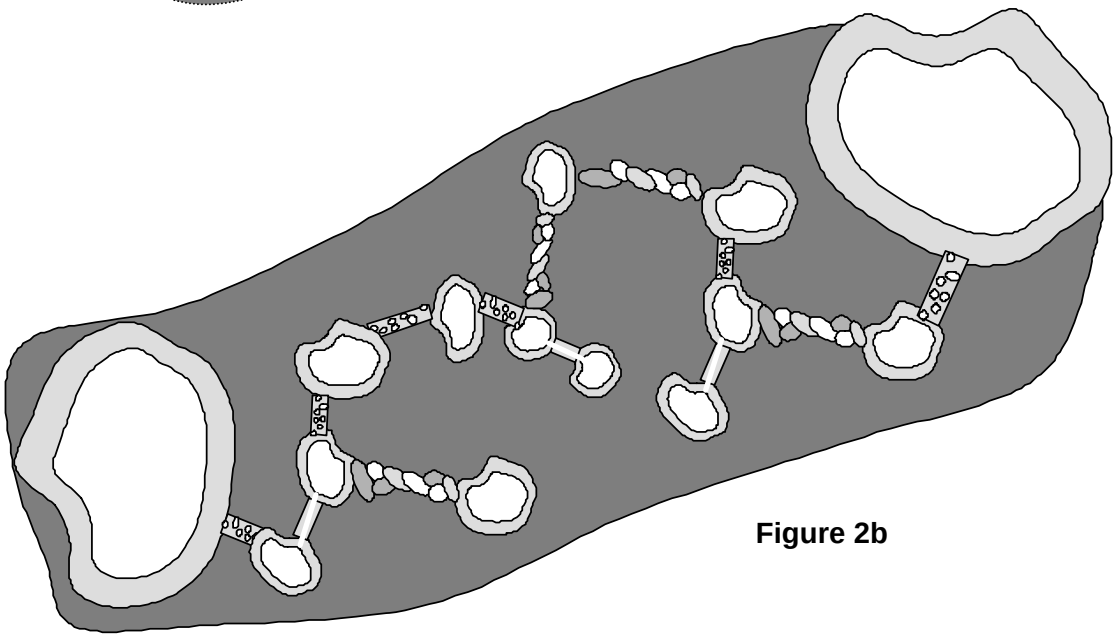


Figure 2b

Figure 13: Connectivity conservation concepts illustrated

Notes: Figure 13a) The conceptual elements that comprise connectivity conservation at the local landscape-scale, modified from Mackey *et al*. (2010). Darker areas incorporate fewer elements of native ecosystems, while lighter areas are higher quality and more intact.
Figure 13b) The way in which conceptual elements can be combined, along with even larger protected areas, to provide connectivity at larger regional, supra-regional and continental scales.

Table 4: Adoption of leading practice management guidelines and design principles (from section 3.2) by case study

	GER	S2S	Habitat 141º	G'Link	E-W NatureLinks	Wild Eyre	Bunya Biolink	Midland-scapes
1	Yes	No[1]	Yes	Yes	Yes	No[1]	No[1]	No[2]
2	Yes	Yes	?[3]	Yes	Yes	Yes	Yes	Yes
3	Yes[4]	No	?	Yes	No	No	No	No
4	Yes	Yes	?	Yes	Yes[4]	Yes[4]	Yes[4]	Yes[4]
5	Yes	Yes	?	Yes	Yes	Yes	Yes	Yes
6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	Yes	Yes	Yes	Yes	Partly[5]	Yes	No[6]	Yes
10	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	No	No	?	Yes	No[7]	No	No	No
12	Yes	Yes	?	Yes	Yes	Yes	?	Yes
13	No	No	?	No	Yes[4]	Yes[4]	No	Yes
14	Yes	Yes	?	Yes	Yes	Yes	Yes	Yes
15	Yes[4]	Yes[4]	?	No[8]	No	No	No	No
16	Yes[4]	Yes[4]	?	Yes	No	No	?	?
17	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	Yes	Yes	?	Yes	Yes	No	Yes	Yes
19	Yes	Yes	?	Yes	Yes	Yes	Yes	Yes

[1] This is because this initiative is a sub-component of a larger initiative. Note that the larger initiative *does* extend across the recommended scale, though in the case of the Bunya Biolink, the larger initiative has not yet progressed beyond the conceptual phase.

[2] Though this initiative does extend across a significant portion of Tasmania.

[3] Many principles could not be directly evaluated for Habitat141 because this initiative does not engage in biophysical design at the whole-of-initiative scale, though many of these principles are employed by individual partners or in specific project regions (for example Zone 1 – Glenelg).

[4] This principle incorporated into the objectives/goals of the initiative, but it does not appear to be guiding on-ground actions.

[5] One or more sub-components of this initiative exhibit high local heterogeneity, but that is not a characteristic of the corridor as a whole.

[6] This is because this initiative is a sub-component of a larger initiative. The larger initiative *does* exhibit some of these characteristics but it has not yet progressed beyond the conceptual phase.

[7] This is the only initiative to explicitly recognise that population *viability* is a key goal and that will require a minimum area to be connected. They just don't specify what that area is or how it can be determined.

[8] However, this initiative has conducted some sophisticated analyses to identify existing connectivity based on estimated landscape resistance.

Several trends became apparent when examining the use of leading practice guidelines and design principles across the case study corridor initiatives. Despite the fact that all initiatives began before the publication of Mackey *et al.* (2010), their objectives are almost universally consistent with Mackey *et al.*'s guidelines for connectivity conservation. The one exception is Mackey *et al.*'s suggestion to identify existing vegetation that provides buffer and connectivity functions in order to secure it first before employing revegetation. This was almost never a stated goal and was not reflected in actions – while some initiatives have undertaken revegetation of structural connectivity, we could not identify any actions being taken to protect existing structural connectivity *per se*. This may be an unintended artefact of the Conservation Action Planning (CAP) process used by most initiatives. In the CAP process, participants rate the landscape context of target ecosystems as poor, fair, good, etc. Objectives and actions are then intuitively directed at improving poor and fair ratings, even if the parts of the landscape contributing to a good rating (for example, riparian corridors, scattered paddock trees) are unprotected.

The initiatives were less consistent at adopting the more detailed design principles. Few considered the amount of area that might be needed to support viable populations (the threshold effect required to

achieve significant benefits from connectivity conservation – see also Parris *et al.* 2011). But it is recognised that estimation of minimum viable population requires considerable ecological research input. Also, few initiatives appeared to consider the design and placement of buffers, or the specific structures that might needed to support various types of functional connectivity. The main reason why these principles were not incorporated seemed to be a perception that only locally-based research was applicable when informing large-scale corridor design. In reality, ecological research is usually designed to test theories and reveal general principles that operate across locations, species and even ecosystems where possible. Thus, particularly where a body of research has been synthesised as in meta-analyses, the results can provide a strong evidence-based foundation for management even if the research was conducted elsewhere. This exclusive focus on local research is common in natural resource management (NRM) in Australia, and may be particularly understandable given that many groups often lack access to and expertise in evaluating the scientific literature (which can be overcome to some extent by strategically partnering). But it may be restricting the ability of many large-scale corridor initiatives to employ the best possible designs and thus may be restricting their ability to achieve their desired outcomes.

It was common for a principle to be reflected in the objectives of an initiative but not its actions. This should not be interpreted as a criticism of the initiatives, but rather as an indication that there are many impediments to achieving all the elements of connectivity conservation (see Box 2 for a specific example and expanded discussion). The most obvious impediment is a shortage of funds – all the initiatives have been able to fund only a fraction of the actions necessary to achieve their objectives. But the types of actions implemented to date also suggest more subtle impediments.

Box 2: Challenges in moving from site-scale conservation to landscape-scale conservation: operational experience in the Slopes to Summit component of the Great Eastern Ranges Initiative

Most corridor initiatives in Australia have struggled to implement on-ground actions that fully match their objectives. In particular, connectivity conservation can only be achieved when all the components of Figure 13 are achieved *in the same area*, so they work in concert to support native ecosystems. If buffering actions occur in one part of a corridor region, structural connectivity is protected in a different part of the region, and assets on private land are protected in yet another part of the region, this is fundamentally still site-scale conservation (albeit with more diverse on-ground actions) rather than true landscape-scale conservation.

The Slopes to Summit (S2S) partnership, a component of the Great Eastern Ranges (GER) Initiative, has recognised this and concentrated on trying to ensure their actions truly achieve landscape-scale conservation. First, Slopes to Summit used the Conservation Action Planning process which is designed to help ensure a logical connection between objectives and actions. In addition, the vision of Slopes to Summit involves increasing the size and quality of patches of native vegetation communities as well as functional connectivity between them (many of the elements of Figure 13). So the partnership supported a sophisticated spatial analysis by the then NSW DECCW that used the best available science to map native vegetation, its condition, and structural connectivity known to provide functional connectivity in the region (see Barrett *et al.* 2011) for a description of the approach as applied to the Upper Hunter Valley component of the GER). The result was a map at a fine spatial scale (100 m grid cells) showing precisely where opportunities exist in the region to truly achieve landscape-scale conservation.

But current and planned on-ground actions in Slopes to Summit are only loosely based on this spatial analysis, and focus on only a few components of Figure 13 — namely, protecting additional patches of native communities with covenants, improving grazing management in the matrix, and revegetating riparian areas that might (or might not) provide connectivity conservation. It is worth exploring the reasons for this mismatch as it is common to all the initiatives to some extent, and this may be where some of the best opportunities lie for improving landscape-scale conservation in Australia.

1. **Social constraints on biophysical design:** While the spatial analysis would ideally be used to target very specific areas for very specific types of management that is not how S2S is using the

analysis. Instead, they examined the resulting maps qualitatively and identified seven priority landscapes where it looked like there were probably some good existing patches of native vegetation and some existing connectivity. There is no further spatial prioritisation or targeting of efforts – any action that a partner wants to undertake is hopefully preferentially undertaken in these priority landscapes. One reason the spatial analysis was used so incompletely was that using it in a more detailed fashion would require targeting particular land owners for inclusion in conservation programs. This was widely considered to be an expensive, time-consuming strategy that might not be very effective compared to working with land owners that already express interest in conservation-oriented management.

2. **Lack of access to and expertise in using the results of spatial analyses:** Simple spatial analysis (a map) was used because the GIS resides with NSW DECCW, not S2S which only has paper maps produced for the whole region. This prevented the exploration of GIS analysis at finer scales. Even with GIS access it is unclear there are suitable people or resources to undertake appropriate analysis at the initiative scale.

3. **Constraints that arise from the 'providing the glue' model:** Most of the initiatives rely on a model in which they merely coordinate existing activities of their partners, meaning that on-ground actions are largely business-as-usual, just with a bit of spatial coordination. This has at least two unintended consequences:

    a. **Partners need to fulfil their own strategic goals, which may not be landscape oriented:** Partners can only undertake on-ground actions that fulfil their existing organisational goals, which may not be fully aligned with the relatively new efforts at landscape conservation. For example, buffering is not part of the existing objectives of any S2S partners, so S2S has no way to deliver targeted buffering in the region.

    b. **Reliance on existing delivery mechanisms means some aspects of connectivity conservation are ignored:** Partners use existing delivery mechanisms to achieve objectives and some aspects of connectivity conservation are not well served by existing delivery mechanisms. For example, there are no S2S actions to protect existing connectivity such as areas of scattered paddock trees, partly because there is no mechanism to do so. Such areas aren't high quality enough to warrant a covenant and are often too small to be considered worthy of a management agreement.

4. **Lack of focus on ecological and evolutionary processes underpinning fundamental objectives:** A key example is population viability. Much of the justification for connectivity conservation is the aim to create viable (persistent) populations and communities that require large and diverse areas actively managed for long periods. Yet conservation management in Australia has focused on species presence (snap-shot data) rather than long term viability. There simply have not been the resources (time and talent) to fully implement population viability analysis for most corridor initiatives.

5. **Insufficient funding for on-ground actions:** Funding for on-ground actions has not matched the scale of initiative visions and objectives. Delivering the principles of connectivity conservation is highly problematic when funding is so limited. Limited funding places a greater imperative on spatial coordination to at least achieve all the elements of Figure 13a *somewhere* rather than just a few scattered elements of Figure 13b and failing to achieve landscape-scale conservation goals.

Many of these problems could be summarised as a misalignment between objectives and opportunities. Current opportunities are still fundamentally designed around the needs of site-scale conservation rather than landscape-scale conservation. Innovative new approaches to expanding opportunities (for example ecosystem service markets) could produce rapid improvements in the outcomes of corridor initiatives.

Most initiatives have concentrated on identifying and protecting (often via covenants) significant assets that lie outside the National Reserve System, and undertaking some degree of matrix management (usually via management agreements to reduce grazing or fertiliser application on production lands). These actions have probably been favoured for two reasons. First, they can be implemented using existing institutional tools, or delivery mechanisms (like covenants and management agreements), and corridor initiatives usually adopt an explicit strategy of coordinating existing NRM activities rather than implementing new ones. Second, these actions can be implemented with almost any willing land owner, whereas implementing buffers adjacent to protected areas or protecting existing elements of structural connectivity would require targeting particular land owners in the landscape, which may not be a socially acceptable or successful strategy; or changing land ownership, a relatively slow and expensive strategy. Despite these challenges and impediments, the actions of most case studies reveal a broad understanding that connectivity conservation is about more than just improving structural connectivity. While not all design principles have been adhered to, the mix of actions employed clearly moves beyond simple concepts of connectivity (see Box 3 for an expanded discussion).

Box 3: Beyond Connectivity

To date, the well developed (active) Wildlife Corridor initiatives, that have already delivered on-ground outcomes, have included a wide range of strategic actions above and beyond building structural connectivity. This is likely a reflection of the use of the TNC Conservation Action Planning process that aims to improve the status or viability of conservation assets (targets) and nested targets (for example grassy woodland and the fauna dependent on these woodlands). Improving landscape connectivity (structural and functional) is only one strategy of many identified by the CAP process for these major initiatives. These initiatives cannot be criticised for focusing on restoring connectivity for connectivity's sake. If anything, they can be criticised for inadequate spatial analysis, with the exception of *Great Eastern Ranges,* which has benefited from leading edge spatial analysis using the latest methodologies from researchers including (Ferrier *et al.*, 2007, Drielsma *et al.*, 2007, Ferrier *et al.*, 2010, Pressey *et al.*, 2002, Ferrier and Drielsma, 2010). Unfortunately this GER spatial analysis is not yet widely publically available, though GER is working with the *Atlas of Living Australia* to place much of the analysis on the Web.

Initiatives such as Gondwana Link, Habitat 141º and *NatureLinks* focus on more than restoring ecological connectivity, and also include a full range of conservation activities across multiple land tenures. NGO partners in Gondwana Link have purchased whole farms for large scale restoration, but this has been complemented by many hundreds of hectares of Landcare style plantings on traditional broadacre farms. Integrated landuses within the *Fitz-Stirling* zone of Gondwana Link have included 280 ha of commercial investments in multi-species native sandalwood plantings and over 9000 ha of alley farms with belts of mono-culture carbon sequestration plantings integrated with no-til cropping systems developed by the now defunct SFMA Ltd. These SFMA farms removed livestock from all operations which greatly reduced grazing pressure on over 8000 ha of remnant woodland.

The *WildEyre* component of *East meets West Naturelinks* (SA) has developed 18 quantitative and time bound objectives. However, only two of them specifically refer to creating structural connections. The majority of objectives refer to improvements in agricultural and peri-urban landuses, particularly grazing practices, fire regimes and exotic species control.

All of the corridor initiatives that we have examined acknowledge the importance of formal conservation reserves in the public and private domain. All have identified the need to buffer and improve connectivity of these reserves, and strategies have focused on doing so on private lands, particularly farmland. However, the operational integration of National Parks and Reserves (NRS) into these corridor initiatives has been patchy. Some initiatives, particularly some zones within a corridor initiative have strong involvement of those State Agencies responsible for the management of the NRS, while others do not.

3.4 Broader institutional arrangements

In this section we review and analyse the diversity of organisational structures that have developed to cope with the complex tenure and institutional environments that corridor initiatives are working within. We concentrate on the experience of the case study initiatives in this report and note that the parallel report by Parris *et al.* (2011) contains additional discussion on the theory underpinning boundary or border institutions such as connectivity corridors.

Governance structures

Governance structures are the ways in which the case study initiatives are structuring and organising themselves. A summary of these arrangements is set out in Table 5. Not-for-profit entrepreneurial environmental organisations (NGOs) have been the driving players in many initiatives (for example Gondwana Link, Habitat 141^{oo} and Kimberley to Cape). In others government has been the initiator and generally remains a significant partner (for example NatureLinks and Great Eastern Ranges) with various levels of government support on-ground (for example Wild Eyre within the East meets West Nature link). The range of organisations involved within the partnerships also differs significantly, only partly depending on the scale (that is different organisations tend to be involved at zonal level compared to whole of corridor level). For example, the Slopes to Summit component of Great Eastern Ranges features a range of scientific and research organisations as partners, whereas Habitat 141^{o} includes CMAs and NGOs at the trans-regional scale and Landcare groups and similar in the zonal scale with 'fuzzy' boundaries.

There is a wide diversity of organisational structures ranging from working groups and steering committees to formally incorporated organisations with a board and director. A brief analysis of the history of these organisations shows that many initiatives are also in a state of transition: from government driven to broader community ownership (for example Great Eastern Ranges and NatureLinks); and from informal to formal governance structures (Habitat 141^{o}). We do not necessarily mean a formally agreed governance framework, although that may be the outcome, rather the transition is towards such a structure, potentially stopping short of it. Co-progressing with a transition towards more formal governance is a transition towards an independent office location, albeit often hosted by a non-aligned NGO (Greening Australia being a common host). The transition to a more formalised structure is complicated by the geographic and operational scales of the corridor initiatives combined with most having relatively strong (but variable) on-ground activities across some elements of the corridor. Most exhibit some form of hierarchical organisation with a zone type structure to the actual on-ground implementation (Midlandscapes being the exception due to its small geographic scale). Even within zones there are often differing focal elements, with subtly or radically differing partnership arrangements.

Whatever forms the initiative began under, partnerships are the dominant operating model with a diverse range of participants. Many initiatives have differing partners at the initiative level and at zone or project levels. Initiative level formal partners include non-government environmental organisations (NGOs), State Government agencies, not-for-profit statutory organisations (Govt. NFP), philanthropies, regional and local natural resource management (NRM) organisations and research organisations. We are aware of a much wider range of participants at the zone or project level extending to local governments, landcare groups, and many others. Consistent with the partnership model, decision making tends to be by consensus.

Table 5: Synthesis of governance, institutional and funding arrangements for case studies

***Governance* Attribute**	**GER** (NSW)	**S2S**	**Habitat 141º**	**G'Link**	**E-W NatureLinks**	**Wild Eyre**	**Bunya Biolink**	**Midland-scapes**	**K2CCCC**
Initiated (NGO, government, Indigenous)	Govt	Govt	NGO	NGO	Govt	NGO	NGO	Joint	Indig.
Inclusion model (partnership, government)	P-ship	P-ship	P-ship	P-ship	Govt	P-ship	Greening Australia → P-ship	P-ship	P-ship
Membership (formal partners only, NGOs includes community groups)	NGOs Govt NFP Govt (state)	NGOs Govt NFP Research Govt (state) NRM	NGOs Govt NFP Govt (state) NRM Philanthrop	NGOs	Govt NRM boards	NRM Govt NGOs	No formal members as yet	NGOs Govt	Indig. NGOs
Governance (Incorporated, MOU, Govt)	MOU	Working group[1]	MOU → Inc.	Ltd.	Govt	MOU	Greening Australia	Inc.	Indig.
Lead organisation or structure (Board, NGO, Govt, Indigenous)	Steering committee	Working group	Council and executive	Board	Govt	Working group?	Greening Australia	Board	Indig.
Hosting arrangements	NGO	Govt NFP in Uni campus	NGO	Own office	Govt. (DENR SA)	Govt. DENR Sa	NGO	NGO	Indig. In Uni Campus.
Decision model	Consensus	Consensus	Consensus	Director and Board	Govt with consultation	Consensus	N/A	Consensus	Consensus
Hierarchy?	Yes – focus regions	Yes – within GER	Yes - zones	Yes - zones	Yes	Yes – within EmW	Yes - proposed	No	Likely

Notes: Table constructed on similar lines to Table 4 whereby evaluation of the initiatives was very inclusive – we describe the attribute according to whether it was mentioned as being the case anywhere in the case study, particularly for the operation model and mechanisms used.

[1] S2S working group operates under an agreed set of principles for collaboration.

Acronyms: GER (Great Eastern Ranges), S2S (Slopes to Summit, component of GER), G'Link (Gondwana Link), K2CCCC (Kimberley to Cape).

Tenure and institutional arrangements

The emerging wildlife corridor initiatives need to be understood within the context of existing institutional arrangements[7] and land tenure within a region. All large scale conservation initiatives are multi-tenure, and will encompass an area which contains many of the following tenure arrangements:

- Conservation lands in public ownership and management (for example national parks and reserves)
- Other publicly owned lands (for example crown lands and state forests)
- Privately owned land managed, at least in part, for conservation (for example private reserves, conservation covenants and wildlife refuges)
- Privately owned land managed for agricultural production, mining, forestry or other similar extensive activities
- Crown leasehold land, usually managed for agricultural production but with residual rights held by the crown
- Indigenous lands, some of which may be managed in part for conservation purposes formally via an IPA or informally (the dominant tenure in much of northern Australia)
- Many large scale corridors will also exist near (or contain small proportions of) urban landscapes.

Present day remnant vegetation patterns are the product of historical land use patterns and tenure arrangements (Lunt and Spooner, 2005). Remaining vegetation factors can be attributed to a range of drivers as set out in section 4. One important driver is the different property rights regimes which govern the landscape. These have partly evolved in response to demands for land access and property rights (a pull factor) and partly driven change where landholders were once required to clear land to fulfil the obligations of their lease (a push factor) (Williamson *et al.*, 2003). Tenure embodies legal property rights, implied or prescribed permissible land use and rules of access. At present, different regulatory arrangements applied to different land-use tenures create on-ground issues for landscape conservation (Binning and Fieldman, 2000). Land management has historically been fragmented along these lines of land tenure types, however the sustainable management of Australian landscapes requires integration across the whole landscape (Saunders and Briggs, 2002). Given the spatial scale of operation, the framework for collaboration put in place to support corridor initiatives must encompass management across all these land tenures, thus providing a promising opportunity for integrated cross-tenure management (Wyborn, 2011 (in press)).

An integrated approach to planning landscape-scale conservation can minimise conflict between economic development and conservation while maximising potential for species survival. This is achieved through the strategic selection of core protected areas, buffer zones and compatible land use and human settlement within a biologically defined region or subregional space per the discussion in Section 3.2. Large scale conservation initiatives tend to take the internal management of conservation areas (publicly owned at least) largely as given and concentrate on the management of the landscape matrix between the protected areas. The key activities envisaged usually involve a mix of:

- Buffering the boundaries of protected areas with a mix of positive or neutral land-uses
- Managing linkages between protected areas to deliver ecological connectivity and permeability between protected areas

[7] We concentrate in this section on the observed use of institutional arrangements with more detailed discussion their limitations provided in the parallel Parris *et al.* (2011) report.

- Protect and restore conservation assets found outside protected areas (for example remnant vegetation on private land)
- Avoiding and reducing threats emanating from the adjacent and often integrated agricultural matrix
- Through these steps deliver ecological connectivity and maintain evolutionary processes.

We note that there are no specific tenure related institutional forms that are specific to the interrelated benefits that are desired by connectivity conservation. That is, there are no unique or special institutional forms relating to tenure that are intended to support connectivity management as opposed to more general conservation. Instead, implementation of connectivity management activities takes place within an overlapping array of formal and semi-formal jurisdictions and with overlapping objectives with other organisations, individuals and businesses. We have already outlined the partnership model that most connectivity conservation initiatives are pursuing and discuss the nature of boundary institutions such as connectivity conservation initiatives in more detail in the associated report by Paris *et al.* (2011). We limit our observation at this point to noting that there are substantial decision making, coordination and implementation transaction costs in these complex environments.

Mechanisms to deliver connectivity conservation outcomes

The experience of the corridor and connectivity conservation initiatives in delivering desired management activities is set out in Table 6.

Most initiatives have undertaken some form of business planning. While we have not reviewed these plans in detail, their emphasis appears to differ significantly. Some plans emphasise the potential for income generation from compatible land uses, others the business environment in which connectivity conservation outcomes are desired, and still others are oriented more towards the form of an investment prospectus and may not necessarily describe specific on-ground opportunities in any detail.

Delivery models have some variation. All initiatives take on a brokering role to some extent – identifying and assisting in opportunities for funding or implementation of mechanisms. In the cases reviewed, few initiatives appear to be designing, delivering and implementing programs themselves, rather they are attempting to leverage, broker and coordinate activities though partner organisations, NRM bodies and state and Australian government initiatives in the manner of boundary organisations (see Parris *et al.* 2011). Two non-exclusive models are emerging (sometimes even within initiatives). One model (generally incorporated entities) accepts and manages funds, but does not always manage programs (funds may be devolved to partner organisations). One reason that initiatives may not wish to handle funds is to avoid a source of friction amongst partners (H141º notes this as reason). Other initiatives have specifically modified their structure to allow for management of devolved funds (Gondwana Link).

The other facilitates and assists in-partner organisations seeking funds. It should be noted that the broker model can be quite an active approach. For example, in the Kosciuszko to Coast section of the Great Eastern Ranges Initiative, a ‘Fact Sheet for Incentive Programs’ has been complied to inform landholders of the different programs and incentive mechanisms in their region. The sheet lists 20 programs delivered through 12 partner organisations and two government departments. In this way, the Kosciuszko to Coast facilitator acts as a broker matching landholders with appropriate mechanisms for their particular situation. Similarly S2S acts as a broker in delivering conservation covenants (see Box 4 for some limitations of the covenanting approach in connectivity conservation management). A second philanthropic oriented broker model has emerged where the upper level initiative identifies and works with potential donors, ‘drafting’ them toward partners and programs where achievements can be maximised (a successful approach within Gondwana Link).

Table 6: Synthesis of implementation and funding arrangements for case studies

Attribute	**GER** (NSW)	**S2S**	**Habitat 141°**[3]	**G'Link**	**E-W NatureLinks**	**Wild Eyre**	**Bunya Biolink**	**Midland-scapes**
Business plan	Yes	Yes (GER)	Yes	Yes	No	Yes?	No	Yes
Delivery model								
Coordinator	No	No	Yes	Primarily	No	Yes	No	Yes
Who delivers operations?	Partners (non-exclusive)	Partners[1]	Partners and zones	G'Link, Zones and partners	NRM boards	Partners	GA, SEQ NRM	Midland-scapes & partners.
Manages funds	No	No	Yes (to be devolved)	Yes	Yes	No	Yes	Yes
Brokers covenants	Yes	Yes	Yes	Yes	No?	Yes	No	Yes
Brokers grants/programs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
On-ground mechanisms applied by partners[2] (direct or via partnerships)								
Targeted information	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Field days / workshops	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Volunteer coordination	Yes			Yes				
Field surveys/monitoring	Yes – ANU, NCT	Yes – ANU, NCT	Yes	Yes	Yes	Yes		
Covenants	Yes - NCT	Yes - NCT		Yes				
Grants (may include MBI)			Yes	Yes	Yes	Yes		Yes
Environmental markets (Carbon, offsets, other)			Yes - Carbon	Yes - Carbon			Yes – Carbon	Yes
Private purchase and management (land)			Yes (partners)	Yes (partners)				
Service provision (e.g. fire, pest and weed)				Yes - coordinate	Yes	Yes		
Other				Yes	Yes	Yes	Yes	Yes

Notes: Table constructed on similar lines to Table 4 whereby evaluation of the initiatives was very inclusive – we describe the attribute according to whether it was mentioned as being the case anywhere in the case study, particularly for the operation model and mechanisms used. Kimberley to Cape was not included as at too early a stage, Bunya Biolink included but also at very early stage.

Acronyms: GER (Great Eastern Ranges), S2S (Slopes to Summit, component of GER), G'Link (Gondwana Link).

[1] Nature Conservation Trust of NSW is contracted to deliver facilitation and covenanting services to NSW State Government (until June 30, 2011).

[2] Only those mechanisms specifically mentioned in case studies are identified. Where cells are blank we have no information about use or otherwise.

[3] H141°zones have an extensive experience in delivery however specific examples were not provided and no assessment could be conducted.

Regardless of the actual mode of seeking to influence landuse change (direct of via partners), the wildlife corridor initiatives have been able to draw on a number of different approaches and programs from the broader NRM and conservation policy space. Actual operational experience summarised in Table 5 suggests that all initiatives have delivered information and communication mechanisms using a wide range of formats. Examples include the Slopes to Summit "Biodiversity on Farms" field day and Most have undertaken field surveys or monitoring of environmental assets and have operated grant or tender programs (directly or via partners). For example, the "Midlandscapes Biodiversity Hotpot Tender" in Tasmania, revegetation plantings in the Fitz-Stirling region of Gondwana Link, and fencing assistance in the East West Naturelink. A few have been active in land purchase, environmental markets (only carbon specifically noted), or coordination of environmental management activities such as feral animal and weed control, or fire management. For example, Gondwana Link and H141ºpartners have purchased land and are active in carbon markets, EcoFire focuses on coordinating fire management, and Wild Eyre has undertaken coordinated weed control. This does not mean that the other mechanisms are not operating within the boundaries of the initiative; rather it is not directly linked to the initiative or reported as part of their achievements. Many other activities were also reported by case studies such as establishment of a seed bank (Bunya BioLink), rubbish clean up (wild Eyre), and a Wedge Tailed Eagle nest protection program (Midlandscapes).

Box 4: Limitations of conservation covenants as a connectivity conservation tool

A challenge for connectivity conservation initiatives is to tailor the mechanisms available to the range of desired activities necessary for the success of corridor initiatives, including management of buffers and associated agricultural matrix. Some conservation tools have limitations to the extent that they can be applied in certain settings. One example is conservation covenants. Conservation covenants are generally restricted to land with high-conservation significance. This usually requires that the vegetation on the property remains intact and in relatively good condition and offers high conservation value due to factors such as:

- It is part of an important wildlife corridor
- Diversity of native flora and fauna
- Presence of rare and endangered species
- It has some other defined high value for protection.

Though there are a variety of forms of conservation covenant available, these restrictions tend to apply in all cases. This means that conservation covenants in matrix management are marginal at best. That is, environmental assets such as paddock trees, and adverse management such as fertiliser addition near environmental assets cannot be protected by covenanting tools. There are also difficulties in overlapping different forms of covenant (such as covering carbon sequestration and biodiversity). A covenanting type of tool would be very helpful in protecting assets and managing threats to functional connectivity linked to matrix management. In contrast, there are incentives for new tree planting. So there is a perverse incentive is to revegetate via new plantings rather than to protect existing functional habitat structure.

A broad range of management activities and tools have been applied to implement the desired mix of conservation activities. It is important to note here that many of these activities extend beyond the singular focus of improving or building structural connectivity (See Box 2). The particular approach will necessarily need to be targeted to the particular socio-ecological context and the particular issue being addressed and are often targeted at different locations across the corridor initiatives. Differing activities will require differing levels of support, institutional arrangements and delivery mechanisms. Regardless of the context or issue at hand, the supporting institutional framework for wildlife corridors will need to be flexible enough to enable delivery across multiple tenures and through a diversity of players. Coordinating approaches across landscapes can therefore be especially difficult given the

differing decision modes of the players (contrast governments, private landholders and title in common, Indigenous tenure for example).

Concluding comments: institutional and organisational arrangements

A few key observations can be drawn from the institutional and organisational arrangements of corridor initiatives in Australia:

1. They are ***evolutionary***: initiatives often start small and over evolve into effective organisations across their eventual scale and range of programs over many years
2. ***Coordination*** is the key to their effectiveness: at such great scales and over so many partners, coordination is seen as a key need to create a 'whole greater than it's parts'
3. ***Formalisation*** over time has occurred as informal coordination amongst partners has moved toward structures such as incorporation with governance boards
4. ***Diversity*** is evident at all scales in the initiatives and in their approaches to conservation and programs they run
5. ***Participatory planning processes*** have commonly assisted in developing cohesion, particularly at the component (for example zones) scale of these spatially extensive initiatives
6. The partnership models tend to be a ***low cost operating model*** as it leverages in-kind (pro bono) time and expertise
7. Implementation remains ***project based*** and managed by a diversity of initiative partners.

There is no evidence, yet, of whole-of-initiative monitoring and evaluation of project activities and outcomes. Though in most cases, at least some form of monitoring plan is in place or signalled.

3.5 Funding arrangements

Secure funding models are critical to the ability of connectivity conservation initiatives to deliver lasting management change and connectivity conservation outcomes. While each initiative operates under a different funding model there is some commonality in the resources targeted which include at least six current sources of resources across the case study initiatives (not all initiatives target all sources but the majority are targeted in all cases):

1. Australian Government programs, primarily (but not exclusively) Caring for Our Country
2. In-kind and expertise of partner organisations (inclusive of local community volunteer activities)
3. Environmental market opportunities, primarily carbon sequestration, but also biodiversity offsets and other emerging markets (see Box 5 for a discussion on carbon bio-sequestration and Box 6 on fire management in northern Australia)
4. Commercial corporations
5. Philanthropics
6. Landholder in-kind and similar contributions.

The experiences of the case study initiatives offer some suggestions on how these connectivity conservation initiatives are operating financially, raising funds and delivering projects:

- Most initiatives are run from a partner's office or via partner funded conduits (Greening Australia is very prevalent in this role)

- Funding is generally unsecured and a major concern for initiatives sustainability into the future. In a small number of cases a philanthropic or other donation has secured some financial security to underpin some operational aspects (for example the Midlands Conservation Fund)
- There is a mix of private and public funded start-ups, though initiatives seem to be converging on partnership approaches. Financial concerns are common at the partnership phase irrespective of start-up funds
- Philanthropic donations are critical to designating a project officer (or similar) where governments are not directly involved
- In-kind knowledge, networks, indirect (and sometimes direct) funding support and on-ground implementation skills from partner organisations (and their members) is critical in facilitating early stages of organisational development of initiative. In-kind is especially important to facilitating CAPs
- Issues of scale around when volunteering or in-kind should become paid for participation (for example H141ºclear statement that volunteering / in-kind appropriate to *local* initiatives, but at scale – with at scale benefits – want to be paid)
- Marketing of the initiative and branding is the responsibility of the head organisation.

Box 5: Potential of Carbon Bio-sequestration plantings to restore connectivity

Various studies have modeled the potential for carbon forestry (plantings to offset greenhouse gas emissions) to drive large-scale landuse change in cleared agricultural landscapes (Crossman *et al.*, 2011, Eady *et al.*, 2009, Freudenberger, 2010, Patterson and Bryan, 2011, Polglase *et al.*, 2011). The potential for a profitable market for carbon forestry to reduce landscape-scale fragmentation is naturally dependent on: land price, cost of planting, cost for licensing plantings for water interception, forest productivity, the discount rate and the price on greenhouse emissions. For example, at an establishment cost of \$3,000 ha^{-1} and a discount rate of 10%, no areas of agricultural land were identified as profitable for carbon forestry until a carbon price of \$40/t $CO_{2\text{-}e}$ was reached (Polglase *et al.* 2011). In contrast, at a carbon price of \$20/t $CO_{2\text{-}e}$ and a discount rate of 5%, the profitable area was 32 M ha for carbon forestry establishment costs of \$1,000 ha^{-1} compared with 1.0 M ha for establishment cost of \$3,000 ha^{-1}. Polglase *et al.* concluded that additional incentives (for example gap payments) may be needed to target carbon forestry in priority places to achieve other NRM objectives such as enhancement of biodiversity.

Box 6: WALFA (West Arnhem Land Fire Abatement)

WALFA (West Arnhem Land Fire Abatement) has clearly demonstrated that landscapes can be effectively managed by traditional owners and that traditional owners can in turn receive tangible benefits through jobs on country that benefit people and nature. The WALFA project results in emissions reductions of more than 100,000 tonnes/year. In turn, ConocoPhillips pays \$1 million/year for the next 17 years for these emissions reductions. This approach will be expanded across Northern Australia as part of the Kimberley to Cape Culture and Climate Change Corridor to provide: (1) connectivity across Northern Australia, (2) significant emissions reduction through savanna burning, sequestration and feral animal management through the Carbon Farming Initiative, (3) biodiversity benefits through effective management and (4) social and cultural benefits for traditional owners.

The role of direct government support

Given the financial pressures apparent in most initiatives, what role should government support take? There is little direct information available from the case studies that would inform what support is most necessary. This question is for the most part beyond the scope of this report, however we make some observations of where support may be most useful with respect to the operation of the initiative as whole rather than in directly influencing on-ground management. Financial support of coordination units is difficult to maintain in a consistent and longer-term way (per guidance principle 24). This means that the key repository tasks are often undertaken by volunteers, by part-time or short-term employees, and this makes it difficult to assemble the institutional capital required to support corridor initiatives. Project funds are often highly targeted and do not support coordination activities. Furthermore, project oriented support may not be appropriate where initiatives are operating a devolved delivery approach via partner organisations. The view that financial support from government will help the coordinating body for the initiative to deliver is not universal, with at least some countervailing view that this would reduce the independence of the bodies, reduce their incentives to develop self-sustaining funding models, and tend to crowd out other contributions.

Other roles for government support are facilitating access to information, networking and where institutional access has substantive cost-efficiencies at large scale. Information appears to be a key constraint in planning and prioritisation tasks within corridor initiatives (see Box 7 describing how the Tasmanian government has assisted in providing information for the Midlandscapes initiative). Constraints relate to accessing existing information and to specialist skills to collect and interpret information. Supporting networking across initiatives will facilitate more rapid evolution and entrepreneurial approaches via sharing of leading practices. Finally, there will be some activities for which it may be far more cost effective to offer consolidated services from a central point across connectivity conservation and other initiatives than for the initiatives themselves to support them. One example is specialist legal services underpinning conservation covenants. Covenants (especially if broadened as suggested in Box 4) are likely to be valuable tools in delivering connectivity conservation outcomes but require a variety of specialist legal steps in their implementation. Centralised provision of these services is likely to be more cost effective that individual purchase (assuming that scale exceeds the existing *pro bono* model operated).

Box 7: Identifying Focal Landscapes in Tasmania for the Protected Areas on Private Land Program

Since the initial planning of the CAR forest reserve system in Tasmania, increasing emphasis is being placed landscape level approaches that cross multiple land tenures. This shift is driven by a focus on the long-term ecological viability of reserves and the maintenance or persistence of large-scale ecological processes seen to be particularly important in the context of accelerated global climate change. Consequently, a broader range of conservation targets are now being considered to address gaps in the adequacy component of CAR, and there is a growing recognition of the need for approaches that strategically integrate the reserve system with broader NRM outcomes.

In 2009 through the Protected Areas on Private Land Program (PAPL), the Department of Primary Industries, Parks Water and Environment sought to "*Develop a state-wide map identifying focal landscapes for targeted effort for future additions to the National Reserve System"*. PAPL aims to take a strategic, landscape-scale approach to identifying potential land that considers the role or functions of natural systems within individual private land titles. PAPL sought to incorporate the best available science and expert knowledge of natural values into spatial datasets that can be interrogated in a Geographic Information System (GIS). This information will be utilised to identify potential areas of resilience or vulnerability to accelerated climate change and other threats, thereby informing management interventions.

PAPL developed a planning tool based around a focal landscape spatial layer and a PAPL metric grid layer that indentified the geographic distribution of focal landscapes and co-occurring natural values in Tasmania. These two layers form the basis of a map called the PAPL Prioritisation Map (PPM), developed to provide a visual representation of the two spatial layers and to provide guidance for future additions to the NRS. The primary intent of the PPM is to meet the needs of PAPL by identifying priorities for protected area establishment on private land using international, Australian and Tasmanian policy drivers. It informs National Reserve System program (NRS) priorities but is not intended to show the only areas of high density of natural values in Tasmania.

The focal landscapes mapped have a high concentration of the defined range of natural values and are areas that PAPL may, in the future, allocate greater attention to. This will direct the focus of PAPL in the medium term, in the interests of promoting conservation management in those parts of Tasmania with the highest concentrations of natural values and specific priorities that are identified in the PAPL project plan. PAPL has directly targeted 413 landowners within 11 of the 14 focal landscapes (as at April 2011). This engagement has resulted in 22 conservation agreements actively proceeding to finalisation (though with only 1 registered on property title to date).

4. SYNTHESIS INTO DPSIR FRAMEWORK

The DPSIR framework is used here as a rationale and synthesis of the compendium against which individual corridors may be considered. The DPSIR (Driving-forces, Pressure, State, Impact, Response) Framework is a conceptual construct for describing the causal interactions between society and the environment. The DPSIR Framework has been used for the past three decades, particularly in Europe and by UNEP, as an overall mechanism for analysing environmental problems and developing policy solutions. It has also been used for some time to frame environmental reporting statistics (Weber, 2010). The Framework has sometimes been criticised as overly linear and may downplay the uncertainty and multiple dimensions of causality inherent in complex environmental and socio-economic systems (Maxim *et al.*, 2009). Careful structuring of the model and responses minimises these concerns, though we agree with these authors that the Framework is one tool for structuring communication between scientists, policy makers and land managers. Here we use the DPSIR framework to help synthesise our compendium of the case studies.

Figure 14 provides a conceptual model of the DPSIR framework. In short, social and economic development **D**rivers, exert **P**ressures on the environment and, as a consequence, the **S**tate of the environment changes. This leads to **I**mpacts on ecosystems, human health, and society, which may elicit a societal **R**esponse that feeds back on the **D**rivers, on the **S**tate or on **I**mpacts via various mitigation, adaptation or curative actions. The elements of the DPSIR framework are defined in Table 7 along with examples of their manifestation in the case study corridors included in this compendium.

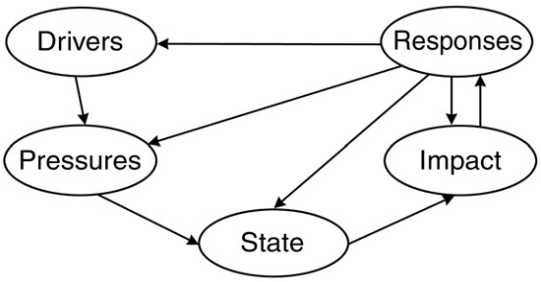


Figure 14: The DPSIR Framework

Source: (Smeets and Weterings, 1999).

The diversity and number of corridor initiatives in this Compendium can all be seen as large scale Responses to the Pressures and Impacts on the State of the environment at the scale of multiple NRM regions. Initiatives such as Habitat 141º have planned strategies (Responses) such as revegetation in prioritised areas, control of grazing in remnant vegetation, as well as integrated pest control. Many of the reviewed corridor projects also identified policy measures (Responses) such as the development of markets for ecosystem services (for example carbon bio-sequestration) that could fund large scale corridor conservation activities, or strategies to restrict adverse landuse change. Several initiatives identify the importance of identifying new and more sustainable income generating activities, particularly in the context of maintaining cultural connection and values on country.

We note that none of these corridor projects directly address the national and international Drivers of the common Pressures identified in Table 7. Clearly there is a role for the Australian Government to address these drivers through biosecurity policies and practices, policies to reduce greenhouse gas emissions, further policy development for human population growth, and mitigating human population impacts on the Australian environment. Nevertheless most of these pressures will remain substantial and will need a countervailing pressure applied via reinvestment and management of the landscape to support the desired connectivity conservation outcomes.

Table 7: **Definitions of the elements of the DPSIR conceptual model and examples relevant to the corridor case studies**

Term	Definition	Examples (excluding impact on human well being)
Driver (or Driving Force)	Essentially human needs expressed as economic and social policies of governments, and economic and social goals of those directly interacting with the environment	• The historical, current and future societal needs for housing, food, fibre and water • Human population growth and regional changes (rural decline, peri-urban growth) • Growth in international trade with risk of plant and animal invasions into Australia and as a driver of intensification • Global economic growth coupled to growth in greenhouse gas emissions • Technology changing methods of agricultural production and environmental management • Cultural change / interaction
Pressure	Ways that human needs are actually expressed as activities and changes to physical and ecological processes that affect the environment	• Vegetation clearance and landuse change • Landuse intensification • Introduction of exotic plants and animals • Introduction of nutrients, pesticides and herbicides • Hydrological impacts (water diversions and extraction, water pollutants, groundwater flow changes) • Changed fire regimes • Climate change impacting temperatures, rainfall and runoff. • Resultant and interlinked degradation processes that also impact on biodiversity such as dryland salinity, disease, pest animals etc. • Change to human population distribution (increase and decrease) • Changes to cultural management
State	The physical, chemical and biological conditions of the environment at various scales	• Extent, condition and configuration of native vegetation • Population size and composition of flora and fauna (and linkage between sub-populations) • Seasonality and intensity of fire • Water quality • Flow regimes • Erosion/sediment movement process • People living on-country, in corridor landscapes • Social capital represented as knowledge and capability to manage environmental issues
Impact	The way the pressure affects environmental conditions including human well being	• Habitat loss • Habitat fragmentation • Habitat degradation • Extinct, declining or increasing population size • Ecosystem services to income generating activities • Existence, option and bequest values • Viability and vitality of social networks and organisations managing environment

Response	Strategic actions and policy measures to reduce Drivers, Pressures and Impacts as well as improving the State of the environment	Policy Measures • NRM Programs, for example One Billion Trees, Natural Heritage Trust, National Action Plan for Salinity and Water Quality, Caring for Our Country, National Wildlife Corridor Program, National Water Initiative • Vegetation clearing controls • Employment programs, for example National Green Jobs Crop, Indigenous Ranger Programs • Landuse zoning Strategic Actions (on-ground) • Revegetation (native plantings and exotic forestry) • Altered livestock grazing regime • Altered fire regime • Pest plant and animal control • Environmental flows to rivers and wetlands

Source: structure adapted from Kristensen (2004).

Table 8: Equivalence of terminology between the DPSIR framework and Conservation Action Planning (CAP)

DSPIR term	Equivalent CAP Term
Drivers	Sources of Threats or Stresses
State	Status (Viability) of the Focal Targets
Pressures	Threats or Stresses
Impact	impact of Strategies and Actions on Key Ecological Attributes affecting Viability of Focal Targets
Responses	Strategies and Actions that can include policy changes

Note: capitalised terms are key concepts for each framework.

The reviewed corridor initiatives are also less than holistic in the sense of addressing socio-economic Pressures, States, Impacts and Responses. Some of the corridor initiatives have strategies to raise environmental awareness, but few have explicit employment strategies or strategies to improve human health through greater participation in and access to natural environments with the exception of those in Northern Australia. Most initiatives seek to directly target the pressures with well considered portfolios of strategy (more on this below).

We are not aware of any formal DPSIR analysis for any of the corridor case studies. However, we note elsewhere (Section 3.4) that most of the case studies have used Conservation Action Planning as a participatory tool to develop objectives and strategies. Step 5 in the CAP process ("Conduct a Situation Analysis") can populate a DPSIR framework. Table 8 provides an equivalence of terms used in the two planning frameworks. The "Situation analysis", particularly when developed with the Miradi visualisation tool (Miradi, 2008), lists each core element of the State (focal targets) and the condition or status of each State component (Figure 15). The CAP situation analysis seeks input from project participants to identify the sources or Drivers of the threats or stressors. CAP seeks particular rigour in analysing the likely Impact of Responses. In CAP, this analysis is termed "Results Chain Analysis" where participants are asked to predict the results (Impact) of strategic actions on the viability (State) of the focal targets. Results Chain Analysis follows a simple (linear) 'if-then' logic. The situation analysis step seeks to expose the underlying assumptions in such logic chains.

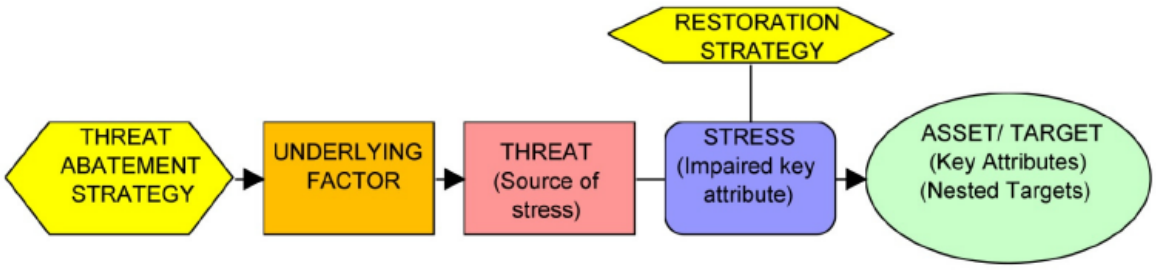


Figure 15: The conceptual structure for a 'situation analysis' using the terminology embedded in the Miradi planning tool

Source: www.miradi.org

We suggest that a broad application of the DPSIR framework or an equivalent such as Conservation Action Planning is needed as part of the initial planning process for each and every large scale corridor initiative. Our review of each initiative indicates that Drivers, States, Pressures, Impacts and effective Responses differ from project to project. To date, most of the initiatives, at the scale of zones and projects have utilised participatory processes, including input of scientific expertise to the application of a generic planning process such as DPSIR. However, the rigour in which likely causal relationships have been analysed is limited to date.

We emphasise that the application of a DPSIR framework is simply an initial step in effective and adaptive project planning, implementation and review. Other tools, such as spatial prioritisation (for example (Marxan, 2011)) are required and should be linked to strategy prioritisation tools such as INFFER (Pannell *et al.*, 2011). These tools are necessary to link the strategic DPSIR approach directly to a set of activities, and then on to individual projects down to the paddock or plot scale. Note though, that inadequacy of comprehensive planning should not be an excuse for inactivity in on-ground conservation.

5. CONCLUSIONS AND FURTHER DIRECTIONS

The objectives of this report were to:

1. Compile a descriptive compendium of existing and planned wildlife corridor initiatives
2. Analyse the operational experiences of corridor initiatives, particularly their governance arrangements, on-ground achievements and planning processes that account for climate change impacts and adaptation.

We limited this compendium to those initiatives that target connectivity conservation at the evolutionary process scale, require the coordination of multiple jurisdictions, and involve multiple partnerships. Even so, we found a striking diversity across and within the many initiatives that cover much of Australia as shown in Figure 1 and described in some detail in the Appendices. Connectivity conservation is now well recognised in Australia. The NWCP does not need to 'seed' the concept, but rather support the many years of planning, promotion and implementation that have gone into many of the described initiatives. The challenge for the NWCP is the bounty of choices.

The common thread across all the corridor initiatives is building leadership (rather than management) and coordination across the finer scales of conservation plans, projects and stakeholders. There is a motivating and compelling vision articulated by the initiative supporters to create a 'whole that is greater than the sums of the parts'. From our perspective the greatest threat to these ambitious corridor initiatives is maintaining high-level leadership and coordination. Components of these initiatives (for example operational zones such as WildEyre) are likely to survive as separate entities due to their significant local support. To date whole-of-initiative leadership and coordination has been through the goodwill and financial contributions of leading organisations (government agencies and NGOs). The loss of whole-of-initiative leadership and coordination is continuously a risk. But without it, the current initiatives will simply be lines on maps, rather than coordinated plans, actions and synergistic achievements.

The science of large scale connectivity processes is in its infancy, particularly in Australia. This continent does not have wide ranging and charismatic fauna such as the well studied wolf and bears of North America. Australia does not have well known, annual migratory routes found in southern Africa, nor iconic flyways such as the Mississippi Valley. Australian science has however been an early leader in landscape-scale fragmentation and the need for various forms of connectivity (for example Saunders and Hobbs 1991). Nevertheless, ecological understanding of patterns and processes at the scale of the Great Eastern Ranges or Gondwana Link is poor. We are unaware of any ecological modelling or comprehensive spatial analysis at this 'mega' corridor scale. Even the commendable analysis by researchers in the then NSW DECCW only focussed on the NSW portion of the Great Eastern Ranges Initiative. There is clearly a need for research to contribute to a continuous improvement in whole-of-initiative planning, coordinated implementation and evaluation of strategies and outcomes.

Governance and institutional arrangement for such cross-jurisdictional corridor initiatives will always be a challenge. There is such a diversity of tenures, partners and stakeholders. The collective experience of these initiatives shows that governance and institutional arrangements need to be evolutionary. Informal arrangement can allow for rapid buy-in and low transaction costs. However, as these initiatives matured over many years, more formal arrangements have been needed to clarify roles, responsibilities and accountabilities. However, corridor initiatives are unlikely to need large and separate bureaucracies. All have partner organisations that have mature systems and processes to manage and account for large financial investments. Furthermore, their operational experiences show a willingness and ability to co-opt a wide ranging set of mechanisms to deliver the desired connectivity conservation outcomes.

Despite the cost-effective operating model of corridor initiatives, financial security remains a challenge in delivering lasting management change and connectivity conservation outcomes. Most initiatives are investing resources in developing secure business models to underpin both their own future activities, and in order to deliver financially sustainable land-management change. Nevertheless there appears to be some need for government support: via information and expertise that is difficult to gather or interpret at the individual corridor level (and especially relating to long-term large-scale monitoring); and potentially via support of the governance and basic operations of the initiatives themselves.

The corridor initiatives described in this report have all arisen by a broad recognition that large scale and well coordinated on-ground conservation and restoration are needed to address the large scale threats affecting Australia's natural and cultural heritage. Rapid climate change is simply one pervasive pressure in addition to invasive species and over a century of land use intensification. These corridor initiatives recognise, mostly implicitly, that much greater financial resources and human energy is needed than has been invested to date in reducing these continental scale pressures. One of the challenges for the Australian Government is to create the enabling conditions needed to attract far greater investment in time, talent and financial capital to match the scale of need and ambition. The enabling condition that is already in place is the desire to act ambitiously. That's the core result of this compendium.

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APPENDICES: CASE STUDIES

Critical elements of case study analysis

1. Governance arrangements for planning and operational funding.

2. Institutional arrangements including the complexities of multiple land tenures and mechanisms to secure conservation gains.

3. Methodology for identifying critical ecosystem linkages in the landscape required to protect biodiversity including facilitation of large-scale movements of species.

4. Use of (or not) a mix of landscape-scale operational measures.

5. Extent to which well-established climate change impact predictions and adaptation strategies have been incorporated into planning and implementation in each case study.

A1 Great Eastern Ranges

Compiled by: Rob Dunn (GER coordinator) and others

1. Great Eastern Ranges Initiative (GER)

The GER Initiative addresses the functional connectivity of ecosystems along the length of eastern Australia's Great Divide and Eastern Escarpment from central west Victoria to the Cape York Peninsula. The 'corridor' follows a single defined route for more than half its length, before splitting in southeast Queensland to form 'escarpment' and inland branches. These merge again to form a single corridor near Cairns (Fig. 1).

Extending more than 2,800 km, the landscapes of the Great Eastern Ranges are Australia's most intact and biologically-diverse mountainous ecosystems. They are a terrestrial archipelago of ancient Gondwanan rainforests, alpine meadows, wetlands, rocky heaths, tall Eucalypt forests, woodlands and grasslands. This diversity of ecosystems is directly related to the diversity of landscapes, climate zones and soil types.

The Great Eastern Ranges are a refuge for a vast array of plants, animals and insects continuing to evolve in the intact ecosystems that provide essential ecological services such as clean water and fresh air – as vital for our wellbeing as for all other species. Improved connectivity management of the Great Eastern Ranges will help protect water supplies for over 93% of eastern Australia's population, as well as significant nature-based tourism assets.

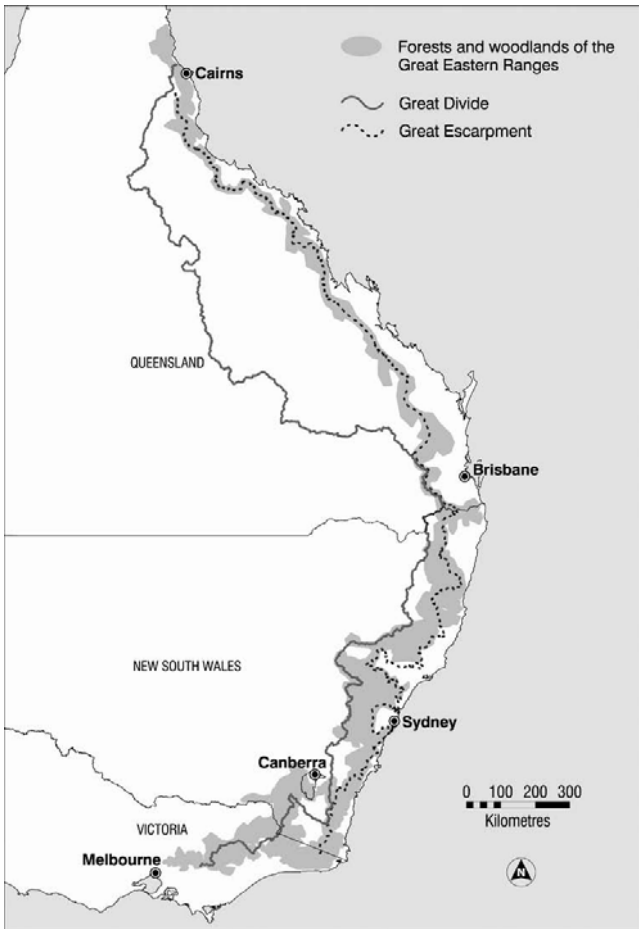

Figure A1.1: The outline of the Great Eastern Ranges initiative.

The GER Initiative commenced activities by focussing in five key focus areas, each with their own Regional Partnerships:

1. Border Ranges (northern coastal NSW and Qld)
2. Hunter Valley (central coastal NSW)

3. Southern Highlands Link (west of the Sydney basin)
4. Kosciuszko to Coast (ACT and Southern Tablelands of NSW)
5. Slopes to Summit (south west slopes of NSW and north central Victoria)

Each Regional Partnership brings together organisations with a range of skills in conservation management, research, on-ground implementation, etc, and encourages alignment of efforts with achievement of common objectives for improved connectivity. These partnerships are supported by a Partnership Facilitator and a central coordination function. This central function is also focussed on expansion across all States. The expansion strategy involves setting up new regional partnerships in priority connectivity gaps, aligning with other conservation and NRM organisations' programs, including the NRS, and with affiliate networks and programs.

Location and jurisdictional coverage:

The GER Initiative intersects with all NRM regions in eastern Australia, most notably:

- Queensland; Burdekin, Burnett-Mary, Cape York, Condamine, Fitzroy, Mackay, Northern Gulf, SEQ Catchments, and Wet Tropics
- NSW/ACT; Hawkesbury-Nepean, Hunter-Central Rivers, Murray, Murrumbidgee, Northern Rivers, Southern Rivers, and Sydney Metropolitan
- Victoria; East Gippsland, Goulburn Broken, North Central, North East, and West Gippsland

2. Drivers

History

On 24 February 2006 the Hon Bob Debus MP, the then NSW Minister for the Environment, announced the NSW Environmental Trust had allocated a budget of $7m. over three years to establish the GER Initiative in NSW. The key means for achieving the vision in NSW are: the Business Plan 2007–2010, a Communication and Community Involvement Strategy, and partnerships for integrating a wide range of conservation activities in priority areas. An inter-state agency working group was established to explore opportunities for implementing the GER Initiative on a national scale. This included commissioning a proof of concept report, *Connectivity Conservation and the Great Eastern Ranges corridor* (Mackey, Worboys and Watson, 2010).

The GER Initiative was led for its first three years by a team of five staff within the Office and Environment and Heritage, Department of Premiers and Cabinet (OEH) with skills in partnership development, conservation analysis, project management, communications and tourism. This team worked closely with the five Partnership Facilitator positions. In July 2010 the coordination of the Initiative was handed over to a group of five leading organisations from conservation NGOs and government.

Mission and purpose:

"To conserve and manage a 2,800km 'continental lifeline' of habitats, landscapes and people that will support the continued survival of native plants and animals along the great eastern ranges from the Australian Alps to the Atherton Tablelands and beyond, and maintain the natural processes on which they depend".

Champion / leadership:

The current Lead Partners Group comprises of Greening Australia (NSW)

- OzGREEN
- National Parks Association of NSW
- Nature Conservation Trust of NSW
- OEH

The Group is supported by the role of Director (Rob Dunn).

Community Drivers

The community is increasingly aware of the scale and impending nature of the environmental issues faced by this vast region of eastern Australia. There is increasing public frustration with a perceived lack of action by Governments. Genuine and deeply felt concern about the environment has primed individuals and communities for action. Many in society are now looking for a place to act on these concerns in a way that resonates with the scale of the problem.

In short, society is looking for leadership, action, and a framework where they can act or contribute in a meaningful way. The GER Initiative fills this gap and is proving timely on all counts, achieving broad-ranging support from a range of sectors. This is one of the most significant achievements of the Initiative.

Programs within the GER Initiative achieve on-ground success by bringing together existing groups, organisations and public authorities to channel potential for collaborative effort into a more focussed area. This targeted 'impact' approach to conservation is able to generate rapid change in behaviour and provide the basis for lasting change in local landscapes which combine those in the same and other regions to create a web of action.

3. Organisational structure

Host / lead organisation:

The GER Initiative Director is currently hosted by Greening Australia, Sydney.

Staff:

The current core team consist of a Director, five Regional Partnership Facilitators and a part-time conservation analyst role within OEH.

The Director's focus is to raise funding for the Initiative, support the Regional Partnerships, expand the Initiative into the other States and new partnership areas and governance.

The Director reports to the Lead Partners Group. The Group provides high level direction, coordination and project delivery across the GER Initiative, supported by a program coordination capacity.

The GER Initiative achieves much of its implementation through Regional Partnerships coordinated by full-time or part-time Facilitators, whose role includes project co-ordination, community engagement, facilitation, fund raising and reporting. Each of the Facilitators is hosted by NGOs who are either Lead Partners or key regional partners. The Regional Partnerships focus on linking regional habitats and landscapes, contribute to the broader vision and set goals to conserve and manage habitats for the benefit of biodiversity and people.

OEH provide central support through the availability of their Conservation Analyst and GIS staff. The Director and OEH Conservation Analyst work closely with the Facilitators to identify opportunities at the regional and whole of Initiative level to share information.

Partner organisations:

Over 100 organisations are involved in the GER Initiative as Lead Partners, members of Regional Partnerships, or active contributors to partnership projects. These represent State and Local Government, CMAs, NGOs, community groups, universities and researchers, landcare groups, indigenous groups. The Initiative is also expanding through association with 'Affiliate' organisations, networks and programs with a regional, State or National focus. These Affiliates would align certain of their programs with the Initiative though they are not direct members of the Regional Partnerships.

Governance and organisational structure

The Great Eastern Ranges Initiative is not an incorporated body at this point in time. However the Lead Partners are all incorporated organisations.

From July 2007 to June 2010, the GER was a NSW Government led program. From July 2010 four NGOs and the OEH reached agreement under a MoU to jointly manage the Initiative through a 'Lead Partners Group'. Current signatories to the MoU are:

- Greening Australia (NSW)
- OzGREEN
- National Parks Association of NSW
- Nature Conservation Trust of NSW
- OEH.

A new MoU is currently being finalised to facilitate the expansion of this Group.

Intended future directions and governance arrangements for the group are described in the 'Proposed model for the future of the GER Initiative' and the MoU.

The Lead Partners meet on a regular basis with actions documented and minuted. The Lead Partners approved the Business Plan and monitor progress and review priorities through the year. Four of the Regional Partnerships operate under principles of collaboration with monthly or quarterly meetings, while one (Southern Highlands Link) is more project focussed with one-off meetings to cover specific issues and opportunities.

Two of the partnerships (Hunter Valley & Border Ranges) have Working Groups and a wider Alliance Group. The Alliance Groups of 30 or so members each meet on an annual basis to provide input to the planning process.

The Regional Partnership areas were selected on the basis of their having significant regional biodiversity values, existing and ongoing threats to connectivity locally and in the context of the wider GER, and regional capacity to deliver collaborative outcomes. Within each Regional Partnership specific areas have been identified in consultation between the Regional Partners, often involving a formal Conservation Action Planning process. These plans and priorities are reviewed and updated as required.

4. Biophysical design principles and analyses

Mackey *et al.*(2010) was commissioned in part by the GER Initiative and formed the basis for the development of applied principles. Mackey et al's (2010) management principles were the basis of pilot spatial analysis conducted by OEH in 2010 to evaluate the significance of the GER for:

- Migratory species movements,
- Maintaining condition of native vegetation,
- Implications of climate change for drivers influencing species assemblages
- Productivity, and identification of potential drought refugia.

This analysis validated the selection of the original five Regional Partnership areas. On-going interpretation has already started to influence the selection or contextualising of future partnership and affiliate activities in NSW, southern Queensland and northern Victoria. Further spatial analysis is planned for 2011-13 (subject to successful funding from NCCARF).

Figure A1.2 Provides an example of the extensive spatial analysis and prioritisation conducted by the OEH for the NSW portion of the Great Eastern Ranges. Figure A1.3 provides and example of the habitat corridor modelling for the Upper Hunter of NSW.

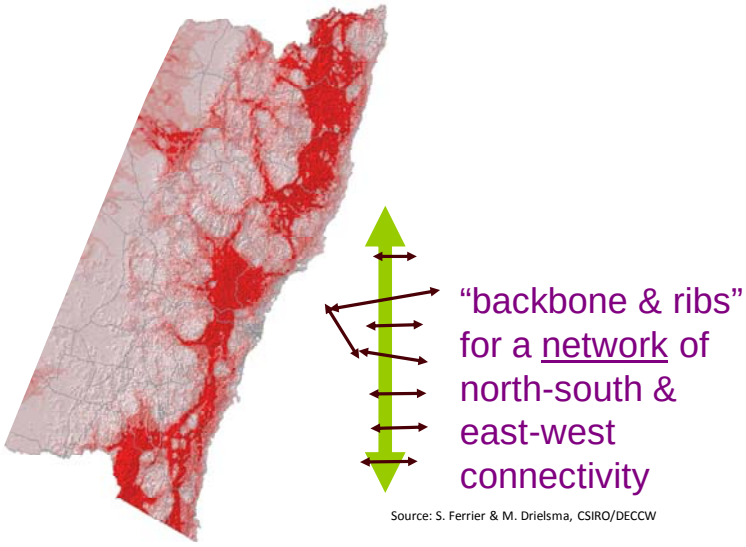

Figure A1.2: Vegetation connectivity analysis conducted by the then NSW DECCW for the NSW portion of the Great Eastern Ranges Initiative.

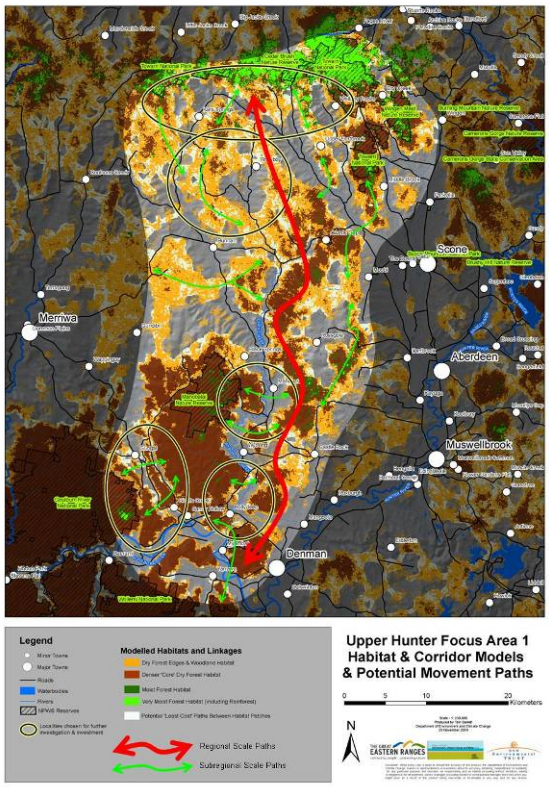

Figure A1.3: Habitat corridor modelling for the Upper Hunter zone of the Great Eastern Ranges Initiative. Modelling conducted by the former NSW DECCW in collaboration in association with local stakeholders with funding support from the NSW Environmental Trust.

Goals:

Interim goals for the GER Initiative have been established as summarised in Table A.1.1.

Table A1.1: Interim goals for Great Eastern Ranges initiative

Long term Goals (commencing 2010-11)	Long-term Objectives for GER Initiative	Measures of Success
Linking landscapes & people People working together in locally organised and managed regional partnerships to improve the connectedness and resilience of landscapes	• 10 functional regional partnerships in priority areas • 20 'emergent regional partnerships' comprising existing local community networks, project efforts or emerging partnerships • Collaborative projects established (or maintained) in each partnership to deliver an integrated mix of conservation mechanisms • Funding obtained in each regional partnership for seed projects to stimulate collaborative action to improve connectivity in highest priority locations	• Number and functional status of regional partnerships and relationships with affiliated projects • Connectivity within and between human communities, with associated leadership capacity across society and within otherwise uninvolved sectors • Capacity of organisations and individuals to act locally with an understanding of the context their efforts contribute towards • Quality and effectiveness of partnerships, information exchange and partners' interactions • Improving trend in condition of environmental assets, and the processes essential to ensuring healthy and resilient ecosystems
Communicating effectively Transfer of knowledge and insights between regional partnerships	• Structures and programs to enlist broad-based community engagement and ownership through inclusive, participatory action research and learning • Mechanisms to transfer learning and improve collaborative efforts both within and between regional partnerships • Greater capacity for local leadership in the context of the wider vision for the Initiative, matched by improved understanding and ability to measure community capacity for involvement	
Applying knowledge Improving understanding of species, ecosystems and local landscapes in the context of the wider GER, and their requirements for long term health	• Joint projects with research institutions to improve understanding of the species, ecosystems, landscapes and processes that comprise the great eastern ranges, and the values that people attribute to them • The ability to measure the functional condition of targeted ecosystems and landscapes and changes relative to management actions, to demonstrate the type and scale of change achieved	

At Regional Partnership scale, conservation action plans have been developed to provide more detailed biophysical goals and strategy objectives. The Border Ranges Partnership is being guided by the Border Ranges Regional Biodiversity Management Plan.

5. Implementation arrangements and achievements:

5(a) Implementation

A new model for engagement (Figure A1.4) was developed and adopted based on Worboys *et al.* (2009).

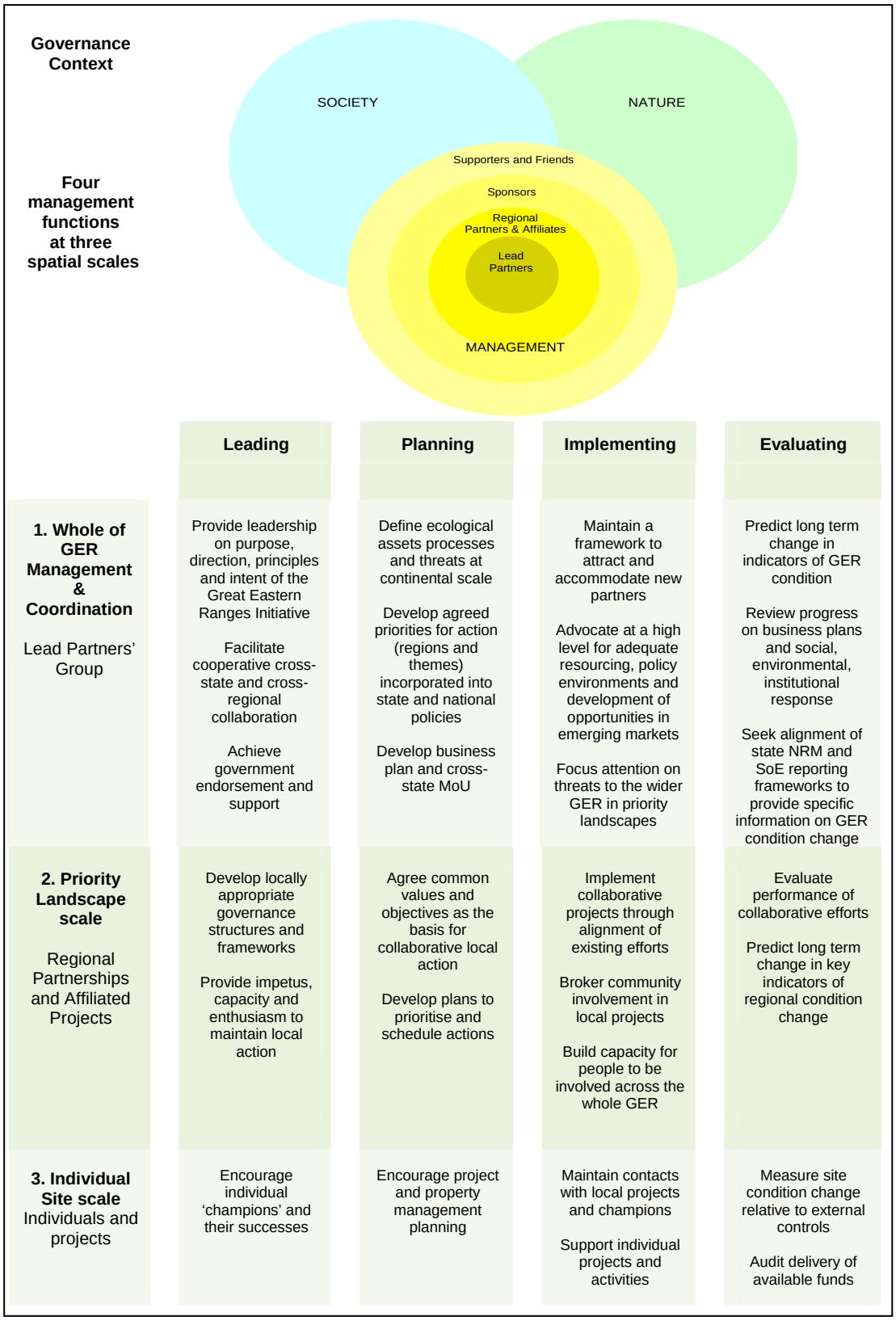

Figure A1.4. Proposed framework for implementation and involvement at multiple scales (after Worboys *et al.* 2009)

'Whole of GER' management and coordination

Establishment of the Lead Partners Group formed a first step in establishing broader ownership of the GER Initiative, with immediate priorities to:

1. Provide leadership on purpose, direction, principles, intent and planning for the Initiative;

2. Maintain structures and governance frameworks to allow other organisations and individuals to participate in the Initiative; and

3. Advocate at a high level for adequate resourcing, policy environments and development of opportunities in emerging markets.

Emphasis on activities at the 'whole of GER' level ensure capacity to develop and implement a series of 'flagship' projects. Themes addressed at this scale include national industry partnerships, coordination of media and communications, community involvement and capacity building, work with scientists to define priorities and quantify success, and cross-regional collaboration. Outcomes achieved complement existing Government-led NRM and national reserve system programs, providing a web of community and non-government involvement far beyond what is achievable in the absence of the Initiative.

Implementation in priority landscapes and at site scale

Experiences in the Initiative and elsewhere demonstrate the importance of local coordination. Successful local action depends on successful local leadership. Securing funds to maintain a local leader in the existing partnership areas remains a priority.

The immediate priorities of Regional Partnerships and affiliates include:

1. Agree common values and objectives as the basis for collaborative local action, and develop plans to prioritise and schedule actions;

2. Develop locally appropriate governance structures and frameworks to enable the involvement of a diverse range of contributors and supporters from all sectors;
3. Use existing networks and innovative media to communicate the importance of local landscapes and the conservation values they comprise as part of the ranges; and

4. Implement collaborative actions that link and add value to the activities of organisations and individuals at local, regional and Great Eastern Ranges scales.

Local leadership by regional partnership facilitators is essential to:

- Provide impetus, capacity and enthusiasm to maintain the impetus for local action.
- Provide a local contact for information, advice, enquiries about the partnership.
- Develop and maintain local contacts and networks.
- Develop, implement, evaluate and review local conservation priorities and plans.
- Identify opportunities to address resourcing needs and project opportunities through partnerships and external funding.
- Maintain connection between local efforts and the wider Great Eastern Ranges Initiative and its network of regional partnerships and affiliated projects.

As a characteristic of functionality, each partnership aspires to implement a package of works (including delivery of conservation mechanisms, incentives, community involvement and education programs, and habitat rehabilitation actions) in sites and contexts that maximize the value-adding potential of collaborative activities. In addition to securing new investment, the realignment of existing resources to achieve outcomes within the Great Eastern Ranges provides a demonstrable manifestation of the Initiative locally.

5(b) Achievements

Many successes have been achieved through projects focussed on on-ground works, private land protection, education, community engagement and research. These include:

- Five Regional Partnerships with maturing governance frameworks established in priority landscapes, benefiting from lessons learned and experiences formed at both regional and whole of GER scales;
- More than 100 organisations engaged as Regional Partners from government and non-government sectors at regional, national and cross-border levels;
- Over 60 projects successfully delivered with partners for activities as diverse as field days, community planting events, youth environmental education, engagement and leadership;
- Spatial analysis of conservation priorities and development of joint ventures with Aboriginal property owners;
- $16m. in cash and in-kind contributions leveraged by investment of $4m. by NSW Government in partner project grants;
- Over $1m. of incentives negotiated and agreed with farmers, directly securing critical habitat in key connectivity areas on 33 private properties;
- Involvement of 18 research organisations from across eastern Australia to link existing research efforts with essential science and information needs, (including the peer-reviewed report on connectivity conservation by Mackey et al, 2010);
- Realignment of partners' existing programs to better target action in the ranges. For example, as a result of adopting the eastern ranges as a priority region, OzGREEN has realigned delivery of nine programs in MYRiveR and YOUth LEADership to deliver within the region;
- High profile successes in piloting Aboriginal involvement are stimulating interest and willingness to actively engage elsewhere;
- Improved understanding of the potential role of major industries (eg tourism);
- A growing level of program visibility and acceptance across many sectors, including within conservation, NRM, scientific, local government, industry, local and national media.
- The Initiative has entered into a collaboration with the Atlas of Living Australia to develop a web 'portal' for all Partners and to pilot a range of interactive data access and analysis tools.

Reference material:

Some materials are available on the GER web-site www.greateasternranges.org.au/site-information/website-policies/resources. There is also extensive planning and analysis documentation held by the Lead Partner organisations and their affiliates

A2 Slopes to Summit component of GER

Compiled by: Sam Niedra, Erik Doerr, Veronica Doerr

1. Basic descriptors

Name: Slopes to Summit (S2S), a Regional Partnership of the GER Initiative

Location and jurisdictional coverage:
The Slopes to Summit (S2S) project area encompasses the whole of the Alpine, South Eastern Highlands and South West Slopes bioregions within the Murray River and Billabong Creek catchments from Culcairn to Albury in the west, to Tumbarumba and Tooma, to Kosciuszko NP in the east, inclusive of box-gum woodlands, riverine forests and floodplains, and dry foothill forests. The project is aligned with the Murray Catchment Management Authority (MCMA) Implementation Areas of the South West Slopes and the Upper Murray (excluding Riverina).

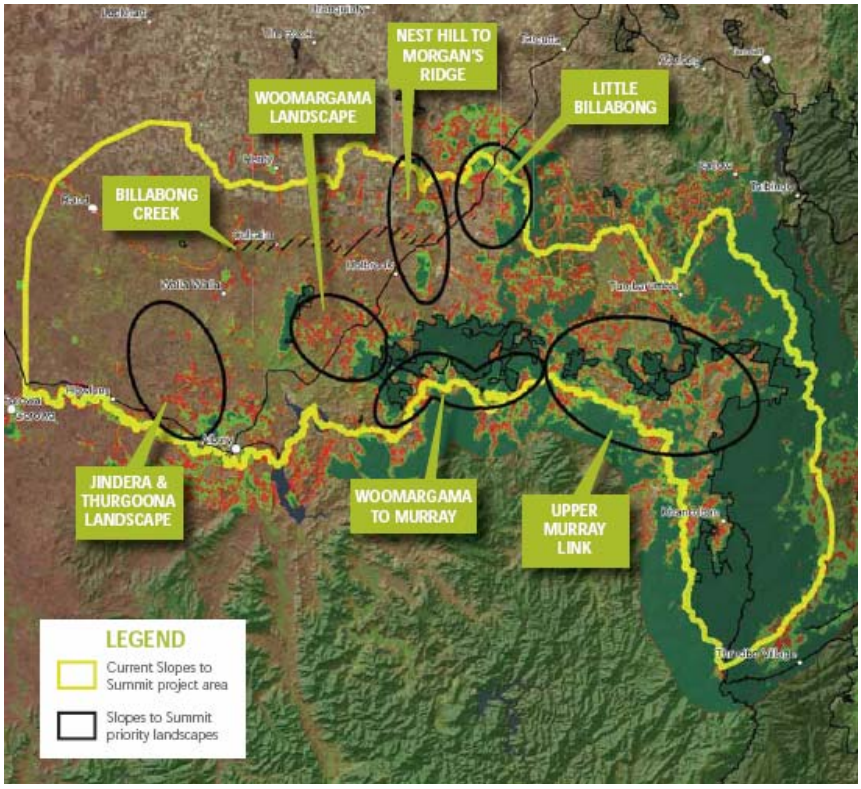

Figure A2.1: Slopes to Summit focus region

Precursor initiatives:

- S2S is a priority focus region of the GER Initiative
- A number of research activities undertaken in the region by staff and students from CSU, CSIRO and ANU (such as David Lindenmayer's long term monitoring project)
- Previous community-based planning initiatives also aided in identifying the importance of the region:
    - Murray Catchment Action Plan (Murray CMA)
    - Local landscape plans (Sheahan et al)
    - Riverina Highlands Regional Vegetation Management Plan

2. Drivers of corridor formation

Mission and purpose:
The vision of Slopes to Summit is:

"To achieve a healthy Upper Murray and Billabong Creek catchment with resilient, connected and functional ecosystems, and to maintain and restore ecological processes to provide greater security for faunal movement and dispersal in response to climate change".

Champion / leadership:

S2S has a working group of eight organisations which provides strategic direction to the project. They include Nature Conservation Trust of NSW (NCT), CSIRO, Murray Catchment Management Authority, Holbrook Landcare Network, Charles Sturt University, Australian National University, Parklands Albury Wodonga and the NSW State Government. The Office of Environment and Heritage, Department of Premiers and Cabinet (OEH), provided an original catalyst for action in the S2S partnership area, identifying the region as one of five priority connectivity links to be targeted by the GER Initiative. NCT is the Host Organisation, employing the key leadership role of Partnership Facilitator, who works closely with the S2S working group partners.

The drivers for the creation of the corridor initiative:

- 2006 – Environment Heritage & Protection Council (EPHC) first considered the idea of a continental scale corridor extending along the Great Eastern Ranges, from the Australian Alps in Victoria to the Atherton Tablelands in Queensland. Establishment of an Interstate Working Group to progress the concept.
- 2007 – GER Initiative established by the NSW State Government, including the S2S Regional Partnership.
- 2007 - a three day conference with major regional stakeholders in the S2S region applied the Conservation Action Planning (CAP) Process to determine the regional impacts on biodiversity, and to establish key focus areas for investment.
- In 2008 the S2S strategic plan was developed, identifying key goals and complementary mechanisms for implementation, including research from CSIRO Better Bush project from study sites in the S2S area.
- The original CAP was reviewed and amended in late 2010. The review considered a 'key habitats and corridors' analysis which identified opportunities for improved connectivity (analysis conducted by OEH). Outputs were considered relative to S2S partners' knowledge of local landholder interest, delivery capacity and intended investment projects for the coming year to define several target areas for attention.
- Advanced connectivity analyses were undertaken by OEH in 2009-10 to assist with defining core habitat areas and opportunities for enhanced connectivity in support of the CAP revision. These data were interacted with data on community and partner capacity to define focus landscapes where S2S could achieve greatest degree of social traction in the 2010-13 period.

3. Organisational structure

Host / lead organisation:
The Host Organisation of S2S is the NCT. The S2S Partnership Facilitator is located at Charles Sturt University, Thurgoona campus, outside Albury NSW.

Staff roles relevant to project:
S2S Partnership Facilitator (Sam Niedra), working closely with the GER Initiative team.

Partner organisations formally involved:
The S2S working group partners are:

- NCT
- CSIRO
- Charles Sturt University

- Holbrook Landcare Network
- Murray Catchment Management Authority
- Australian National University
- Parklands Albury Wodonga
- Office of Environment and Heritage, NSW Dept of Premier & Cabinet

Governance / organisational structure:
The S2S working group consist of three environmental NGOs (including Landcare), three tertiary education/research institutions, the NSW Government and one State Government Statutory Authority. The S2S working group partners participate voluntarily in the project according to the "S2S Principles of Collaboration" document revised and adopted in October 2010. NCT is contracted for 10/11 by Greening Australia, on behalf of the NSW State Government, to undertake hosting of the Facilitator role. S2S is guided by a Strategic Plan (2009) and the S2S Principles of Collaboration.

Brief organisational/institutional history of the initiative:

In 2007, S2S became the second Regional Partnership established within the GER Initiative. S2S held a strategic planning workshop later in the year attended by over 30 stakeholders. Nine organisations became Regional Partners and four years later seven of these are still actively involved.

In more recent times, Holbrook Landcare (2009) and Parklands Albury Wodonga (2010) have joined the working group, while NSW Department of Primary Industries and Bush Heritage Australia have reduced their direct involvement. S2S is currently in a transitional process from being almost solely supported by NSW Government funded to now being more dependant on other funding sources.

Planning/decision making framework:

- **Collective-choice rules -** The planning/decision making framework of S2S is mostly by consensus, based on priorities and scientific expertise. The S2S approve business issues at working group meetings or by email. It is a consensus operating model and very much a team work approach where the S2S Facilitator role is critical in maintaining momentum and reviewing opportunities and priorities.
- **Prioritisation** – The S2S working group has undertaken an extensive Conservation Action Planning (CAP) process to identify priority areas, assets, and threats in the S2S area, and to set conservation targets. The learning from the CAP strongly influences S2S planning and decision making. The original CAP was reviewed and amended in late 2010. The review considered a 'key habitats and corridors' analysis which identified opportunities for improved connectivity (analysis conducted by OEH). Outputs were considered relative to S2S partners' knowledge of local landholder interest, delivery capacity and intended investment projects for the coming year to define several target areas for attention.
- **Scientific expertise –** The S2S partnership has a very strong involvement from the research community with knowledge applied through partnership decision making and priority setting discussions.
- **Funding -** S2S is currently in a transitional process from being almost solely supported by NSW Government to now being more dependant on other funding sources. This involves financial support through business sponsorship, philanthropic foundations, Australian and State government funding and regional contracts.

  In-kind contributions are calculated against each project and is used to demonstrate the leverage that can be achieved by investment.

Priority areas and initiatives:
Within the Slopes to Summit project area there are seven priority landscapes (Figure A2.1) identified by S2S as being regional biodiversity 'hotspots', and deserving of the greatest attention in terms of 'connectivity conservation'. They include:

- Woomargama landscape;

- Jindera & Thurgoona landscape;
- Woomargama to Murray - Woomargama National Park to Mt Lawson State Park (Vic) and the links between them and the Murray River corridor;
- Upper Murray link - Jingellic Nature Reserve to Bogandeyera Nature Reserve to Clarkes Hill to Kosciusko National Park;
- Nest Hill to Morgan's Ridge;
- Billabong Creek;
- Little Billabong.

The S2S partnership also undertook a Conservation Action Planning Process in 2009 and identified nine landscape assets within the S2S project area. They include:

- Grassy Woodlands System (inclusive of Upper Murray woodlands communities, e.g. Apple Box);
- Rock dwelling plants and animals;
- Alpine complex;
- Montane complex;
- Moist Foothill Forest;
- Dry Foothill Forest;
- Riparian Systems;
- Wetlands;
- Farmland/urban matrix system.

The combination of information relating to priority landscapes and priority assets allows for the identification of implementation opportunities for S2S stakeholders.

4. Biophysical design descriptors

Physical characteristics of the corridor:
The S2S region comprises the mountains and still wooded hills and low ridges between Kosciuszko National Park in the east and Albury in the west. The area cuts across the southwest slopes, connecting inland temperate woodland and grassland ecosystems in otherwise highly fragmented agricultural districts with the intact and well preserved mountains. The project area encompasses the whole of the Alpine, South Eastern Highlands and South West Slopes bioregions within the Murray and Billabong Creek catchments from Culcairn to Albury in the west, to Tumbarumba and Tooma, to Kosciusko NP in the east, inclusive of box-gum woodlands, riverine forests and floodplains, and dry foothill forests.

The area has a large altitudinal range and variety of communities, aspects and ecosystems. It consists of a series of stepping stones of protected areas which are mostly less fertile country, with valleys containing fragmented remnants of woodlands with more fertile soils (e.g. Woomargama National Park to Benambra National Park). The S2S area represents a 100-150km long series of stepping stones of large blocks of forest from the highest point in Australia to the edges of the Riverina bioregion. In between the core large areas of forest are mid-slopes which often contain less modified pastures and scattered tree cover. Examples of the importance of these 'ecotonal' habitats are threatened woodland birds which are often found around the lower elevation edges of these areas.

Goals: S2S has undertaken a CAP process which has identified biophysical goals, including the following:

- Grassy Woodland Systems (GWS):
  - By 2020 retain 90% of GWS (based on best current mapping)
  - By 2020 restore 10,000ha of GWS in targeted zones
  - By 2040, restore 50 000 ha of GWS in targeted zones
- Rocky outcrops:
  - By 2020, ensure at least 100 rocky outcrops of 4 ha or greater are managed for conservation and in good condition.

Application of biophysical design principles:

Critical ecosystem linkages were identified through the CAP process and informed by other sources:

- **For large scale movements of species:** Subsequent data and analysis by Birds Australia has defined movement pathways for 18 species (as part of a pilot project undertaken in 2009-10);
- **To address the impacts of climate impact predictions?** Analyses by Mackey *et al.*identified distribution of drought refuge areas at the whole of GER scale – the underlying data allows S2S to be considered relative to adjacent landscapes.
- **Other factors?** Localised connectivity analyses (key habitats and corridors) were undertaken to assist the CAP review (as per above)

Resultant mix of landscape scale operational measures:
Outcomes of the original CAP and CAP review processes included development of agreed targets for major assets in the S2S region. These were documented in a Strategic Plan adopted in 2008 and amended in 2009-10.

Social and economic factors incorporated into the prioritisation of actions:
Development of focus landscapes and priorities in 2009-10 relied heavily on regional partners' knowledge of regional groups capacity and likelihood of landholder involvement.

Other strategic parameters taken into account in shaping priorities:
Development of focus landscapes and priorities in 2009-10 relied heavily on regional partners' knowledge of regional groups capacity and likelihood of landholder involvement.

Impact of complexities of multiple land tenures and land uses in setting priorities:
Membership of the S2S partnership delivers a range of public and private land mechanisms. The potential for improved outcomes from alignment of delivery was acknowledged in the selection of focus regions. The Womargamma to Hill Top Link provides an example of multiple mechanisms (in this case including CMA property vegetation plans, NCT covenants, RTA offsets) operating in concert to achieve an integrated landscape outcome.

Incorporation of climate change predictions and adaptation in planning/ implementation:
Ferrier *et al.*(2010) applied two downscaled regional scenarios derived from and agreed with OEH in their pilot work to establish the software and decision support framework to assist understanding of climate impacts on future species distributions.

5. Implementation arrangements / achievements:

Projects have been implemented to date:
S2S has delivered a variety of projects since its inception in 2007, including:

- S2S Covenanting Program

  Funded by the NSW State Government and administered by NCT, this program has so far resulted in nine conservation covenants totalling 319 hectares, with a further two currently being processed. These have been targeted towards the seven priority S2S landscapes.

- Ecological monitoring program

  Funded by the NSW State Government and administered by Australian National University, a monitoring program of birds, reptiles, other fauna and vegetation has been established at a number of properties with conservation covenants administered by NCT.

- "Community Engagement through Wildlife Survey" wildlife monitoring program – Funded by the NSW State Government and administered by NCT, the project

involved wildlife surveys at properties with conservation covenants and a Public Wildlife seminar to promote results at Tumbarumba in 2009.

- Community events

  A number of community events have been hosted to raise awareness of connectivity conservation, including a "Biodiversity on Farms Day", used to launch the S2S project in Woomargama in May 2011, a wildlife seminar in Tumbarumba in 2009, and a number of community planting events in 2009 and 2010.

- Caring For Our Country (Community Action Grant)
  In partnership with Woolshed/Thurgoona Landcare Group, this project commenced in January 2011 and will involve revegetation to fill vegetation gaps in known Squirrel Glider habitat, and the hosting of a series of community engagement and education events. Thurgoona is located in one of the seven priority S2S landscapes.

Reference material available:

- Slopes to Summit Strategic Plan 2009
- Slopes to Summit Principles of Collaboration 2010
- Slopes to Summit Prospectus

Operational arrangements and data collection:
To date the bulk of on-ground implementation associated with S2S has been in the form of conservation covenants implemented by NCT.

A range of data collection and effectiveness measurements are being undertaken including:

- Monitoring – ecological monitoring at conservation covenant properties.
- Capture of less tangible factors such as education etc - surveys, evaluation forms, questionnaires.

Summary of achievements to date: Since 2007, S2S has:

- Facilitated strong collaboration between key NRM organisations in the region to deliver strategic biodiversity outcomes (eg. permanent protection of over 300 hectares of important wildlife habitat on private land in priority zones);
- Completed a Conservation Action Planning process to identify priority landscapes in the region to focus effort and resources;
- Hosted a number of community education and engagement activities, including community planting events and a "Biodiversity on Farms" field day, attended by over 200 farmers and other community members;
- Raised the profile of biodiversity and highlighted the importance of connectivity conservation;
- Produced a bi-monthly S2S newsletter.
- Currently working with Atlas of Living Australia to develop products to enhance data capture and anaylis in the S2S Region as part of a whole of GER project.

A3 Habitat 141

Compiled by: Carina Wyborn, Benn Carr

1. Description

This initiative seeks to restore the links between major national parks and nature reserves over a 700 km stretch straddling the SA, NSW and Victorian border region (Map 1). It covers an area of 18 million hectares stretching from the Murray River in the west to the Grampians and Mungo in the east; from the coast in the south to Broken Hill and Menindee in the north. Habitat 141 is just a little smaller than the whole of England and Scotland.
Habitat 141° straddles a biodiversity hot-spot and is one of the few places in Australia where national parks form a series of massive stepping stones from the ocean to the outback. It encompasses heathland, mallee country, red gum forests, flood plains, grassy woodlands and esturaries. Some of Australia's most iconic landscapes are encountered along the way; the floristically diverse Grampians, the magnificent floodplains of the Coorong and the famous River Murray.

Location and jurisdictional coverage:

Habitat 141° is located in western Victoria, eastern South Australia, and a small part of south western corner of NSW.
It is located within parts of the following Regional NRM group areas:

- South Australia: Murray Darling Basin and South East NRM
- Victoria: Glenelg Hopkins, Wimmera,and Mallee CMAs
- New South Wales: Lower Murray Darling CMA

Component initiatives:

H141° currently consists of nine distinct landscape zones (Map 1). These are:

- Zone 1- Greater Glenelg
- Zone 2 – West Wimmera
- Zone 3- Wimmera Mallee Tatiara
- Zone 4 – Murray Mallee
- Zone 5 – Kanawinka Coast
- Zone 6 – Rangelands
- Zone 7 – Murray River Floodplain
- Zone 8 – Grampians Gariwerd
- Zone 9 - Coorong

2. Drivers

History

There are a number of projects that inspired the development of the Habitat 141° vision. The most influential of these has been Project Hindmarsh[8] which is an on-going project that operates in Zone 3 of Habitat 141°. Other projects within the Habitat 141° region that have contributed to developing Habitat 141° include the Grampians to Little Desert Biolink, Yarrilinks Project and the Kowree Biolink. The effect of these projects, particularly Project Hindmarsh, has led people, primarily local people and landholders, to realise that recreating habitat and enhancing existing remnants was not only possible, but it was achievable through long term commitment and dedication of people who share a common vision. In 2005 The

[8] More information and details about project Hindmarsh can be found here http://www.hindmarsh.vic.gov.au/page/page.asp?page_Id=100

Wilderness Society and Greening Australia initiated a visioning process to create a tri-state initiative under the Wild Country umbrella.

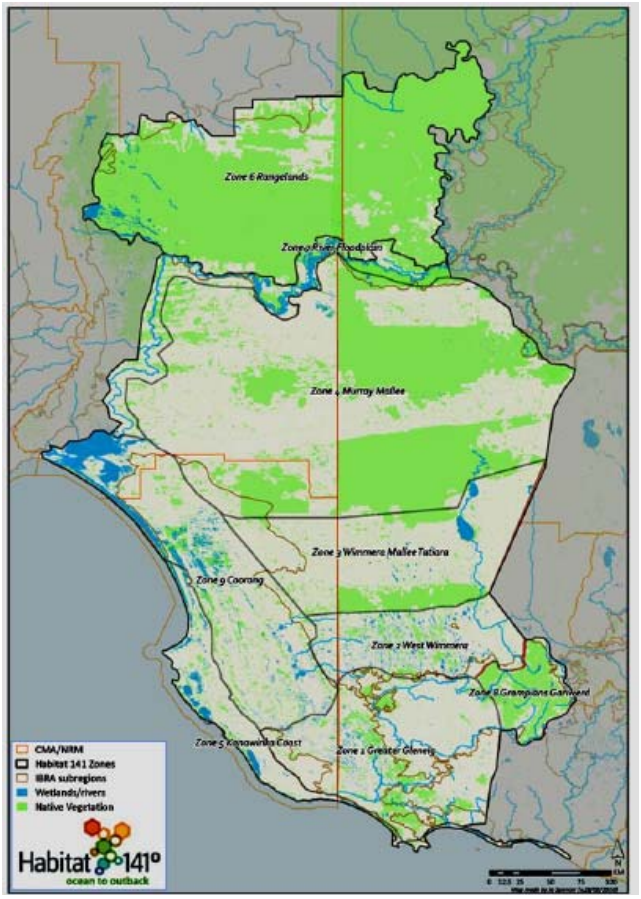

Figure A3.1: The broad outline of the Habitat 141° initiative with the SA-VIC boarder in the middle of the map and the planning zone.

The evolution of Habitat 141° began with an initial focus on a group of organizations including Greening Australia Victoria, The Wilderness Society and Victorian CMA's that sought to coordinate and align their effort in a 'tri-state or Murray to Moyne initiative'. The numbers of organization wanting to be involved and the geographical extent of Habitat 141° has grown considerably since its inception. In September 2008 a partner meeting was held in Dunkeld where the Habitat 141° vision was agreed upon and an Interim Steering Committee (ISC) was established. The ISC was comprised of organisations that eventually signed the original MOU. During 2009 the ISC focused on Habitat 141° development including scoping establishing a Habitat 141° entity, the preparation of an (unsuccessful) bid to Caring for our Country, the further development of the zones and their Conservation Action Plans (CAP), developing the brand and identity of the project and progressed the process of establishing a suitable governance arrangement for the initiative.

Mission and purpose:

The vision of Habitat 141° is:

"to work with communities to conserve, restore and connect habitats for plants and wildlife on a landscape scale from the outback to the ocean."

This vision was developed and refined at one of the initial stakeholder workshops in 2008.

Objectives:

Beyond the vision that guides Habitat 141°, the metaphor that has been used to describe the role of Habitat 141° (Inc) is that it will focus on "the gluing rather than the doing": that is the primary role of Habitat 141° (Inc) is to foster and support collaboration between member

organisations throughout the Habitat 141° region. On-ground work, that is "the doing", will be undertaken by member organisations and determined through Conservation Action Plans developed through collaborations at the Zones scale.

Through extensive consultation with member groups and stakeholders, it has been determined that Habitat 141° will:

- seek collaboration and alignment between groups and individuals working towards the vision;
- mobilise rural and regional communities through partnership and collaboration between private and public groups and landowners, land managers, investors, and volunteers;
- promote a lasting philosophy of environmental stewardship in communities;
- utilise the strengths, skills and knowledge of member groups through collaboration to apply resources efficiently to achieve high yield, value-for-money outputs and significant enduring outcomes;
- Focus investment and action by partners on priority areas identified through rigorous scientific assessment."[9]

Champion / leadership:

There is no single key individual or champion, rather a number of key individuals who have championed the initiative over the period of formation. The following are some of the people who have named significant contributions to Habitat 141° to date; Ron Dodds (Greening Australia), Ian Walker (Parks Victoria), Richard Hughes (The Wilderness Society), Karen Alexander (Victoria Naturally Alliance), Jody Gates and Sarah Lance (SA DENR), Andrew Brady (Kowree Farm Tree Group).

The drivers for the creation of the corridor initiative:

Habitat 141° is driven by both social capital and social momentum, as it has been about ameliorating threatening processes to biodiversity in the region. Social momentum was developed through the work of key individuals in promoting the idea that lead to the genesis of the H141° Alliance.

Habitat 141° does not refer to itself as a corridor project or a corridor initiative. Connectivity is one of a number of contributing drivers for the project. Other biophysical drivers include loss of habitat, habitat fragmentation, invasive species, habitat decline, and climate change. Habitat 141° describes itself as a long-term, multi-sector landscape scale initiative that aims to transform landscapes by conserving, restoring and connecting habitats. Habitat 141° aims to achieve "more and better habitat" in the landscape through engagement and participation of communities.

3. Organisational structure

Habitat141° is undergoing rapid growth and evolution at it grows from a loose coalition of interested parties into more formalised governance arrangements. It is expected that an incorporated association, Habitat 141° Inc, will be established in the first half of the 2011-2012 financial year.

Host / lead organisation:

There is no one single lead organisation, but rather a number of organisations who have been contribution significant time, skills and financial resources into developing Habitat 141°. Significant contributions have been made by Greening Australia, Parks Victoria, The Wilderness Society, the Victoria Naturally Alliance, and the South Australian Department of Environment and Natural Resources.

[9] H141 Governance document

A Governance working group has been the primary body operating at the whole of H141° scale since July 2010. It is being jointly chaired by Parks Victoria and Victoria Naturally Alliance.

Staff:

Ben Carr, Habitat 141° Coordinator is currently the only Habitat 141° staff member. The Coordinator has been hosted by Greening Australia (Victoria) since September 2010 and has been working to convene and compile the collaborative process being undertaken to develop governance arrangements.

After the formation of the H141° Incorporated Association there will be an Executive Officer and a communications manager to be based in an office that will be located centrally within the region –e.g. Natimuk near Horsham.

Partner organisations:

During 2008-2009 Habitat 141° was governed through a fixed-term MOU. The signatories and partners to this MOU included the following:

- Parks Victoria
- Greening Australia
- Glenelg Hopkins CMA
- Wimmera CMA
- Mallee CMA
- DSE Victoria
- Victorian Trust for Nature
- South Eastern NRM Board- South Australia
- Murray Darling Basin NRM Board- South Australia
- Wilderness Society Victoria
- Victorian National Parks Association
- Victoria Naturally Alliance
- Department of Environment and Heritage SA
- Department of Environment and Climate Change NSW

Many of these organisations also contributed finically to the cost of maintain the collaboration in the early stages including employing a Coordinator.

In July 2010 a Governance Working Group (GWG) was formed through self nomination of interested people who are associated with organizations that have been partners in development of the H141°. The GWG did not attempt to be representative of the range of groups involved in Habitat 141°. The members of the GWG are from the partner organisations listed above.

Governance and organisational structures

The Habitat 141° Alliance represents the total efforts and endeavours that are contributing towards achieving the Habitat 141° vision. The Alliance is not a formalised body but represents the total of all contributions.

H141° is currently in a transition phase as it moves towards becoming a formally Incorporated Association in Victoria. It is proposed that Habitat 141° will operate with a Council and Executive Committee. Under this model, collaborating organisations will continue to working individually, while seeking to align and coordinate their efforts and collaborate on work that will contribute to the Habitat 141° vision. Habitat 141° will be governed by a Council of consisting of member organisations. Any member organisation of Habitat 141° may nominate a delegate to the Habitat 141° Council. The Executive will be comprised of 6-9 members, elected by the member organisations, 60% of whom must also be

delegates on the Council. In May 2011 an Interim Executive Committee was elected to guide the final process of establishing the incorporated association.

Member organisations are those groups who are aligning and coordinating their actions consistent with the Habitat 141° vision. The 'member organisations' will be a broad range including government departments, statutory authorities, local governments, incorporated associations, community landcare groups, friends groups and public and private companies. It is anticipated that all of signatories of the MOU will become members of Habitat 141°. Membership will only be available to organisations who are either legal entities, have formalised governance in place, e.g. through a signed MOU or hosting arrangement with an incorporated body or who are established under the authority of legislation, e.g. Advisory Committees. It is proposed that, through the Council, member organisations will contribute to the strategic direction and leadership of Habitat 141°. The basic membership requirement is that an organisation will contribute to and support the 'values' and 'vision' of Habitat 141°. Members will also come together for an annual Habitat 141° forum organised by the staff to learn, plan and build cooperation and collaboration.

As Habitat 141° is currently in the final phase of establishing its governance arrangements after substantial consultation and it is difficult to give an overview of the representation and participation on the Executive. It is currently envisaged that the elected Chair of the Executive Committee will also be the Chair of the Habitat 141° Council. The final details of chairing of the Council and Executive Committee have as of end May 2011 been delegated to the Interim Executive Committee. In general terms, the role of the Council is to provide board strategic direction and strategic input from all member organisations while the role of the Executive Committee is to manage the business of the incorporated association and its staff. Member organisations will retain the ultimate control of the Executive Committee.

Challenges in developing an organisational structure:

Habitat 141° (Inc) seeks to provide additional capacity and support for conservation over and above that which currently exists within the region. Hence Habitat 141° considers there to be sufficient public and private organisation within Habitat 141° to do the on-ground work, what is lacking is an overarching framework to support collaboration between the different players in the region.

Following Habitat 141°'s commitment to work with local communities, a community meeting, held in March 2010 to engage these groups in the ongoing governance discussion. The meeting was attended by 22 community groups and is seen as a milestone in the development of Habitat 141°. The meeting confirmed the strength of support for Habitat 141° from grassroots organisations distributed across the region. A number of key principles to facilitate local group participation in the initiative were identified at the meeting that place emphasis on ownership, empowerment, fairness, transparency, accountability and mutual respect as central characteristics of the Habitat 141° alliance. These principles have been adopted in the subsequent governance discussions reported elsewhere[1].

Given the challenges of developing governance arrangements for a multi-sector, multi-stakeholder, multi-jurisdiction cross scale initiative, the governance arrangements were not developed by the time that the MOU and ISC agreement expired. Consequently, the Governance Working Group (GWG) was formed at a meeting established by the ISC and held at Sylvania Park, Horsham on 26 and 27 July 2010. The time taken and costs involved with negotiating appropriate governance arrangements for this initiative has surpassed the initial expectations of many involved with Habitat 141°. The significant injection of philanthropic funding secured by Greening Australia (Victoria) has enabled the engagement of Ben Carr to coordinate and compile the discussions of the GWG that were integral to the current transition from MOU to incorporated association.

The GWG collated input from a series of consultation meetings, partners, workshops, the Interim Steering Committee, a consultant's report (commissioned by the ISC) and previous Habitat 141° staff (Mr Andrew Brady was the previous coordinator, hosted by GA). In

December 2010 the GWG released its report and recommendations containing proposed governance model with details of the structure and functions of Habitat 141°. This report was sent out for an 8 week consultation period to 25 organisations requesting written and/or verbal feedback. Written feedback was received from 8 organisations and verbal from another 10 that was subsequently incorporated into a revised model. On April 19-20 2011 a Habitat 141° Alliance meeting was held where a motion to create the Habitat 141° incorporated entity was passed and details of the governance model were decided in consultation with prospective Habitat 141° member organisations. Note that formation of governance is not yet completed and as of end May 2011 a first draft of the Rules of Association (Constitution) is being prepared.

Throughout the formation stages of Habitat 141° key driving organisations and individuals have come from across state government agencies and Environmental NGOs working in the region. One key characteristic that has been reinforced through deciding the governance arrangement is that Habitat 141° will be cross-sector. And that no one sector should or will be seen as leading Habitat 141°.

Habitat 141° has had some engagement with traditional owner groups. However it recognised that much more could be done in this area. One traditional owner group in Zone 1 has been significantly engaged and will likely become a member group. In general terms Habitat 141° recognised that engagement with Traditional owners requires sustained presence and capacity and until this is achieve it has been better to start small rather than over promise and under deliver in engagement.

While it is not expected that Habitat 141° (Inc) will engage directly with landholders, the Habitat 141° vision is expected to inspire landholder participation in the initiative. Member organisations will be the conduit for landholder engagement in Habitat 141° as the entity does not and is not planning to have the capacity to interface at the individual landholder level. As many of the member groups have these skills and capacity, it is seen as an unnecessary duplication of resources for Habitat 141° (Inc) operate in this arena.

Decision making frameworks and processes

Planning and decision making throughout Habitat 141° will operate based on the principle of subsidiary that is decision making will be decentralized to the lowest possible scale with the capacity to adequately undertake a task (see Marshall 2008). Consequently there are four primary locales for decision making:

- Member groups
- Zones
- the Executive Committee
- the Habitat 141° Council

The Council and the Executive Committee will make decisions through a consensus approach. If consensus cannot be reached a form of modified consensus will be used to ensure that there is a majority of support that is 80% of member group's present support the decision. GWG 2010 Report outline our agreement on Consensus that will be included in the Rules of Association

Habitat 141° currently does not have a strategic plan though a draft has been prepared. Finialising the strategic plan is noted as a priority for the incoming Executive Committee.

At the Zone scale, the collaborative and participative Conservation Action Planning (See Section 3.4) process is used the primary means to negotiate planning and decision making. Conservation Action Planning is the glue that holds the zone collaborations together, however it is envisaged that into the future these collaborations may take on other forms.

A Zone Committee exists within each of the 9 landscape zones of Habitat 141 (Map 1 above). The Zones are recognised as the appropriate scale at which groups come together to plan and implement the conservation actions necessary to achieve Habitat 141° vision. In

some zones, organisations have been working together for several years while others are in nascent stages developing their collaboration and conservation planning. The Zones are the primary aligning, planning and decision making forum for on-ground delivery and decision making at the local scale. The groups who are active within the zones will become members of Habitat 141° and be involved directly in the Council. There is currently a diversity of arrangements across the different zones and variable degrees of formalisation and collaboration within zones. Habitat 141° recognises that the zones will be need on-going facilitation and support in order to be effective.

It is important to note that the primacy of decision making, particularly with regards to decisions on the size, and period of investment in on-ground outcomes by each participant / member groups is maintained. The Conservation Action Planning process brings participants together in each Zone and through the join determination of what the Biodiversity assets are, what are the high value assets and what are the significant threats to the high value assets and what are the most strategic action that will address these threats – consensus is achieved about what strategic actions should be implemented. Each participating group however then must determine its own capacity and commitment to implementing the tasks that will jointly achieve the strategic action. Our experience – and that of other project using a CAP planning framework is that its participatory nature ensures strong "buy in" and generally an on-going commitment. But it's important that each organisation has the ultimate responsibility to determine its own investments. Hence the CAP process is not binding on participants and this is both a great strength and also a potential weakness.

The key function of Habitat 141° (Inc) is to build the collaborations necessary to achieve the Habitat 141° vision. The model for Habitat 141° that is taking shape resembles a polycentric network with the zones acting as dispersed nodes of decision making throughout the region. It is a collaborative effort at overarching Council scale, the Zone scale, and it is envisaged that the member organisations will work in collaboration and partnership with landholders.

Habitat 141° (Inc) will have a key role in catalysing, supporting and servicing many of these collaborations. Depending on context or local capacity, it may be very involved in some collaborations and others it may support and assist. It is envisaged that after catalysing collaboration, and once established and operating the role of Habitat 141° (Inc) will gradually withdraw and shift to provide support 'from a distance'. This will allow the capacity of Habitat 141° (Inc) to then focus on building subsequent collaborations where needed.

Funding

A primary focus of Habitat 141° has been the vision that through a collaborative, iconic project the alliance will be able to increase funds for on-ground work within the region. Habitat 141° aims to increase and diversify funding sources to the region. This is motivated by a strong desire to move beyond Government as the sole or the significant majority source of direct funding for NRM. Habitat 141° is premised on the notion that promoting and building a visionary long-term project will significantly increase funding coming from non-government sources. Habitat 141° has a desire to secure funding from a diversity of sources including the government, non-government, corporate and philanthropic sectors.

The model for the initiative sees funding for 'on-ground work' directed through member organisation rather than Habitat 141° (Inc). There are a number of reasons for this:

- Member organisations have both an existing track record and capacity to attract and deliver funding for NRM outcomes. It would be inefficient to try and duplicate or replicate this capacity.
- Habitat 141° Inc will not be engaged in directly delivering on-ground work. For the scale of investment needed to achieve our vision it will be inefficient to try and channel all of these funds through one organisation.
- Under the current governance arrangements, member organisations retain the autonomy to seek funds from wherever they like. It is envisaged that a diversity of funding recipients will attract a diversity of funders and funding. For example, within

Zone 2 there is substantial investment coming from the corporate and philanthropic sectors based on long standing relationships that would not be available to the Habitat 141° entity.

Through promoting the region and the initiative, Habitat 141° (Inc) will be involved in substantial fund raising, however it will only seek to receive funds for its primary functions. Habitat 141° (Inc) will assist member organisations to build their fundraising and grant receiving capacity to assist members to raise investments needed to implement project that directly align with strategic action identified through a Zone run CAP process. Habitat 141° has identified however that funding for Conservation Action Planning, alignment, coordination and facilitation across the Alliance and within each zone should be channelled through Habitat 141° (Inc). The focus will be on making Habitat 141° member groups attractive to investors in on-ground outcomes while making the Habitat 141° (Inc) attractive to investors in multi-party collaboration, planning and alignment. Once incorporation is achieved, Habitat 141° will seek to become listed on the Register of Environmental Organisations which provides for tax deductable gift recipient status. Habitat 141° (Inc) will establish a public fund so it can receive donations.

Fundraising has been recognised by Habitat 141° as having the potential to cause friction among the Alliance and its member groups. Establishing a new and separate legal entity that will, could or may be perceived as competing for funds with established partner groups could threaten the Habitat 141° cause. It is expected that member groups will undertake collaborative fundraising and seek to minimise direct competition between groups. However it is also recognised that Habitat 141° cannot and should not try and prevent all competition.

4. Biophysical design descriptors and principles

Habitat 141° is more than a corridor project. It is an endeavour that aims to increase the amount and functionality of habitat through a planning framework at multiple scales. Creating greater connectivity between areas of natural habitat is simply one strategy to improve the resilience of these habitats and the indigenous species they support.

Habitat 141° conservation objectives are determined and set through at the zone scale (Map 1) through the participatory Conservation Action Planning process and toolbox. A whole of Habitat 141° Conservation Action Plan is not envisaged at this stage. Rather the aim is to complete and implement more plans for additional zones.

Priority biolinks have been identified in Zones 1, 2, 3 and 4. An example of some of the spatial analysis that has been undertaken is shown in Map 2 from Zone 1. An additional example is the connectivity analysis undertaken in Zone 2 (Map 3).

The approach used for Habitat 141 Zone 1 spatial prioritisation broadly followed the steps of the INFFER framework (Pannell et al. 2009):

1. Develop a list of significant natural assets in the relevant region(s)
2. Apply an initial filter to the asset list, using a simplified set of criteria
3. Define projects and conduct detailed assessments of them (this results in the generation of a numerical Benefit-Cost Index for each project)
4. Select priority on-ground works projects
5. Develop investment plans or funding proposals
6. Implement funded projects
7. Monitor, evaluate and adaptively manage projects

In this case, a hierarchical (coarse filter-fine filter approach) was used to define broad ecological systems as assets as well as threatened species and species assemblages that were considered to be “nested” within these systems. Various GIS methods and datasets were then been used to determine high value areas for protection, enhancement and restoration based on the distribution of key nested assets and strategies developed by the Conservation Action Planning process (Koch 2011).

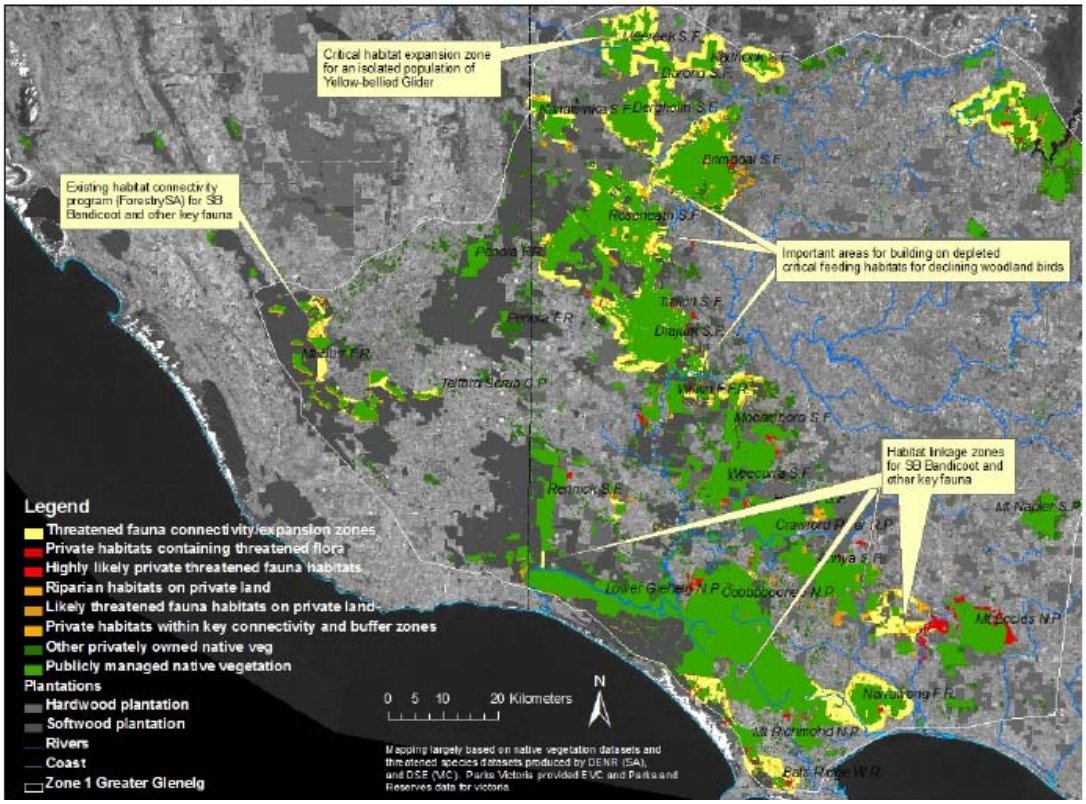

Figure A3.2: Priority areas in Zone 1 of Habitat 141° for permanent protection (RED = High; ORANGE = Medium; GREEN = Lower) and restoration (YELLOW AREAS) on private land.

Note: connectivity and expansion zones refer to broad target areas – it is envisaged that landscape linkages in reality will range in width from 50m (eg. within plantations) to 1km. (from Koch 2011).

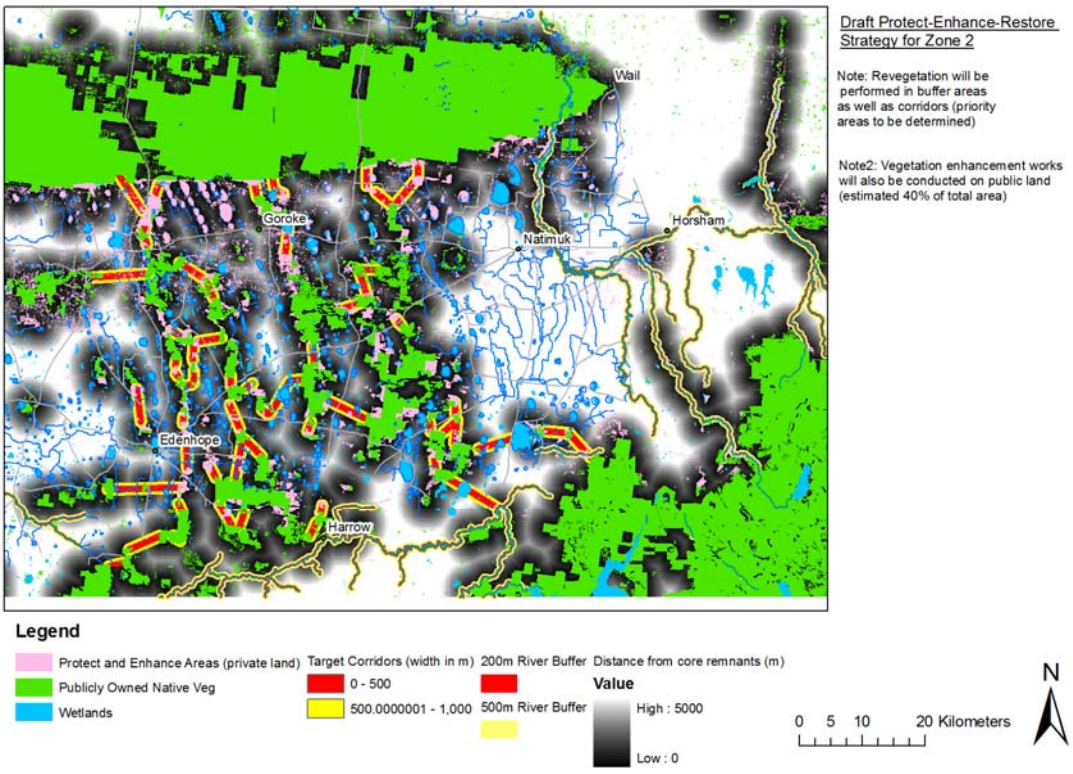

Figure A3.3: Priority restoration areas to improve landscape scale connectivity and habitat in Zone 2 of Habitat 141° (S. Schultz, Greening Australia).

GIS analysis was used to determine priority habitats (across all land tenures) for protection against invasive weed threats as well as other threats that apply to all land tenures (eg road and fire access track construction). Threatened ground-dwelling mammals and threatened flora species were used to indicate priority areas for habitat protection as taxa generally requiring a structurally intact and floristically diverse understorey (ie good understorey condition). Threatened ground-dwelling mammals were divided into nationally threatened mycophagus mammals, other nationally threatened ground-dwelling mammals, and Victorian listed threatened ground-dwelling mammals, in order of importance. Key declining woodland bird habitats were also mapped for the northern part of the zone (where disproportionate loss has occurred) and included as part of the analysis, on the basis that many declining insectivorous woodland birds prefer relatively intact habitats.

5. Implementation arrangements and achievements:

A large number of projects have been implemented by partner groups. Priority for Habitat 141° currently is to complete its governance arrangements and to establish the governance in place. Projects are not implemented nor managed by Habitat 141° At this point in time, Habitat 141° does not have an up to date list of all project that are being or have been undertaken by its partner organisations in the past 5 years.

However of note, was a Habitat 141° science workshop convened by The Wilderness Society and Greening Australia held in 2009 (Koch 2009). The workshop explored the research needs and opportunities provided by Habitat 141°.

Reference material:

Considerable supplementary data (reports) have been submitted to The National Wildlife Corridor Program (‘The CD’).

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A4 Gondwana Link

Compiled by: Paula Deegan, Keith Bradby and David Freudenberger

- Gondwana Link has not been designed as a "corridor" as such; it is a large landscape program based on cohesive protection and restoration of ecological functionality at a number of scales. Corridors are one of the landscape patterns Gondwana Link groups work on that can improve functionality.
- The follow case study is a summary of a 42 page report prepared by Paula Deegan from the Gondwana Link Ltd office (report available from the Australian Government National Wildlife Program).

1. Overview

Location and jurisdictional coverage:

Western Australia; including parts of the South West, South Coast, Wheatbelt and Rangelands NRM regions.

Initiative Components

Gondwana Link currently works across a number of key zones as listed below and shown in Map 1. More zones may be added in the future as opportunities and circumstances allow.

- "Great Western Woodlands"
- "Fitz-Stirling"
- "Ranges Link" (Stirling Range to Porongurup)
- "Forest to Stirling Range"
- "Margaret River"
- "Ravensthorpe Connection" (Preliminary work commenced but yet to be activated as a zone)

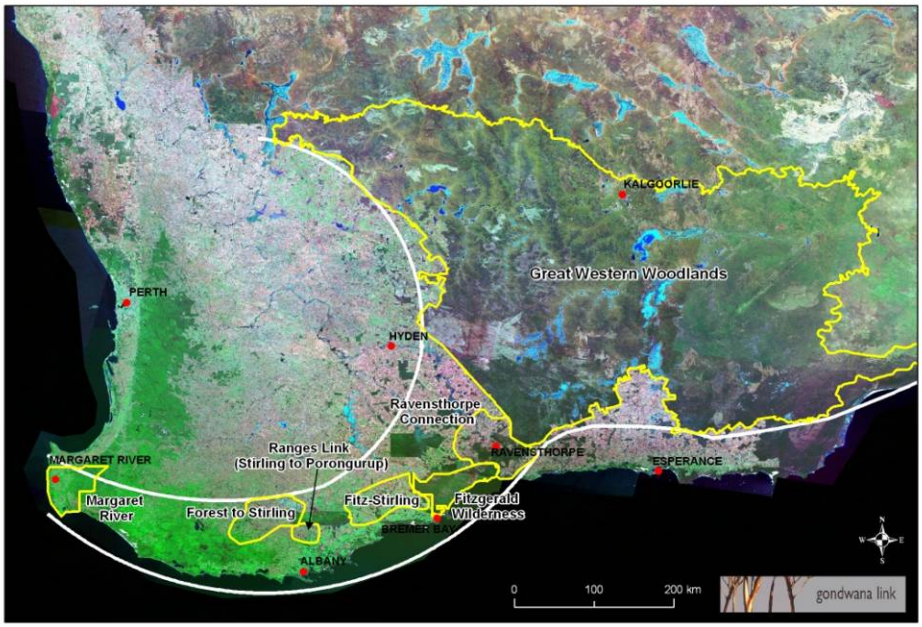

Figure A4.1: Gondwana Link with focused work areas within this large initiative.

These zones are being developed sequentially, with momentum initially built by a focus on the Fitz-Stirling and Great Western Woodlands. In both cases, there were opportunities to make rapid and significant ecological gains. These first zones provided inspiring examples that have encouraged other partners and projects to join the Gondwana Link Initiative. Section 6 below, summarises the Fitz-Stirling zone.

Mission and purpose:

Gondwana Link Mission: To restore ecological resilience across southwestern Australia.

Gondwana Link Vision: Reconnected country, from the wet forests of the far south west to the woodland and mallee bordering the Nullarbor, in which ecosystem function and biodiversity are restored and maintained.

Physical characteristics of the corridor:

Gondwana Link extends across a 1000 km swathe of country from the tall wet forests of the far south western corner of Australia, sweeping across the species-rich but fragmented southern mallees and heathlands, through to the vast woodlands of the goldfields, which in turn, link northwards and eastwards with Australia's interior.

As such, Gondwana Link extends across the highest quality habitat and least fragmented portion of the South Western Australian Biodiversity Hotspot (Myers et al 2000). The Gondwana link area includes over 75% of the flora species in south western Australia and over 20% of Australia's flora species. It has the most complete faunal assemblages in southern WA (and possibly southern Australia), along with 17 of Australia's 23 main vegetation groups. It holds the world's least disturbed portion of the Mediterranean biome and straddles the climatic divide between wet forests and arid ecosystems of south western Australia. Gondwana Link includes numerous climatic refugia and is arguably the most climatically buffered part of the south western Australian biodiversity hotspot. This region has the greatest opportunities in the Mediterranean biome of Australia to protect and re-build ecological functionality and resilience at scale.

2. Initiative Drivers

History

Four critically important 'pre-cursor' themes have contributed to the successful establishment of the Gondwana Link initiative.

1. Increasing awareness of the global and national significance of the region based on scientific assessments (e.g. Burgman 1988; Myers et al 2000). Of particular importance was the identification of centres of plant species richness and endemism concentrated in the Ravensthorpe, Fitzgerald, Stirling Range and west of the Stirling Range, known informally for some time and now documented (Hopper and Gioia 2004).
2. Increasing scientific awareness and local frustration that more than twenty years of small scale environmental efforts had failed to reverse any significant environmental declines (Kitchener et al 1980a, 1980b, 1982; Hobbs, 1993; Saunders et al 1993).
3. Increasing frustration at the stop-start nature of government funding programs, often compounded by inappropriately prescriptive approaches, and a failure to address the conflicting objectives of other government programs, either across sectors or across scales (local, state and national).
4. Increasing awareness that ambitious privately funded programs were being undertaken in other parts of the world, particularly The Nature Conservancy's programs across North America.

In addition, earlier actions have been critical to providing the 'enabling conditions' for Gondwana Link including:

- Forced cessation in the early 1980s of the WA government's 'land release' (clearing) programs.
- Introduction of reasonably effective native vegetation clearing controls from 1997 onwards and the end of old growth logging in 2001. This was an essential pre-requisite for many people in shifting from fighting local defensive battles to being able to focus on landscape restoration.
- Attempts to establish a genuine Biosphere Reserve in the Fitzgerald region.
- Operation of some of WA's longest running local conservation groups, including Friends of Fitzgerald River National Park (first established in 1971 as the Fitzgerald River National Park Association), Fitzgerald Biosphere Group (first established as a landcare group in 1983), Green Skills (established 1988), Friends of Porongurup Range National Park, Oyster Harbour Catchment Group and many others. The continuity provided by local individuals and groups has been of immense importance, particularly when there has been high turnover in government agencies and programs.
- Heightened awareness of what could be achieved through environmental philanthropy, particularly following engagement with The Nature Conservancy from 1999 onwards. There were also strong national (growth of Bush Heritage Australia and Australian Wildlife Conservancy) and local (fundraising by the Friends of Twin Creeks for purchase of the Twin Creeks Conservation Reserve in 2002) examples.
- Individual skills and capacity built by restoring farmland over thirty years (e.g. Peter Luscombe/Nindethana Seeds).

There are a number of versions of how Gondwana Link began. One version starts with two people in a car, Keith Bradby and Peg Olsen of The Nature Conservancy, wrestling with how to substantially advance the ecological agenda. Keith was determined to achieve more for the region he was committed to, and Peg was exploring where in Australia The Nature Conservancy could do most good. From its inception, Gondwana Link was built on the foundations of friendships, trust, and many years of active championing for this region.

Opportunities

The Gondwana Link initiative was not so much driven by the threatening processes assailing biodiversity, but rather by the stunning conservation opportunities that the region presented (summarised above). This is in stark contrast to the adjacent wheatbelt where the threatening processes are extreme, but there are limited prospects for greatly improving conservation outcomes with the same amount of effort. The driving factors in the Gondwana Link region were the ecological opportunities offered by a large amount of diverse bush remaining, relatively recent fragmentation that was likely to be reversible with moderate effort, and a support base that could be reliably expected amongst key community leaders.

The strategic approach to Gondwana Link has therefore been built on six key elements:

- Articulating a compelling vision of the future – rather than being overly constrained by what has been achieved so far ("audacious but not too audacious"). Gondwana Link participants consciously choose to imagine and act for the best instead of preventing the worst.
- Demonstrating empathy and compassion for both people and nature (but not being captured by industry views – nature has the lead here).
- Building upon decentralised conservation approaches that rest on the power of place.
- Identifying and implementing the 'no-regrets' actions that give useful tangible outcomes, while also building the momentum we need to achieve Gondwana Link.
- Building astuteness and common sense approaches through open and rigorous discussion.

- Utilising the power of good will and good work

The years of knowledge and experience living and working in the area and the trust in others with similar values, was enough for those involved to know it *could* be done, and it *should* be. It simply made sense. The collective experience and knowledge of those involved convinced everyone that there was no alternative.

3. Organisational structure

Host / lead organisation:

Gondwana Link Ltd, (Albany, WA) acts as an agreed 'keeper of the vision' and provides the cohesive framework through which local actions are integrated into landscape scale change. Gondwana Link Ltd roles include:

- Collaborative outcome based arrangements with constituent groups
- Strategic planning across the Link.
- An essential core communications role to ensure a coherent and consistent narrative, including facilitating communication between groups when needed.
- Support mechanisms including data collection, collation and sharing, and providing a 'single port of call' for those interested in supporting Gondwana Link generally.
- Establishing and promoting ecological standards for the work being undertaken.
- Promoting strategic planning, for example support of the Conservation Action Planning process.
- Start up activities, including assisting to establish and strengthen work in emerging zones and then stepping back from an operational role when new zone groups are able to take over.

Some of the characteristics of Gondwana Link Ltd are:

- It has a standard 'Limited liability' company structure and constitution
- The current Board consists of representatives of the three 'founder' organisations (The Wilderness Society, Greening Australia and Bush Heritage Australia) and is to be expanded in 2011 to five Board members with at least two independents.
- The current Board sees its role focused on managing a transition to the more independent Gondwana Link entity.
- The constitution includes a 'Public Fund', currently managed through Board members, and a DGR application has been submitted and is being processed.
- Membership is open to all groups involved in Gondwana Link, with 8-10 main groups being treated as 'members', but at present Gondwana Link Ltd has only actively sought the legally required 5 members (to smooth any further changes needed constitutionally).

Champion / leadership:

The key champion and the most recognised 'public face' for Gondwana Link, from its inception, has been Keith Bradby. Key champions during the early establishment phase were principally Peg Olsen and Olivia Millard from The Nature Conservancy. After initial development there have been a number of key people leading the involvement of their specific groups and sectors.

Staff:

Gondwana Link Ltd has two dedicated core staff of; the Director Keith Bradby and the Information Manager Amanda Keesing working on all of Link issues, plus a Great Western Woodlands Corporate Affairs Manager (Peter Price) and a voluntary internship position (Blythe Spraggins). However, there are often short term contracts, such as for specific

Conservation Action Plan development, and Gondwana Link works closely with a small number of independent consultants who have had important roles with Gondwana Link. In addition, Gondwana Link Ltd is seeking to fund three new positions (strategic planning, finance and communications-fund raising).

Partner organisations:

The groups working closely and regularly to achieve Gondwana Link, who are authorised to use the logo in material as appropriate, and who are included in Gondwana Link gatherings and planning and/or who have contractual arrangements with GLL to achieve parts of the Link are:

- Greening Australia
- Bush Heritage Australia
- The Wilderness Society
- The Nature Conservancy
- Friends of Fitzgerald River National Park
- Green Skills
- Fitzgerald Biosphere Group
- Ranges Link (Stirling Range to Porongurup) Group
- Cape to Cape Catchment Group
- Gillamii Centre
- Pew Environment Group

There are also a number of conservation investors and individuals who are recognised in various ways for their involvement and contribution (eg private conservation investors such as Eddie and Donna Wajon; and voluntary or contract contributors to projects such as Justin Jonson, Paula Deegan, Annie Mayo, Virginia Jealous and others). In addition there are a significant number of philanthropic donors and corporate supporters, particularly Shell Corporation and Wesfarmers who have supported projects in the past. Other organisations with involvement with Gondwana Link include Goldfields Land and Sea Council, Carbon Neutral, University of Queensland, University of WA, and Curtin University.

Practical organisational structure

The partners in Gondwana Link chose an ‘organic growth model’ in its early years, a model that was able to fit with the needs and possibilities of changing circumstances and avoid a stagnating focus on governance when the critical need was to build momentum and achievable tangible outcomes. It is also important to appreciate that the first nine years have significantly increased the understanding of what large landscape programs involve and require. While those involved knew that Gondwana Link was originally ‘organisationally naive’, they didn’t want or allow that to stop them.

Currently much of the operational work occurs through member organisations. Within the groups there would be about 40-50 partner staff scattered nationally and internationally that have full or part-time roles contributing to Gondwana Link. In other cases, some key functioning areas of the Link have no paid staff (i.e. Ranges Link) but are operated by landholders providing time *pro-bono*.

Gondwana Link is perhaps best seen not so much as a large landscape program, but as a number of smaller landscape programs fitting together cohesively to produce a large landscape change (Figure A4.2). This doesn’t so much imply that the programs and groups work closely together, but that their results fit together, which is very different. Part of the work of Gondwana Link Ltd is to improve the ‘fitting together’ for the end result, not necessarily direct the works themselves.

Figure A4.2. A conceptual diagram for the desired operational structure for Gondwana Link Ltd (GLL) with lines as trusted relationships, communication and cooperation between projects and partners (small circles) (from Amanda Keesing, Nov. 2009).

Planning/decision making framework

Gondwana Link runs on relationships and the performance over time that builds trust, or wariness in the case of non-performers. In this regard Gondwana Link Ltd focuses more on the long term trends rather than the short term hiccups. The Director consults widely but has final say on boundaries of zones, relative priorities, contested decisions on CAP plans, use of logo and many other such items. If he gets it right then the goodwill continues, if he has to make hard calls that upset people he relies on the longer term relationships to carry Gondwana Link beyond the short term difficulties, and if decisions are severely contested they can be referred to the Board of Gondwana Link Ltd.

Groups make their own decisions regarding their operations and roles, and where these fit into broad Gondwana Link objectives or specific Conservation Action Plans, they can be promoted as such. Gondwana Link Ltd is increasingly preparing standards for works and actions across the Link, with a view to ensuring donors to Gondwana Link can contribute to specific groups confident that the proposed actions meet agreed needs. The Board of Gondwana Link Ltd makes the final strategic and governance decisions regarding Gondwana Link Ltd, and will be the final decider of publications and plans, once the member groups have had their input. This decision making structure consciously gives the Gondwana Link Ltd staff considerable operational flexibility and adaptability.

From the Gondwana Link Ltd perspective, the best value for effort comes from the groups focusing on their efforts in their respective 'zones', though in some of these there is a need for better integration between groups, and decisive steps by Gondwana Link Ltd may occasionally be needed in these circumstances.

Gondwana Link and its members have remained keen for the structure to be private sector based. To date the input of government funded projects and NRM-related discussions have been largely confined to arrangements between those structures and specific groups within Gondwana Link who have projects funded through government programs. With 'connectivity conservation' increasingly recognised by Government, Gondwana Link Ltd is keen to explore opportunities for significantly increasing the overall funding support supplied by the Government sector.

Risks, barriers, and what has been learnt:

- Effective relationships require work to make them effective; they can't be taken for granted and there is a need to recognise the significant 'pull' between geographic and organisational priorities and processes.
- Trust develops slowly based on people's and organisations' expectations being met; conversely, it is lost very quickly and is even slower to re-establish.
- The Conservation Action Planning process worked well to identify priorities and strategies, but needed to be backed by operational agreements, particularly where there is more than one organisation involved in implementation.
- Coordination is very difficult where there is responsibility but not authority.
- There are big challenges for national and state-based NGOs in learning to collaborate at both operational and strategic levels.

- Independent entities are needed to lead large landscape programs. To work effectively across numerous groups and areas it is critically important that leadership is provided through an independent entity that is representative of the collective interest and not impaired by too close an association with the specific interests of any one group. Even at operational level, the longer term steps needed to achieve the bigger program can be quite different from the short or long terms steps perceived by individual groups as being in their best interests.
- Bigger is not necessarily the better economy of scale, both organisationally and operationally. Significant efficiencies are to be found in the ability of smaller geographically focused organisations, particularly when these can be paired with the specific efficiencies of scale larger groups hold.
- There is a temptation for organisations to build too rapidly from their on-ground programs – small successes geographically need consolidation before they become the basis of national efforts.
- There is a tendency that needs to be overtly addressed for 'larger' groups to assume a degree of leadership that is not necessarily equitable of the significant on-going contributions of 'smaller' local groups.
- It is highly likely that organisations will go through phases of internal restructuring and external re-focusing at various times, and the implications of this need to be considered in relation to their collaborative roles.
- Some 'functional redundancy' is useful in having sufficient partners involved in implementation is useful in case one partner fails or drops away for a period.
- The ability of other organisations to 'carry' one of the partners for a period must be based on mutual trust.

Funding

Of the approximately $20 million raised and spent for Gondwana Link purposes since 2002, some 85% has come from private and corporate sources. However, the scale of funding is still way below what is needed.

The initial Coordination team and Gondwana Link Ltd has supported numerous individual fundraising efforts by member groups and will continue to do so. Gondwana Link Ltd is aware of concerns amongst some of its membership on the risk of competitive fundraising, and endeavours to respect that view. At the request of member groups there have been some collective bids for funds, both public and private, on the basis that 'back to back' contracts would then disperse the funds through the groups.

Groups enter into joint funding agreements and contractual agreements between themselves. Where funding is made available through Gondwana Link Ltd, it is subject to similar contracts. Where Gondwana Link Ltd directs a funder to a particular group, or selection of groups, it is for the funder and the groups to organise their own arrangements.

A business plan for putting Gondwana Link Ltd on a self sustaining basis, and identifying viable funding mechanisms for the next 10 years work across the Link, is currently under development. Subject to discussions with the relevant groups, this may include joint funding approaches.

In order to develop major economic drivers, extensive work has been done to quantify the carbon sequestration potential from native species management and restoration. The Nature Conservancy funded and arranged some initial consultancies and contracts, including an extensive business feasibility developed with McKinsey & Company. Greening Australia, and Justin Jonson in particular, have conducted extensive research and development, mostly in the Fitz-Stirling and the Ravensthorpe Connection areas (Jonson, 2010, Jonson and Freudenberger, in press). Four major carbon funded multi-species plantings, totalling over 500ha, are now in place (Greening Australia and Carbon Neutral). The Wilderness Society funded researchers from the Australian National University to conduct a 'green carbon

analysis' in the Great Western Woodlands (Berry et al. 2009) which demonstrated the significant carbon storage gains that are possible through improved fire management.

In-kind contributions

In kind contributions are part and parcel of living in a regional community, whether it be property neighbours assisting with maintenance of fire breaks, or volunteers coming to assist with data entry or ecological monitoring, or individuals buying and restoring areas of bush privately, or time spent in developing the strategic plans. Such contributions strengthen the social capital that makes Gondwana Link stronger than it could be if it were a top-down, remotely administered or planned initiative. There is no formula for valuing in-kind contributions as 'matching' funding: funds are generally provided to produce an outcome that is clearly specified. Where in-kind contributions need to be identified for particular funding sources or applications, they are done so according to the needs of that specific process.

4. Application of biophysical design principles:

The whole concept of Gondwana Link rests on fundamental science principles developed over decades, but poorly implemented anywhere. In essence, it still comes down to 'more habitat, better connected, in good health, and with manageable level of threats' (Bradby and Deegan, 2011, *in preparation*). While broad advice has been taken from a wide range of scientists, Gondwana Link has maintained a focus on clear 'no regrets' actions that enabled much needed progress to be made initially, and the more finely-tuned science to be drawn in as needed.

As part of the current documentation of the basic approaches to Gondwana Link activities and the standards, Gondwana Link partners are encouraged to apply the following principles:

- *We work through ongoing and highly adaptive processes rather than pre-determined and inflexible conservation area designs and plans.* To date the prescriptive approaches haven't been adequate to arrest widespread downward trends in most indicators of ecological health. Reliance on continuing the same management approaches in the face of accelerated rates and types of change in future is likely to be increasingly costly and increasingly risky.
- *The required changes need to permeate all scales and sectors of society.* It is not enough to only work with our conservation colleagues and friends.
- *To achieve long term conservation (at evolutionary timescales rather than political cycles) in the face of the currently accelerated rates and types of change, the maintenance of ecological functions and strengthening of resilience across systems is required, rather than a focus on individual species.* Species loss and accelerated damage to systems is now so severe in south western Australia that, even before the full onslaught of climate change hits, we need to undertake a heartbreaking exercise in triage and concentrate on those systems we can maintain in reasonable condition without a high degree of human interference or management.
- *A vastly increased scale of conservation action is essential to arrest the continuing attrition of nature and build resilience to future pressures.* We need to both exponentially increase the existing efforts and devise cleverer ways of achieving change.
- *The diversity of the environment requires a diversity of approaches: there is no single solution. Gondwana Link will not be restricted to any particular conservation approach: advocacy, covenants, purchase, and many more tools are all required across the mix of land uses and tenure we operate in.*
- *All steps taken should be useful in themselves, with 'the whole being greater than the sum of the parts'.* We can't guarantee that the entire Gondwana Link vision will be achieved, but we can ensure that every step along the way is an important one that we should take anyway.
- *People shouldn't be separated from nature: they may be part of the pressures but they are also part of the conservation solutions.* We will work to strengthen the resilience of the linked ecological and social systems with the goal of moving towards a society that is viable, vibrant and ecologically supportive.

- *Actions should be informed by the best available, evidence-based science interpreted through experience and common sense.* Our scientific knowledge of complex ecological systems will always be incomplete but this cannot be a reason for inaction. There are many sources and forms of knowledge, and formal science needs to be supplemented with the rich veins of local and traditional knowledge, much of which is based on generations of observation and interpretation.
- *A cooperative and open structure where shared learning is encouraged and practiced is most likely to achieve our vision*

Geographically Gondwana Link is aligned across the major environmental and climate change gradients. Directions of predicted climate change are a major consideration in development of strategies. Among the fundamental approaches taken is that of building resilience: Gondwana Link's whole reason for being is to strengthen the ability of biota to withstand the environmental assaults that are already reducing the viability of species, communities and processes; climate change provides an additional imperative to do more, faster and better.

5. Implementation achievements:

All of Gondwana Link achievements include:

- Approximately $20 million has been raised and spent for Gondwana Link purposes since 2002, and some 85% has come from private and corporate sources. However, the scale of funding is still way below what is needed.
- A vision of ecological health extending over 1000 km of a recognised biodiversity hotpot has been widely promoted and accepted.
- Extensive networking to build support and involvement, including all of Link groups gathering and review.
- (Initial) spatial analysis (based on size, fragmentation and representation).
- Enough on-ground momentum and tangible large scale change generated to have the vision recognised as achievable.
- An accepted Governance structure in place
- A Functional Landscape Plan for all-of-Link in preparation (subject to funding availability).
- Documentation of "The Story So Far" by a professional journalist (in press).
- Two The Nature Conservancy Fellowships to build the collective capacity for fundraising.

Fitz-Stirling:
Significant on-ground achievements within the Fitz-Stirling zone of Gondwana link include:

Property acquisition (Map 2 below):

- Purchase of 6 properties totalling about 7022 ha by Gondwana Link groups.
- Private individual conservation buyers acquired two properties totalling 1600 ha.
- Covenants over some 900 ha.

Revegetation:

- A total of 2300 ha has been revegetated, including biodiverse and mixed species plantings. This is across the group-owned properties and plantings with private landowners.
- 998 ha of the revegetation was through the Shell Reconnections project.
- 280 ha of the revegetation was through a joint venture between Greening Australia, The Australian Government, private investorsand Spicatum Resources Australia, with support provided by The Nature Conservancy. These plantings comprise native sandalwood with mixed host species plantings.
- 250 ha of 'biodiverse carbon' planted on Peniup under a carbon-funded contract between Greening Australia and Mirabella Ltd.
- 90 ha of 'bio-diverse carbon' planted on Nowanup South by Carbon Neutral.

Other Activities:

- Development of a detailed Functional Landscape Plan to set the level of work necessary, and which has guided research programs to fill critical knowledge gaps, such as a three year wallaby program.
- Significant ongoing monitoring by Bush Heritage of fauna use in both remnants and revegetated areas, with six years data telling a significant story.
- A University of Queensland PhD thesis (in progress, Ayesha Tulloch) supporting the wallaby research, but with a focus on selection of indicator species to determine predator control effectiveness.
- *Phytophthora* dieback mapping of the woodland areas of Yarrabee and Chereninup properties carried out with the assistance of the South Coast NRM Project Dieback.
- Through the leadership of Eugene Eades, Noongar people have greater access to the land from which they have been forcibly removed. 'Nowanup' has become a Noongar cultural centre including educational programs and an intervention program for youth at risk identified by the Justice system. No dot-point summary can do justice to what Eugene has accomplished, nor to the enormity of the hurdles Noongar people face. It is clear though that the provision of opportunities for indigenous people to continue their cultural heritage, in their own way, is a dimension to large scale restoration projects that should not be ignored.
- Cultural mapping has been carried out by Noongar community members in partnership with a local archaeologist on most of the Gondwana groups' properties and several others in the region.
- Gondwana Link's vision has captured the imaginations of artists as well as conservationists and naturalists, and resulted in several art events over several years, some run in conjunction with the Great Southern Regional Program of the Perth International Arts Festival (PIAF). Examples are the Hotspots exhibition, Liminal Exhibition, and the (now annual) Gondwana Youth Arts events coordinated by Gondwana Link Arts.

Great Western Woodlands:

- Through The Nature Conservancy, achieved the initial funding that supported The Wilderness Society to start scoping issues and values in this relatively unknown area, leading to compilation of the ecological values and the known science for the Great Western Woodlands in the publication '*The extraordinary nature of the Great Western Woodlands*' (Watson et al. 2008).
- The advocacy and communications work by The Great Western Woodlands Collaboration achieved bilateral political support for greater conservation effort in the region prior to the last WA state election.
- As a result, the state government committed $3.8 M in funding for the Great Western Woodland (GWW), and the WA Department of Environment & Conservation established (DEC) established a Stakeholder Reference Group (including Gondwana Link Ltd and other members of the GWW Collaboration) to develop a Biodiversity and Cultural Conservation Strategy (DEC, 2010).
- While awaiting the release of the DEC strategy, members of the Stakeholder Reference Group decided that they wished to continue as an independent group and they selected the Gondwana Link Director to chair the 'Woodlands Initiative'. This group has:
    - Established a land use planning process.
    - Continued joint lobbying across environmental, mining and Traditional Owner issues.
    - Commenced the establishment of a 'Woodlands Foundation'.
    - Included a GWW Biodiversity Science Reference Group with a range of Australian and international researchers
- Other projects/initiatives that have been supported by Gondwana Link or GWW Collaboration include:

- ANU analysis on Green Carbon potential in GWW (Berry *et al.* 2009).
- A '*Development by Design'* process currently in progress, led by The Nature Conservancy in conjunction with a major miner
- A Marxan analysis for the GWW by the University of Queensland under an ARC Linkage project, supported by The Nature Conservancy and The Wilderness Society
- A science program (under development) led by The Nature Conservancy and Birds Australia, including a research project to answer two important questions:
    - What does an intact woodland bird fauna look like, and how does it interact with its habitat?
    - How do the birds use the GWW, and are some areas more important than others?
    - More information: http://www.birdsaustralia.com.au/our-projects/birds-in-the-great-western-woodlands.html
    - Support for the Terrestrial Ecosystem Research Network (TERN) Supersite project, through Dr Suzanne Prober (CSIRO) and the University of WA (See http://tern-supersites.net.au/GWW.jsp)

Ranges Link (Stirling to Porongurup)**:**

- Work now included in this initiative has been underway for some years, through the Oyster Harbour Catchment Group, Friends of the Porongurup National Park and private individuals. Successes include some 1800 ha under conservation ownership, a network of biodiverse plantings and a spatial plan of priority areas.
- Through 2010-2011 a Conservation Action Plan has been developed and further funding is currently being sought for its implementation.
- A local business sponsorship was facilitated, allowing expansion of the group's activities in fencing remnant vegetation and restoration of native communities.

Forests to Stirling:

- This initiative builds on a range of landcare and environmental work conducted by Greenskills and the Gillami Landcare Centre over the past 5-10 years. The current effort is seen as the way to build on earlier work to make more significant improvements in the landscape.
- A resources document and spatial data have been compiled. This developed the skills of the local group especially in GIS.
- Modest funding has already achieved the fencing and protection of significant farmer owned bushland areas and bushland management in some of the smaller corridor links in the zone.
- A Conservation Action Plan has been produced and is providing the basis for funding applications for its implementation.
- The Conservation Action Plan process has catalysed communications and data exchange across players within the area, including the plantation forestry industry.

Margaret River:

- The Capes to Capes Catchment Group have been active for many years, with a particular focus on water health. They currently run a number of programs involving the key rivers and with the wine industry. In 2010 they were successful in gaining a small grant to implement a number of on-ground steps and develop their role in Gondwana Link.
- As a consequence, and with additional donor funds, a Conservation Action Plan has been produced and further funding is currently being sought for its implementation.

6. Gondwana Link component case study: The Fitz-Stirling

The Fitz-Stirling operational area lies between the Stirling Range and Fitzgerald River National Parks and has an area of about 250,000 ha (Map 2.). It is clearly seen on a satellite image of Gondwana Link as one of the largest gaps in the Link. Nevertheless, it includes two small nature reserves (Corackerup and Peniup) and more areas of native vegetation in private ownership than have survived elsewhere in the agricultural areas. The Stirling Range National Park includes approximately 1500 plant species, 87 of which are endemic to the Park. The Fitzgerald River National Park includes approximately 1700 plant taxa. The two National Parks are about 75 km apart and there is only 40% overlap in their plant species.

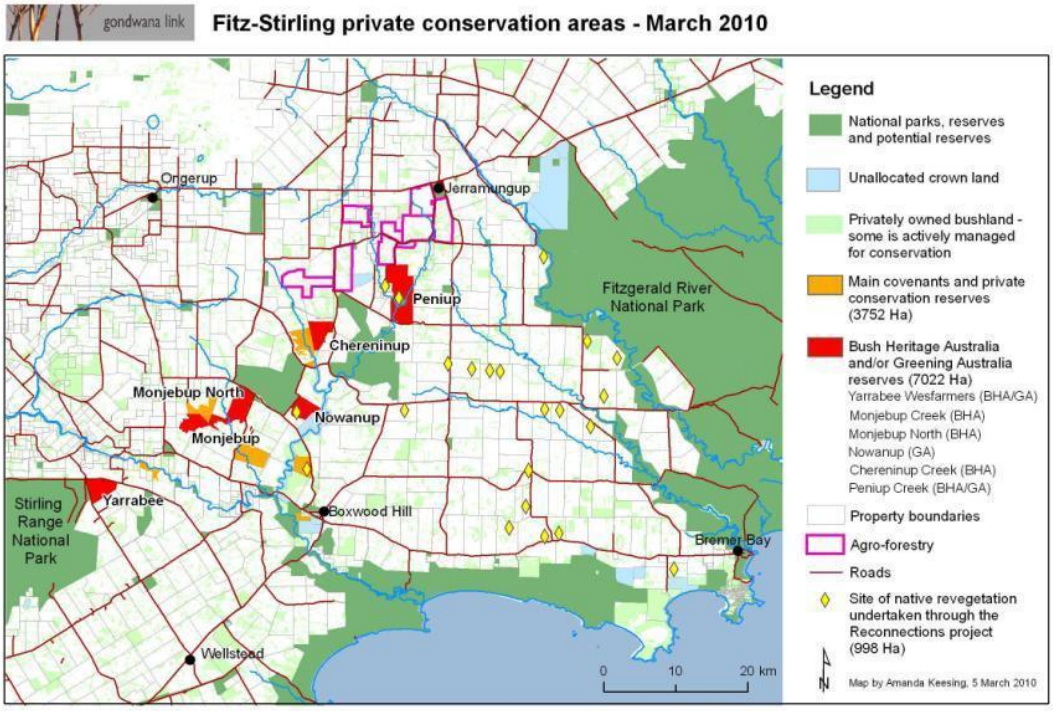

Figure A4.3: The Fitz-Stirling component of the Gondwana Link initiative.

Initially, very simple spatial analyses were done for the Fitz-Stirling area which demonstrated for example, that a 75 km link of 2 km width to re-connect the two National Parks through the existing nature reserves would, if ideally situated, require somewhere between 7000-8000 ha of restoration (it was assumed some 10-12,000 would in reality be required). This was not a spatial plan as such: it was used as a basis for preliminary estimates of the funding that could be needed for land purchase and restoration. It was also superseded by further development of the Function Landscape Plan (FLP) started from a Conservation Action Planning workshop given by Greg Low from The Nature Conservancy in Albany in July 2004.

The initial FLP was coordinated by the (then) Gondwana Link Coordination Unit (now Gondwana Link Ltd), with a 'core project team' comprised of individuals with direct experience and knowledge in the area, most of whom were employed by the groups that were the founding partners of Gondwana Link (The Wilderness Society, Fitzgerald Biosphere Group, Friends of Fitzgerald River National Park, Bush Heritage Australia and Greening Australia).

The initial FLP was used as the basis of a successful funding application to LotteryWest that funded the employment of two of the people involved in the initial plan, Paula Deegan and Angela Sanders, to fill the gaps and revise and strengthen the FLP. In the spirit of collaboration, the funding proposal was prepared with input from the Gondwana Link Coordination Unit, The Wilderness Society, Bush Heritage Australia and Greening Australia.

The FLP was revised and continuously adapted over a two year period in which baseline data for a number of key ecological attributes for the conservation targets were also established. The FLP continued using the basic methodology of the Open Standards for Conservation and The Nature Conservancy's CAP process. Objectives embedded in the FLP are:

- By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including *Phytophthora cinnamomi*), and invasive weeds over at least 60,000 ha of native vegetation in the Fitz-Stirling area.
- By 2015 restore at least 16,000 ha of native vegetation, including at least 2000 ha of proteaceous-rich communities that support native insect, bird and other vertebrate pollinators.
- 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.
- By 2020 increase the populations of Tammar and Black-gloved Wallabies within the Fitz-Stirling area by 30%.

Strategies include:

- Land acquisition;
- Large scale high quality biodiverse restoration (targeting priority vegetation associations and sub-catchments);
- Management of properties to demonstrate conservation practices locally;
- Encouragement of and support for ecologically beneficial (or at least benign) commercial land uses;
- Regional scale management of fire, feral invaders (especially integrated feral predator control);
- Integrated management of other degrading processes (eg *Phytophthora* dieback);
- Cooperative learning and adaptation.

Various spatial analyses have been conducted for the Fitz-Stirling area in the past six years, each informed by what has been learnt in the previous years, along with listings of priority purchases based on both environmental priorities and market knowledge. No plans with lines on maps indicating areas for purchase or restoration have been, or are likely to be released, as they only ever represent one among many options with varying degrees of ecological and social impacts. Such maps could cause serious problems through distorting local markets or just causing a lot of time and energy being spent on unrealisable expectations.

In summary then, the vision for the Fitz-Stirling part of Gondwana Link remains an ecologically functional landscape which will consist of a variety of land tenures and land uses, the mix of which allows ecological permeability and functionality. The ideal is that the remaining areas of native vegetation are expanded greatly by high quality restoration that ultimately provides a wide structural connection between the two National Parks, but whether this is a linear connection or a series of large 'conservation nodes' with ecologically-permeable commercial land uses between them, will be determined by the opportunities that arise and further analysis of what ecological impacts the actions to date have had.

7. Additional material:

- PDFs of the following documents can be downloaded from the Gondwana Link website http://www.gondwanalink.org/:
  - Summary of the Fitz-Stirling Functional Landscape Plan
  - Summaries of the 6 conservation targets for the Fitz-Stirling area (Creek systems; Proteaceous rich communities; Tammar and Black-gloved wallabies; Mallet & moort woodlands; Flat-topped Yate woodlands; and Freshwater systems)
  - The Peniup Restoration Plan

- Justin Jonson's summary article of the Peniup restoration plan (published in AEDA Decision Point)
- 'Living with the Land' guidelines for land managers, produced by the Knowledge Connection project.

- PDFs and Miradi versions of the CAPs for Fitz-Stirling (http://conpro.tnc.org/33/), Ranges Link (http://conpro.tnc.org/1722/) and Forests to Stirling (http://conpro.tnc.org/1721/) can be downloaded from The Nature Conservancy's ConPro database.

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A5 East-West Nature Links

Compiled by: Carina Wyborn, David Freudenberger

1. Basic descriptors

Name: *NatureLinks* with emphasis on the *East meets West* component

Component initiatives:

NatureLinks is an overarching State Government policy that aims restore habitat at a landscape scale. It is comprised of six corridors:

1. *Arid Lands NatureLink* – northwest corner of SA across desert bordering NT and QLD
2. *Cape Borda to Barossa NatureLink* – west edge of Kangaroo Island, northeast across Backstairs Passage, nth through the Adelaide region to Barossa Valley
3. *Flinders-Olary NatureLink* – Southern Flinders ranges, north to Gammon Ranges and north-east to Olary Ranges
4. *River Murray-Coorong NatureLink* – full length of Riverland towards the Upper South East encompassing the entire Coorong region.
5. *Trans Australia Eco-Link* (new)– Arid lands of SA through to the Northern Territory.
6. *East meets West NatureLink* – central Eyre Peninsula to WA border, including the Nullarbor Plain and Great Australian Bight. This connectivity concept has four sub-components
    - *Coastlinks* – this is yet to be a formal component of *Naturelinks*, however, the planned coastal threat abatement and land purchases could potentially contribute to the implementation of East meets West.
    - *Bounceback* - Spans two NatureLinks corridors; Gawler Ranges component relevant to East meets West.
    - *Far West*- Recent external funding has meant we can put on another implementation officer in the far west, to extend the implementation projects.
    - *WildEyre* (western Eyre Peninsula) – is the southern portion of *East meets West* concept. The *WildEyre* sub-initiative is the focus of a separate analysis in this report.

This case study focuses on the *East meets West* component of *NatureLink*.

Location and jurisdictional coverage: *East meets West*

South Australia; Eyre Peninsula and Alinytjara Wilurara NRM Boards;

2. Drivers

Mission and purpose:

The *NatureLinks* policy initiative is said to provide a vision "for an ecologically sustainable future for South Australia, integrating proactive biodiversity conservation with regional development and natural resource management." This initiative seeks to enable species persistence in the face of environmental change through creating a comprehensive system of connected habitat with core protected areas and buffers linked by integrated cross tenure land and sea management for conservation.

East meets West is guided by an overarching vision that would see people working in collaboration to enable the species and ecosystems throughout the region "to continue to

survive, evolve and adapt to changing climatic conditions." Beneath the vision, *East meets West* is guided by the following aims:

- The active involvement of all people in a *NatureLink* that enhances their social, economic and cultural wellbeing;
- Integrated biodiversity conservation and natural resource management across the *East meets West NatureLink*;
- An increase in the area, connectivity and long term viability of core habitats; and
- No further loss of native species and ecological communities due to human impacts
- *East meets West* was designed with the intention of linking to landscape scale programs in WA (e.g. *Gondwana Link*) creating an opportunity for cross jurisdictional planning and management
- To create a less fragmented landscape, seeking to bring the region closer to pre- 1750 conditions

Champion / leadership:

East meets West is a policy initiative driven by the South Australian Department of Environment and Natural Resources implemented predominantly through the NRM Boards. Emma Coates is the *East meets West NatureLinks* Coordinator and has overseen the planning and now implementation of this initiative. Note, Emma Coates (DENR) has also been appointed as the *WildEyre* Coordinator and oversees administrative matters such as meeting dates and arrangements, key milestones, group communications, website development, etc. This is considered a significant in kind contribution from DENR.

The drivers for the creation of the corridor initiative:

The *East meets West* initiative has been framed as an integrated cross tenure management approach to climate change adaptation. It promotes a landscape scale approach with the focus on functioning ecosystems at a broad scale to facilitate the conservation of ecological processes and through that species and ecosystems in the landscape. The *East meets West* region is seen to be a major link connecting the mallee areas of western and eastern Australia and the acacia shrub lands and woodlands across the North, East and West. As the region is less fragmented than other areas of South Australia the *East meets West* initiative aims to provide an opportunity for conservation not available in other areas of South Australia. There are four key elements to *East meets Wes*t that are also shared by all the other *NatureLinks* initiatives:

- **People in Nature** – sharing benefits of ecological sustainability
- **Integration and partnerships** – learn Natural resource management across landscape to meet common biodiversity objectives
- **Connectedness** – connected habitat facilitating ecological flows across land and sea;
- **Lose no species** – native species and ecological communities surviving and continuing to evolve and adapt to changing climatic conditions

There have been many influences over the initial development of *East meets West*, these include (not are not limited to):

- Biodiversity plan for Eyre Peninsula
- NRM planning and local knowledge
- Previous efforts of *Ark on Eyre* Education/Communications program
- Threatened Species recovery efforts in region
- Local action and community group aspirations for the area
- Consideration of the populated areas within the *NatureLink* and capacity for community involvement.

- Location, extent and condition of remnant native vegetation on Eyre Peninsula. (Current boundary follows largely continuous native vegetation in reserves extending from east to west)

No research conducted to primarily inform *East meets West*, however, DENR are beginning to roll out the Landscape Assessment Framework across Eyre Peninsula in coming years, which will help in assisting priorities for effort across the entire landscape. In the early planning stages of the initiative, the landscape classification method developed by Hobbs and MacIntyre (1999) was used to determine areas considered to be core and with restoration potential to guide activities. This work was combined with subsequent spatial analyses, mapping product and ground truthing of threatening process within corridor boundary. There has also been a number of Honours & PhD research projects conducted on the Eyre Peninsula looking at fire ecology, species response post fire, reptile movement, species richness comparison between core park areas, roadsides and remnant paddock vegetation, prioritisation of areas within corridor. Biological surveys and baseline data have been captured and subsequently incorporated into Biological Databases of SA. Ongoing monitoring of particular threatened species populations (eg Sandhill Dunnart Yellabinna, Malleefowl, shorebirds, coastal raptors) have been conducted and in 2010, State wide Bushland Condition Monitoring sites were established.

3. Organisational structure

Host / lead organisation (if any):

Emma Coates is the *East meets West NatureLinks* Coordinator working out of the DENR office in Port Lincoln, South Australia.

Staff:

- *East meets West NatureLinks* Coordinator, the sole staff member overseeing planning & implementation of entire initiative. The DENR regional office hosts this staff member (Port Lincoln)
- Recent short term contract secured for far west implementation officer (based in Streaky Bay) – to assist delivering *NatureLinks* principles on-ground in far west portion of corridor.

Partner organisations:

East meets West is a policy initiative driven by the South Australian Department of Environment and Natural Resources implemented through DENR & regional NRM Boards. With recent integration (which is ongoing currently) between DENR and NRM in South Australia – the focus of conservation efforts can now be undertaken more effectively across tenure boundaries, with the combination of efforts made on both public (reserve estate) and private lands.

Formal governance / organisational structure:

The *NatureLinks* program, as an overarching statewide program, has an executive *NatureLinks* Steering Committee which oversees *NatureLinks* governance and progression within Department of Environment and Natural Resources (DENR).

The then Department for Environment and Heritage developed the NatureLinks concept in 2002 – which is heavily based on the Wilderness Society's *WildCountry* philosophy. *NatureLinks* gained increasing impetus in 2005 upon incorporation of Target 3.2 in South Australia's Strategic Plan to "have five well established biodiversity corridors across SA, by 2010". The *East meets West NatureLink* was the first of these five to become established in the state. NatureLinks also contributes to the No Species Loss Nature Conservation Strategy.

The *East meets West* Plan was launched by the Minister for Environment and Conservation in November 2008 and directly feeds into the South Australian government strategic plan commitment to establish five biodiversity corridors linking public and private land across the State by 2010.

East meets West has an informal governance structure and is not governed by excessive committees and boards. This was a deliberate decision as stakeholders felt this informal structure would work best in the region, and this informality is working. Though, this is not to say that the coordinator sets direction independently, rather colleagues from NRM, DENR, and broader networks are consulted, with input requested in relation to particular issues or opportunities.

During the plan-drafting phase, a *NatureLinks* Working Group (cross agency collaborative group with diverse stakeholders) was established but has since dissolved. This group were valuable in inputting expert knowledge from diverse stakeholders and helping with the drafting of the Plan. DENR is taking the lead for *East meets West*, but is complement by an active on-ground program supported by the NRM Boards.

Practical organisation structure

Given the large geographical extent of the *East meets West NatureLink*, the area has been divided into four key zones for implementation:

- *WildEyre* – focuses planning and implementation in the southern portion of *East meets West*, and is described separately in this report.
- *Bounceback* – Spans two NatureLinks corridors, the Gawler Ranges component relevant to *East meets West*.
- *Coastlinks* – Not formal component of the *NatureLinks* initiative, however the planned coastal threat abatement and land purchases can contribute to the implementation of *NatureLinks* in the *East meets West* area.
- Far west area *of East meets West* – Recent external funding has meant DENR can put an implementation officer in the far west, to extend the implementation projects.

A brief organisational/institutional history of the initiative:

- 2002 – *NatureLinks* launched by DEH – based on The Wilderness Society's – *WildCountry* program
- 2005 – Draft EMW Plan launched & public submissions analysed
- 2008 - Final EMW Plan launched by the Minister for the Environment and Conservation (Hon Jay Weatherill)
- 2008-onwards – Plan being implemented by *NatureLinks* coordinator and other partners.

Risks and barriers for *NatureLinks* include:

- Lack of funding for implementation; success is heavily reliant on external funding
- Hence, heavily reliant on developing partnerships in resource constrained environment
- Funding uncertainties, budget cuts and agency mergers means uncertain times for all involved in Naturelinks.
- Only one staff member per corridor – each with differing levels of experience, technical ability and social influence
- Some *NatureLinks* are in remote areas, with little human habitation, hence it difficult to bring community along at times
- Mining and exploration in reserves becoming much more of an issue for *NatureLinks* in recent times. This is due to the "Joint proclamation status" of 74% of SA's core

areas and reserves means the resilience and condition of the "skeleton of core areas", upon which *NatureLinks* is based, are being degraded at the same time they are trying to be protected. So, in essence, these core areas are being mined or explored which negates much of the positive on-ground outcomes for conservation.

- Political uncertainty – if the Government of the day changes, *NatureLinks* could be dropped as a policy priorty.
- Year to year contracts for all *NatureLinks* staff means lack of continuity in staffing. This has meant that many relationships must be rebuilt with each new project officer appointed, and undermines project success over time.

Mechanisms to deal with conflict

- Policy discussions from each partner in relation to specific issues in a proactive way
- Each partner given a timeslot to raise queries and concerns each meeting
- All partners have equal say and matters of conflict handled respectfully and tactfully.
- Some confidential matters only ever discussed internally

More discussion on practical organisation structures:

- In particular describe whether there are hierarchical arrangements in place and the way in which they emerged.

Typical organisational structure for *NatureLinks*

I. Premier of SA – SASP target incorporation
II. Minister Environment and Conservation – political commitment and environmental focus
III. CE DENR - approves
IV. Exec Directors of each directorate involved in particular decision making
V. *NatureLinks* Project Manager (Adelaide)
VI. Corridor Coordinators (regional) and line managers supervising

How did the structure emerge (top-down, bottom-up or some combination)?

Top down mostly – DENR committed to the target, sought potential applicants and retained where possible with annual funding.

How devolved are the arrangements (at what point is sign-off at the whole of corridor level required)?

NatureLinks corridor planners have say over most on-ground activities, however broader government policy dictates whether local strategies and specific activities will be supported at higher levels within the agency. Partnerships formed by planners and backed up by the DENR Executive. Any major activity or strategy must go to the DENR executive for sign-off.

4. Biophysical design descriptors

Physical characteristics of the corridor:

East meets West covers 21 million hectares from the central Eyre Peninsula to the Western Australian border, including the Nullarbor Plain, Great Australian Bight and Wilderness Protection Areas of Yellabinna, Hincks and Hambidge. It spans three biomes: Arid, Mediterranean, and Marine.

Goals:

The *East meets West NatureLinks* Plan outlines four elements, two of which relate to biophysical attributes: connectedness, and no species loss. The plan outlines an ambitious 10 year strategy under these elements to:

1. Increase the area, connectivity and long-term viability of core habitats
2. No further loss of native species in ecological communities due to human impacts.

While these do not relate to specific biophysical attributes, Table 1 outlines the primary objectives and approaches being pursued to meet these goals.

Application of biophysical design principles:

The Hobbs and McIntyre landscape classification, that identifies "intact, variegated and relictual" landscape condition, proved useful. The fundamental principle applied was to create linkages between, and buffers around, existing remnant vegetation or including Parks and Reserves. The spatial prioritisation for *East meets West* is described in the Supplementary section (below) of this case study.

Brief assessment of the success or otherwise of biophysical design principles in informing corridor AND have been actually applied to resultant activities (or proposed) in the corridor. Critical ecosystem linkages were identified for large scale movements of species. Linkages to address the impacts of climate impact predictions were also identified. However, for many individual species specific responses are still unknown, although some anecdotal (non quantitative) evidence for climate change responses were included.

Social and economic factors were incorporated into the prioritisation of actions in order to assess feasibility, regional uptake and capacity for involvement. Also, some social research was done on potential for the Eyre Peninsula to adopt or develop stewardship and incentive schemes for conservation outcomes. Attention was paid to landholder interest, approvals and tenures etc. However, given this project is attempting to achieve landscape scale changes, both private and public lands need to contribute for a successful outcome. Hence, the *Naturelink* boundary is not considered fixed, but soft and provides a basic template for focussing attention, but other worthy works have occurred outside the boundary and considered to be contributing to *NatureLinks* outcomes. For works conducted on the public estate, *East meets West* has tried to ensure private land managed in complementary way, e.g. neighbourly agreements and coordination of weed control. Funds for implementation from the Department have fallen short so the *East meets West* Coordinator must find external funding each year to continue the work.

The impact of conservation planning at this scale is hard to ascertain at this stage because landscape scale changes will take decades to achieve and East meets West only started three years ago. Biophysical design principles have helped focus attention within the landscape, prioritise sites within the corridor, and consider changes to *NatureLink* boundaries and target on-ground outcomes.

Table A5.1: Objectives and approaches for *East meets West Naturelinks* initiative

Connectedness	
Primary objectives	**Approach**
Maintain a comprehensive, adequate and representative system of protected areas to provide an ecological core for the NatureLink	Research, develop and implement a plan for targeting additional protected areas in priority locations to build upon the existing extensive core areas. (Arid, Mediterranean, Marine)
	Review and where necessary revise the management of public landholdings to emphasise biodiversity conservation and linkages for biodiversity conservation. (Arid, Mediterranean)
Maintain and restore existing areas of remnant native vegetation and significant Marine and coastal attributes that offer and provide linkages between key habitats	Maintain native vegetation where it joins core habitat areas to allow regeneration and provide a buffer. (Arid, Mediterranean)
	Develop and implement landscape wide fire management plans. (Arid, Mediterranean)
Re-establish connectivity between core habitat areas	Incorporate complementary nature conservation goals into land management practices for primary production and resource extraction. (Arid, Mediterranean, Marine)
	Establish or protect and manage areas that provide stepping stones and corridor links between core areas of habitat. (Arid, Mediterranean, Marine)
	Develop the necessary policy and planning environment to facilitate and promote ecosystem function and habitat connectivity in the landscape.
	Increase understanding of the impacts of climate change on ecological processes and core protected areas. (Arid, Mediterranean, Marine)
Research priorities	Identify which species move between habitat patches without corridors which species depend on corridors, and to what degree.
	Determine how corridor use is influenced by human activities in areas surrounding the corridor.

No species loss	
Primary objective	**Approach**
Manage ecosystem function to ensure the viable populations of species in ecological communities continue to survive.	Focus protection and recovery programs on species which require a high degree of connectivity across the landscape. (Arid, Mediterranean, Marine)
	Establish baseline information and ongoing monitoring programs to identify declining species and communities within the Naturelink. (Arid, Mediterranean, Marine)
	Identify opportunities to build resilience in ecosystems to improve their capacity to respond to disturbance and stress. (Arid, Mediterranean, Marine)
Manage the impacts of climate change on species and ecological communities	Identify the threats to declining species in communities within the Naturelink and undertake actions to reduce those threats within the Naturelink. (Arid, Mediterranean, Marine)
	Monitor species at risk of extinction due to rapid climate change and incorporate requirements for future management into planning and actions within the nature link. (Arid, Mediterranean, Marine)
Re-establish species into known to for areas where they are no longer present	Identify opportunities, maintain technical capacity and undertake predatory works for flora and fauna translocations and re-introductions. (Mediterranean)
Research priorities	Conduct baseline surveys of flora and fauna species distribution within the Naturelink. Further develop ongoing monitoring plans
	Determine ecological requirements of species living within the Naturelink, including critical population sizes
	Identify which species require a high degree of habitat connectivity for survival
	Determine the ideal size of habitat remnants required to maintain species populations

5. Implementation arrangements / achievements:

Implementation to date includes:

- Threat abatement (weed and feral animal control)
- Fauna surveys
- Incorporation of datasets into State databases
- Community engagement and education events
- Themed, scientific workshops
- Appointment of contractors and short term staff
- Significant revegetation and restoration
- Fencing for protection
- Soil erosion control measures
- Seed collection and training of indigenous peoples in particular techniques
- Promotions, presentations and other marketing tools eg. Website, E-cards, Ministerial presentations & briefings, attending conferences and networking events
- Internal and external communications.
- Planning and on ground action

Funding for implementation is shown in the table below.

Table A5.2: Total funding secured, as at September 2010, for *East meets West* projects including sub-landscapes such as *WildEyre*.

Funding Source	**Description**	**Value**
Australian Government - Caring for our Country	2009 – WildEyre Foundational activities (EPNRM) 2010 – Chain of Bays Coastal Project (FOSB) 2010 – Dune-top Remnants / Soil Erosion Project (GA)	$144,000 $780,000 $300,000
Native Vegetation Council	2009 - Investigations into Landholder attitudes to conserving Sheoak Woodlands (DENR) 2010 – Sheoak Grassy Woodland Tender (EPRNM)	$11,000 $520,000
SA State Complementary / NRM Funding	2009 - targeted protection and revegetation of Sheoak Woodlands, coastal fencing, weed and rabbit control, bushland condition monitoring, consultation with traditional owners 2010 – Development of a Sheoak Woodland Tender 2010/11 – Implementing High Priority WildEyre Conservation (EPRNM)	$207,000 $30,000 $484,000
Eyre Peninsula NRM Board	Produce WildEyre investment prospectus	$8,000
Department for Environment and Natural Resources	Assess condition classes of Sheoak Woodlands (GA) Bushland Condition Monitoring sites entered into Nature Conservation Society of SA database (NCSSA)	$20,000 $6,000
TOTAL		**$2,510,000**

SUPPLEMENTARY INFORMATION

Preliminary Prioritization of Sites within *East meets West*

A system was devised to give a priority rating for the sites highlighted by the results of this report. Each site was assessed against five different categories; biodiversity value, degree of threat, level of intact vegetation, relative connectivity, and the percent of the area that is already within a reserve or reserves. Each site was given a value for each of these categories then all the values were added up to produce a score or priority rating (Table A5.3). The values assigned to each category are qualitative.

Methods of assessing each category:

Biodiversity Value: Results from all the analyses in this study were reviewed for each site. Sites with high values for multiple taxonomic groups and/or analysis' were given higher ratings. Sites, such as Area 3, which was high for only one taxonomic group, were given moderate to medium ratings.

Threat: This category was based on two main criteria: (A) The closeness of the area to either adjacent degraded or non-degraded lands and (B) the richness of threatened species found in the area.

Intact Vegetation: This category was based on the best available data maintained by DEH. Areas completely intact over large areas received "Excellent" ratings and areas severely fragmented with patchy intact vegetation received "Poor" ratings. Smaller areas that were partially intact and partially degraded were rated in the middle.

Connectivity: This category was based on how well connected the area was both:

(A) Internally: how well connected the reserves/intact areas were within the area and

(B) Externally: how well connected these reserves were to parks in adjacent areas and the larger reserve network represented by the *East meets West* corridor.

Percent Reserved: This category was defined by a straight forward rough percentage of how much of the highlighted area sits within a current reserve or heritage boundary.

Table A5.3: Scoring scale used to prioritize sites

Value	Biodiv. Value & Threat	Intact Veg. & Connectivity	% Reserved	Priority Level (Score)
1	Lowest	Excellent	Highest	(1-5)
2	Moderate	Good	High	(6-10)
3	Medium	Average	Medium	(11-15)
4	High	Poor	Moderate	(16-20)
5	Highest	Poorest	Lowest	(21-25)

Table A5.4: Prioritization of Sites within the *East meets West* region.

Area	Biodiv. Value	Threat	Intact Veg.	Connectivity	% Reserved	Score	Priority
1	Highest	Highest	Poorest	Poorest	Lowest	25	**1**
2	High	High	Poor	Poor	Moderate	20	**2**
3	Medium	Moderate	Excellent	Good	Lowest	9	**5**
4	Lowest	Lowest	Excellent	Excellent	High	6	**7**
5	High	Lowest	Excellent	Good	High	10	**4**
6	Medium	Lowest	Excellent	Excellent	Highest	7	**6**
7	Moderate	Moderate	Average	Average	Lowest	15	**3**
8	Medium	High	Poor	Poor	Lowest	20	**2**
9	Moderate	High	Average	Average	Medium	15	**3**

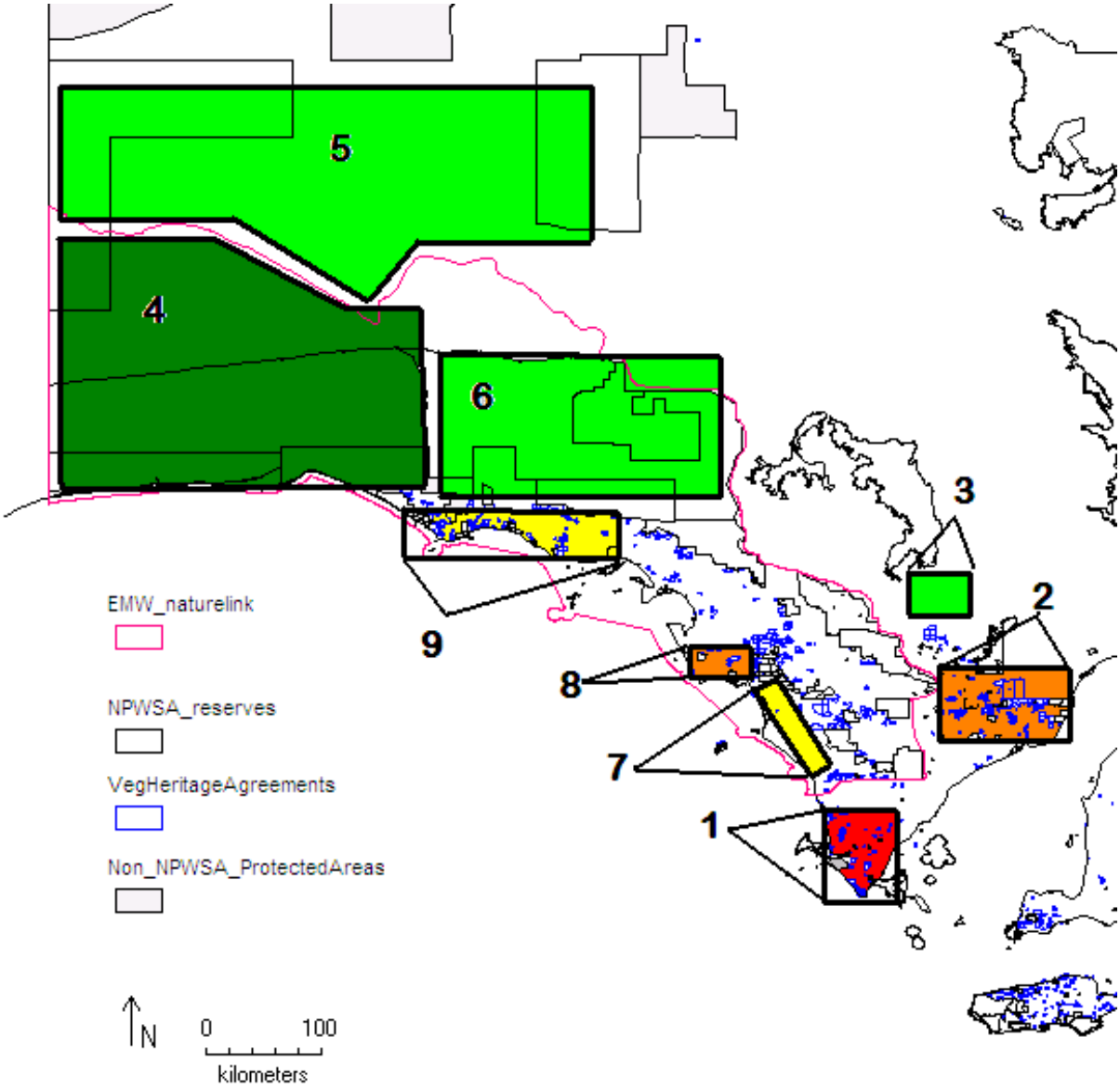

Table A5.5: Priority Level of Sites and Summary of Justifications

Area	Region/Reserve Name	In EmW corridor	Priority Number	Priority Level
Area 1	Southern Eyre Hills	No	1	**Highest**
~ Highest level of native and endemic plant species richness ~ Highest concentration of nationally threatened plants ~ Highest beta diversity measure for plants indicating high diversity of habitats ~ Complementarity analysis prioritizes the area for both plants & vertebrates ~ Most fragmented & lowest percentage of area represented in reserves				
Area 2	Northeastern Eyre Hills	No	2	**High**
~ Second highest level of plant endemism ~ High levels of native plant, bird, and mammal diversity ~ Second highest level of beta diversity for native plants ~ High fragmentation and low connectivity with EmW corridor ~ Sites within area prioritized in complementarity analysis				
Area 3	S. Gairdner Lake, Gawler Range	No	5	**Moderate**
~ Highest levels of diversity for native birds ~ Moderate levels of diversity for native reptiles and amphibians ~ High level of beta diversity for native plants ~ Sites within area prioritized in complementarity analysis				
Area 4	Nullarbor Plain	Yes	7	**Lowest**
~ Lowest levels of biodiversity for all taxonomic groups ~ Excellent extent of native vegetation & high percentage of area within reserve				
Area 5	Maralinga Tjarutja Lands Aboriginal Lands	No	4	**Moderate**
~ Highest diversity levels for native reptiles & amphibians and high levels for mammals ~ High percentage of complementarity sites selected from this area ~ Excellent extent of native vegetation ~ Low percentage in reserves but the area is Aboriginal land				
Area 6	Yumbarra-Yellabinna Reserves	Yes	6	**Moderate**
~ Significant hotspots of native plant, mammal and reptile diversity occur here. ~ Sites within area prioritized in complementarity analysis ~ Excellent extent of native vegetation & high percentage of area occurs within reserves				
Area 7	Western Coast Eyre Peninsula	Yes	3	**Medium**
~ Moderate levels of biodiversity ~ Good extent of native vegetation but poor representation in reserve				
Area 8	Venus Bay-Calpatanna Waterhole	Yes	2	**High**
~ Second highest level of native plant diversity, high level of plant endemism ~ High level of beta diversity for native plants ~ Second highest concentration of threatened plants & one threatened mammal ~ Sites within area prioritized in complementarity analysis				
Area 9	Ceduna Coastal Region	Yes	3	**Medium**
~ High concentration of threatened plant species & moderate levels of biodiversity ~ Half the area has good extant native vegetation in parks, half is cleared and parks are scattered.				

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A6 Wild Eyre component of East-West Nature Links

Compiled by: David Freudenberger, Carina Wyborn

1. Basic descriptors

Name: *Wild Eyre* – An operational component of *NatureLinks*: "East meets West"

Component initiatives: *Wild Eyre* commenced in late 2007 through the development of a strong partnership between non-government organisations and State Agencies of the South Australian Government including:

- Greening Australia (SA)
- Eyre Peninsula Natural Resources Management Board
- Department for Environment and Natural Resources
- The Wilderness Society
- Nature Conservation Society of South Australia

Location and jurisdictional coverage:

Wild Eyre is recognised as an area of significance for biodiversity conservation being part of the State Government's '*NatureLinks*' Program, and specifically a component of the South Australian "East meets West" *NatureLink* initiative. Wild Eyre is wholly within the Eyre Peninsula NRM Board.

WildEyre features more than 300 km of coastline and a diverse range of natural assets from coastal dunes, rocky cliffs, woodlands and mallee. This variety of habitat gives rise to a unique suite of flora and fauna species, many of which are endemic. *WildEyre* also compliments existing landscape conservation programs to its east and west - namely *GondwanaLink* and *Habitat 141*.

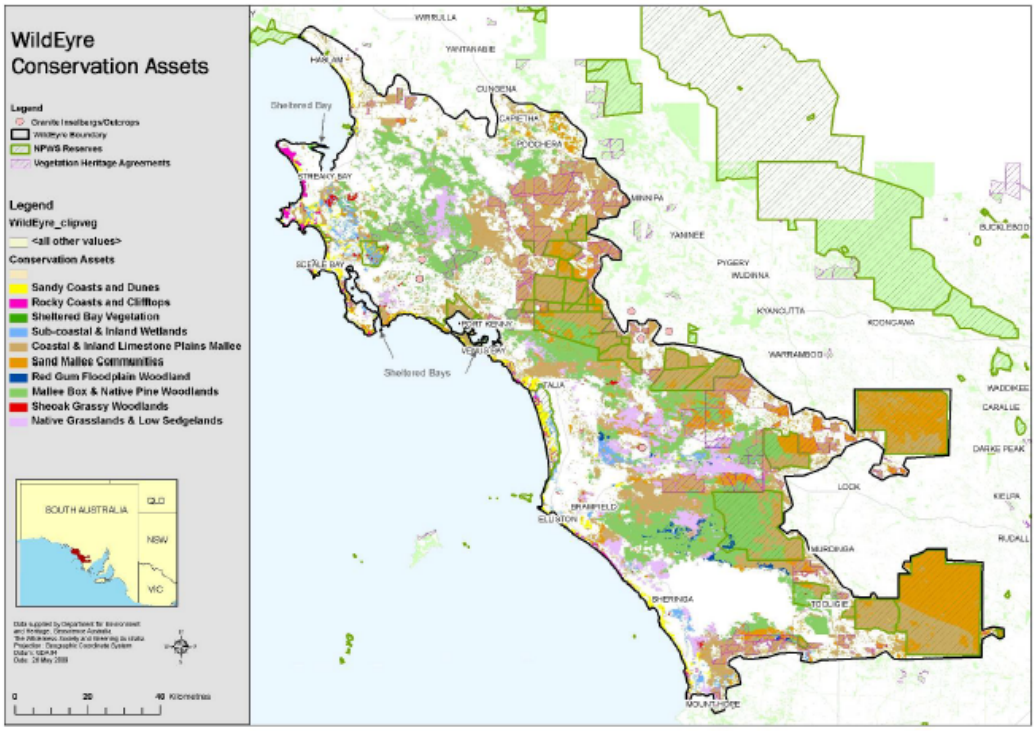


Figure A6.1: Wild Eyre zone of activity.

2. Drivers

Mission and purpose:

WildEyre is working to the following vision:

> *"A vibrant rural community living in an ecologically-valued landscape that sustains large tracts of Sheoak Woodlands, high quality coastal ecosystems and core mallee habitat areas, all of which support the recovery of the region's most threatened fauna and flora species".*

WildEyre represents a major step forward in developing and articulating a practical and carefully planned conservation vision for western Eyre Peninsula. The planning recognizes that while this is a landscape of high conservation value, as it retains a large proportion of its unique flora and fauna species, it could easily lose this richness if current threats are not addressed. It is also recognized that while the *WildEyre* region retains a high proportion of native vegetation cover (approximately 55%), the vast majority of this is mallee vegetation on low productivity limestone and sandy soils. Native vegetation on more fertile soils has been extensively modified by cropping and grazing activities leaving many of the grassy ecosystems and wetland systems in poor condition and highly threatened, along with many of their associated fauna and flora species.

The purpose of *WildEyre* is to maximise the chances of conserving the unique species and ecosystems of western Eyre Peninsula by protecting the large intact tracts of native vegetation as 'core habitat areas', and addressing the critical threats to the vulnerable habitats within the agricultural matrix. The Project aims to do this through:

- collaborative landscape scale conservation planning
- sourcing funding for conservation works
- implementing on-ground works
- promoting the region and *WildEyre* Project
- monitoring and evaluating conservation outcomes

Champion / leadership:

The *WildEyre* project is championed by a consortium of key conservation groups in the region including Greening Australia, The Wilderness Society, the Department for Environment & Natural Resources, Eyre Peninsula Natural Resources Management Board and The Nature Conservation Society of South Australia. Representatives from these organisations form the *WildEyre* project team. The team is supported by a range of other individuals and organisations and has undertaken extensive engagement with local landholders and indigenous representatives. Governance arrangements are described below.

The drivers for the creation of the corridor initiative:

This component of Naturelinks has been developed over the years by 'champions' for this region. The Wilderness Society, through it's '*WildCountry*' Program (Soulé et al. 2004) helped initiate this program and bring together other organisations and individuals committed to landscape scale conservation.

The project team has developed an over-arching ecological vision and conservation strategies for the project area through use of the Conservation Action Planning (CAP) process. This is a landscape-scale planning methodology developed and refined over the past 20 years by The Nature Conservancy. The process is used in over 1000 conservation projects worldwide. Key elements of the CAP are described in section 4 below.

3. Organisational structure

Partner organisations

The following organisations have signed an MOU (April 2011) outlining the arrangements between the Parties involved in the WildEyre Project:

- The Department of Environment and Natural Resources
- Eyre Peninsula Natural Resources Management Board
- Greening Australia (South Australia), Inc.
- The Nature Conservation Society of South Australia, Inc
- The Wilderness Society, Inc.

Chair for the Working Group of *WildEyre* meetings revolves among these parties.

Governance / organisational structure

The MOU amongst the above parties does not create legal relations between the parties; however it does signify an understanding between the parties to work together in a manner that complies with the terms of the MOU, in order to achieve the objectives of the *WildEyre* project.

Quoting from the MOU "The Parties understand working collaboratively to mean:

- A commitment to quarterly meetings, involving at least one representative from each Party. Cost of attendance to be borne by each Party.
- A degree of coordination of the activities of the Parties in pursuit of the Vision, including funding, project delivery, branding and communications.
- Facilitating the exchange of information internally between the Parties and externally the Parties and the community.
- Promotion of the *WildEyre* initiative and Vision to key decision-makers, influencers, stakeholders and the community.
- Contributing expertise and capacity to implement the Project and achieve the Vision.
- Actively promoting the Project's Vision, concept, achievements and plans.
- Delivering programs, projects and activities through each Parties organisational mechanism, processes and infrastructure, recognising the strengths and individual attributes of each Party.
- Using existing capacity and infrastructure to support the Project's activities, irrespective of external funding processes.
- Actively communicating to resolve broader issues and discuss cooperative projects and programs.
- Committing to contributing time, effort and intellectual property to landscape scale conservation planning.
- Supporting the facilitation of forums that contribute ecologically sound scientific principles and development of landscape scale plans.
- Working together to identify and cooperatively apply for funds from other sources for joint ventures, cooperative projects, joint research and training programs.
- Committing to completing externally funded collaborative projects within funding timelines.
- Agreement that where funding applications have been identified and jointly prepared by the Working Group as a "collaborative project" and where the skills and capacity exist within the WildEyre group, the opportunity to deliver components of such projects will be offered to participating organisations before being contracted out to third parties.
- Nominating one of the Parties as an agreed organisation to act as lead proponent on all collaborative external funding and administer funds on behalf of WildEyre Working Group."

(Quoted from: *A Memorandum outlining the arrangements between the Parties involved in the WildEyre Project*. 8 April 2011.

Practical organisation structure

The key decision making forum for the Project is the *WildEyre Working Group*. Meetings only occur when at least four of the five parties are represented. Each of the parties nominate one individual to act as a representative of that organisation. Decisions are made by consensus. Out of session decision making can also be made by consensus of the Working Group.

The following describes the administration and functions of the Working Group:

- Meet quarterly at an agreed venue.
- Key actions recorded and circulated within 30 days of the meeting.
- Chair for the Working Group meetings revolves between the Parties.
- Planning – to develop landscape scale conservation plans, and facilitate co-ordination of input of technical and specialist knowledge to conservation planning.
- Implementation – to oversee on the ground implementation of conservation planning.
- Monitoring and Evaluation – to plan and implement appropriate monitoring systems to evaluate success in delivering *WildEyre* aims.
- Communication and Awareness – to oversee public and corporate awareness raising critical to delivery of *WildEyre* conservation outcomes.

The MOU recognises that the Parties bring expertise in the following areas and will be primarily responsible for:

- Greening Australia – Conservation Action Planning, seedbank coordination, revegetation, carbon offsets, corporate investment, education and awareness training, community engagement,
- The Wilderness Society – WildCountry Principles, land/sea-scape planning, advocacy, wilderness protection
- The Nature Conservation Society of SA – Technical advice on bushland condition monitoring, biological surveys, biodiversity, biodiversity workshops, biodiversity advocacy
- DENR – National Parks management, conservation reserves, threatened species, *NatureLinks*, biological database, fire management, heritage agreements, wilderness protection, marine planning
- EP NRM – Community engagement, local knowledge, funding administration, technical knowledge, aboriginal engagement, pest plant and animal control, coastal management, biodiversity management, heritage agreement advice

Branding and promotion

The parties to the MOU agreed that any party may use the *WildEyre* logo provided due reference is provided to all parties. However, the *WildEyre* logo must be used either exclusively (ie with no individual organisation's logo) or with all other parties' logos. Other parties' logos may only be used with written approval of party representatives. Third parties making a contribution to the *WildEyre* Project may be provided use of the logo if endorsed by the Working Group.

The parties agreed that no party may authorise the publication of any printed material, advertising, press release or publicity, or the making of a speech or lecture in relation to the project, without first obtaining written consent to do so from other parties' representatives.

Funding

The parties to the MOU agreed to work together to identify and cooperatively apply for funds from other sources for joint ventures, cooperative projects, joint research and training programs.

4. Biophysical design descriptors

The Conservation Action Planning (CAP) process for *WildEyre* continues to be underpinned by sound science and an in-depth understanding of landscape conservation. The planning team has identified 12 broad conservation assets in the region and has assessed their health and viability (Table A6.1).

Table A6.1: Conservation assets and viability summary

Conservation Assets	Landscape Context	Condition	Size	Viability Rank
Sandy Coasts and Dunes	Fair	Fair	Good	Fair
Rocky coasts and clifftops	Good	Fair	Good	Good
Sheltered coastal bays (Venus, Bairds, Streaky Bay)	Good	Good	-	Good
Sub-coastal and Inland Wetlands	Poor	Good	Good	Fair
Coastal and Inland Limestone Plains Mallee	Fair	Good	Very good	Good
Sand Mallee Communities	Fair	Good	Good	Good
Sand Mallee Dune-top remnants	Poor	Poor	Poor	Poor
Red Gum Floodplain Woodland	Fair	Fair	Fair	Fair
Mallee Box and Native Pine Woodlands	Good	Poor	Good	Fair
Sheoak Grassy Woodlands	Fair	Poor	Poor	Poor
Native Grasslands and Low Sedgelands	Good	Poor	Good	Fair
Granite Outcrops	Fair	Fair	-	Fair
Project Biodiversity Health Rank				Fair

Key threatening processes for each conservation asset have also been identified (Table A6.2).

The *WildEyre* planning process identified 18 objectives to address critical threats and improve viability of key conservation assets (Table A6.3).

Table A6.2: Summary of highest ranked threats across conservation assets

TABLE 2: SUMMARY OF HIGHEST RANKED THREATS ACROSS CONSERVATION ASSETS													
Summary of Threats Across Targets	Sandy Coasts and Dunes	Rocky coasts and clifftops	Sheltered coastal bays (Venus, Bairds, Streaky Bay)	Sub-coastal and Inland Wetlands	Coastal and Inland Limestone Plains Mallee	Sand Mallee Communities	Sand Mallee Dune-top remnants	Red Gum Floodplain Woodland	Mallee Box and Native Pine Woodlands	Sheoak Grassy Woodlands	Native Grasslands and Low Sedgelands	Granite Outcrops	Overall Threat Rank
Stock grazing	Medium	Medium		Medium	Low	Low	High	High	High	Very High	High	Medium	Very High
Feral herbivores (rabbit grazing)	Medium			Low	Low	Low	Medium	High	High	High	Medium	Low	High
Encroachment of agriculture (cropping, fertiliser, grazing) & absence of buffers				Medium			High					High	High
Over abundant native species grazing (kangaroos)					Low			Medium	Medium	High	Medium	Low	Medium
Unsustainable groundwater extraction				Medium				High					Medium
Habitat fragmentation (from historic land clearance)					Low	Low	Low	Low		High			Medium
Weeds (e.g. African Boxthorn)	Medium	Low	Low	Low	Low	Low	Medium	Medium	Low	Medium		Low	Medium
Feral carnivores (foxes and cats)	Medium	Low	Low	Low	Medium	Medium	Medium	Low			Low	Low	Medium
Coastal development	Medium	Medium	Low										Medium
Fire management / suppression (lack of mosaic, patchy burns)					Medium	Medium							Medium
Unmanaged recreational activities	Low	Low	Low										Low
Threat Status for Targets and Project	Medium	Medium	Low	Medium	Medium	Medium	High	High	High	Very High	Medium	Medium	Very High

Table A6.3: Conservation objectives by ecological community

COASTAL	**Objective 1**: Restrict coastal developments to environmentally appropriate designs and locations and cease any further developments from ecologically sensitive areas by 2013. **Objective 2**: Measurable improvement in condition of coastal areas regularly used for recreational activities through appropriate infrastructure and signage by 2013. **Objective 3**: Protect high priority areas of Coastal Dunes and Cliff-tops from African Boxthorn and other significant weed infestations by 2015. **Objective 4:** Protect and buffer high priority Coastal Dunes and Cliff-tops from stock grazing to allow measurable improvements in native vegetation condition by 2015.
SUB COASTAL WETLANDS	**Objective 5:** Protect high priority sub-coastal wetlands with vegetation buffers to improve habitat diversity and linkages by 2015.
MALLEE COMMUNITIES	**Objective 6**: Restore fire regimes in mallee communities to produce an appropriate mosaic of fire history that minimises the risk of a large fire destroying localised species populations and maximises habitat diversity by 2015.
SAND MALLEE DUNE-TOP REMNANTS	**Objective 7:** Buffer and reconnect Sand Mallee Dune-top remnants in priority areas to support species dispersal by 2020.
RED GUM WOODLANDS	**Objective 8**: Restore groundwater hydrological regimes for Red Gum Woodlands to achieve improvement in the health of overstorey trees and encourage regeneration by 2015. **Objective 9**: Restore and secure long term protection for an additional 1,200 hectares of high quality Red Gum Woodlands by 2015. **Objective 10**: Measurable improvement in condition of 1,000 hectares of Red Gum Woodlands through improved stock grazing regimes by 2015.
MALLEE BOX AND NATIVE PINE WOODLANDS	**Objective 11**: Restore and secure long term protection for an additional 10,000 ha of high quality Mallee Box and Native Pine Woodlands by 2015. **Objective 12**: Measurable improvement in 40,000 hectares of Mallee Box and Native Pine Woodlands through improved stock grazing regimes by 2015.
SHEAOK GRASSY WOODLANDS	**Objective 13**: Restore and secure long term protection for an additional 1,300 hectares of high quality Sheoak Grassy Woodlands by 2012. **Objective 14:** Measurable improvement in condition of 20,000 hectares of

	degraded Sheoak Grassy Woodlands through improved stock grazing regimes by 2014. **Objective 15**: Revegetate 1,500 hectares of Sheoak Grassy Woodlands to ensure adequate and representative areas and to create vegetation buffers for linear ecosystems by 2015.
GRANITE OUTCROPS	**Objective 16:** Protect and buffer Granite Outcrops in priority areas to restore specific habitat type by 2015.
FERAL ANIMAL CONTROL	**Objective 17**: Maximise the distribution and populations of native fauna threatened by feral predator by 2020. **Objective 18**: Regeneration of palatable native plant species and stabilisation of soil structure in areas not grazed by stock by 2020.

Biolinks

Two of the objectives set out in Table A6.3 refer specifically to landscape scale structural connectivity:

- Buffer and reconnect Sand Mallee Dune-top remnants in priority areas to support species dispersal by 2020 (Objective 7).
- Revegetate 1,500 hectares of Sheoak Grassy Woodlands to ensure adequate and representative areas and to create vegetation buffers for linear ecosystems by 2015 (Objective 15).

In order to focus conservation efforts to ensure high value assets with high threats are given the highest priority, the *WildEyre* planning team has developed the following 3 strategic projects for initial implementation:

PROJECT 1 – Restoration of Sheoak Grassy Woodlands on Western Eyre Peninsula

Drooping Sheoak (*Allocasuarina verticillata*) grassy woodlands were once the most extensive grassy habitats on western Eyre Peninsula and have supported a productive grazing industry since the 1850's. However intensive grazing practices along with the introduction of rabbits, wildfires and clearance for agriculture and firewood has led to a dramatic decline in the condition and extent of grassy sheoak woodlands on the Eyre Peninsula and elsewhere in the State, to the point that they are now considered a threatened ecosystem in South Australia (listed as Vulnerable within the agricultural regions of South Australia by the Department for Environment and Natural Resources). As expected there are a number of flora and fauna species associated with these woodlands which are also threatened and/or in decline.

WildEyre seeks to address this issue by working with landholders to 1) protect and improve the condition of high quality sheoak remnants by excluding stock grazing and managing other threats and encouraging the uptake of covenants and conservation agreements; 2) to manage grazing in extensive degraded (recoverable) remnants to regenerate the overstorey of sheoak trees and to improve habitat condition; and 3) and to restore significant areas of sheoak grassy woodland through active revegetation in highly cleared landscapes.

Translating these objectives to the CAP, the goal is to see the "Condition and Size" viability indicators move from "Poor to Moderate" in the short to medium term, and eventually to see at least the "Condition" indicator move to "Good" (Table 1).

PROJECT 2 - Protection and Restoration of Sand Mallee Dune-top Remnants.

Central Eyre Peninsula contains extensive linear dune ridge systems which support a characteristic biodiversity which is different from the surrounding matrix of limestone mallee and as such, these systems are an important component of biological diversity in the region.

The condition of sandy dune-top remnants was assed as Poor for all viability indicators (see Table 1) and therefore they have become an initial focus of conservation effort in order to move all three indicators of viability from "Poor to Moderate".

A major threat to these systems is the encroachment of agricultural activities such as livestock grazing, fertilizer and herbicide use, and physical damage from agricultural machinery. In addition, where these sand dune ridges occur adjacent to suitable agricultural soils, these soils have been extensively cleared, cropped and grazed leaving the dune-top ridges isolated in the landscape and vulnerable to threats such as wind erosion, weed invasion and other edge effects.

WildEyre seeks to address the critical threats to the dune-top ridges by working with landholders and farming enterprises to prevent and ameliorate soil erosion, manage stock grazing and agricultural

impacts and also to restore vegetation for soil stabilization and to promote connectivity for a range of flora and fauna species.

PROJECT 3 - Protection and Restoration of High Conservation Value Coastal Dunes and Cliffs

The coastline of the *WildEyre* region is one of its most highly valued assets. Conservationists, landholders, the fishing industry, residents and others have a vested interest in the conservation and management of the coast and this, combined with the high biodiversity value and a range of threats makes it a priority in the region. The northern coastline from Venus Bay to Streaky Bay has also been recognized as a national priority area within the Federal Government *Caring for Our Country* program.

WildEyre seeks to protect high value parts of the coast from threats such as livestock grazing, recreational impacts (vehicles, camping, rubbish, etc) and inappropriate coastal development. This will involve extensive engagement with the Eyre Peninsula community and planning authorities.

The spatial location of these projects is shown in Figure A6.2.

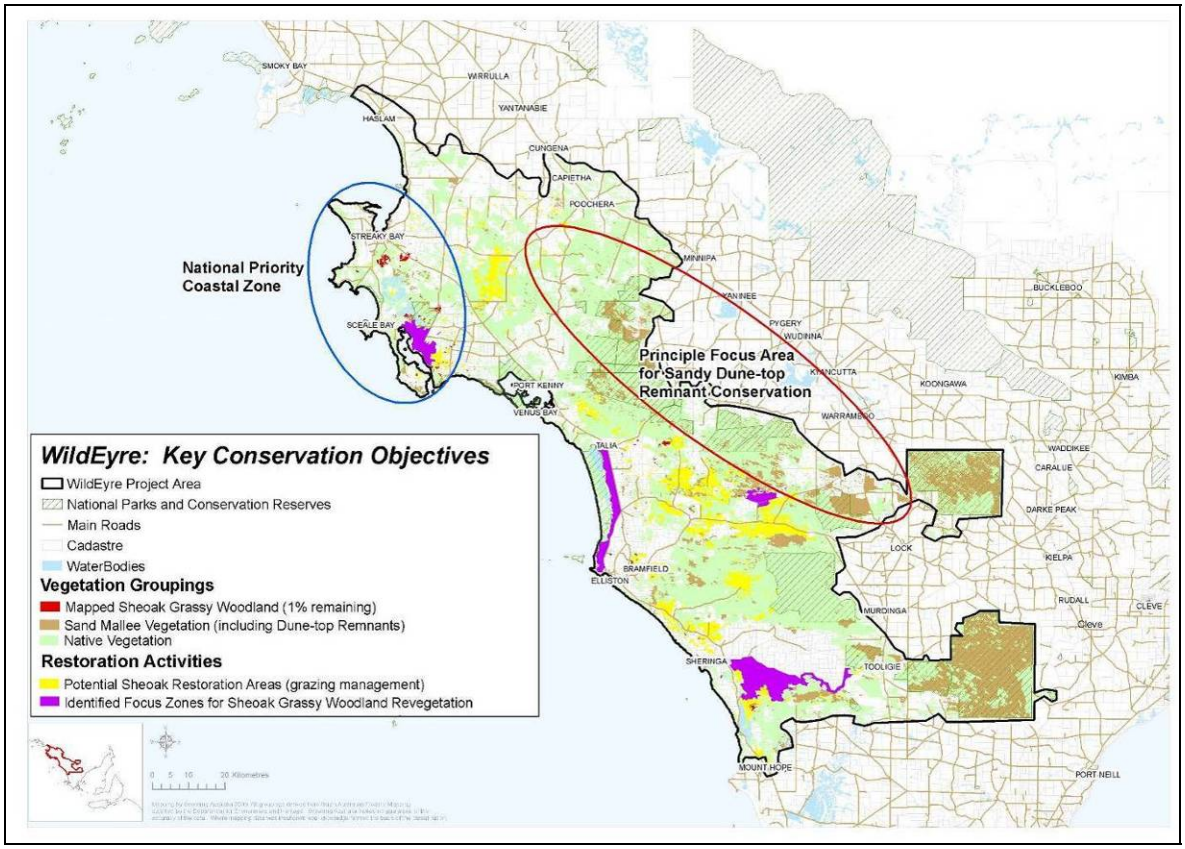


Figure A6.2: Spatial location of WildEyre projects

5. Implementation arrangements / achievements

Projects implemented to date

There is a long history of progressive conservation land management across the *WildEyre* region that has been implemented by private landholders, NGOs and State Agencies. Funding for on-ground activities has been diverse including former Australian Government programs such as the One Billion Trees, Natural Heritage Trust, and the National Action Plan for Salinity and Water Quality. WildEyre builds on these programs and includes funding from the current Caring for Our Country program.

More recent projects secured and coordinated under the WildEyre initiative are briefly described in Table A6.4. As of March 2010, total project funding secured was $426,500 plus significant in-kind contributions from each partner organisation.

Table A6.4: Funding arrangements

Funding Source	Description	Value
Caring for our Country	Funding application successful in 2009 - Foundational activities (project summary document, community workshops, bushland condition monitoring sites, WildEyre seedbank, CAP planning, large scale site plans)	$144,000
Native Vegetation Council	Grant successful in 2010 - Investigations into Landholder attitudes to conserving Sheoak Woodlands	$11,000
Eyre Peninsula NRM Board	State Complimentary funding to develop Sheoak MBI / stewardship program	$30,000
Eyre Peninsula NRM Board	State Complimentary grant successful in 2009-2010 - $37,000 for targeted protection and revegetation of Sheoak Woodlands, $126,000 for coastal fencing, weed and rabbit control, $16,000 project management, $4,000 Bushland Condition Monitoring sites, $5,000 to consult with traditional owners, $19,000 for M&E and project management	$207,000
Dept Environment and Heritage	Produce WildEyre investment prospectus	$8,500
Eyre Peninsula NRM Board	Assess condition classes of Sheoak Grassy Woodlands in the WildEyre project area (undertaken by Simon Bey - GASA)	$20,000
Eyre Peninsula NRM Board	WildEyre Bushland Condition Monitoring sites into Nature Conservation Society of SA database	$6,000
TOTAL		**$426,500**

One practical project that has already contributed to the objectives of the *WildEyre* project is the engagement of contractors to assist land managers of fragile coastal sand dunes with the control of serious environmental weeds such as African Boxthorn and Aleppo Pine. This project complimented the extensive control work undertaken on private agricultural lands over the past 12 years. For many years the expense and technical difficulty in accessing and treating African Boxthorn in coastal environments has been beyond the capacity of most. By funding the control program in some of the most inaccessible areas of the coast the volume of seed spread has been dramatically reduced. A major component of the long term success of this work is the willingness of land managers to continue to undertake yearly boxthorn control programs at the property level.

Biophysical design principles

The *WildEyre* project addresses the Mackey *et al*. 2010 “Connectivity conservation principles” (pp 41-42) as follows:

Principle 1. Connectivity Conservation focuses on geographically extensive areas that are supra-regional in scale and can extend to continental and intercontinental scales.

The *WildEyre* project focuses on a relatively small (1.2 Million ha) area of southern Australia, but it is ‘nested’ within the “East meets West” concept of *Naturelinks* and complements *Habitat 141* to the east and *Gondwana Link* to the west, which together covers two thirds of southern coastal Australia.

Principle 2. The landscape matrix serves a number of critical functions including: buffering protected areas, 'de-islanding', protecting-restoring assets not found within protected areas, and maintaining large-scale ecological and evolutionary processes

WildEyre has a focus on revegetating 1,500 hectares of Sheoak Grassy Woodlands to ensure adequate and representative areas and to create vegetation buffers for linear ecosystems by 2015 (Objective 15, Table 3). These grassy woodlands were once the most extensive grassy habitats on western Eyre Peninsula and have supported a productive grazing industry since the 1850's. However intensive grazing practices along with the introduction of rabbits, wildfires and clearance for agriculture and firewood has led to a dramatic decline in the condition and extent of grassy sheoak woodlands on the Eyre Peninsula and elsewhere in the State. They are now considered a threatened ecosystem in South Australia. *WildEyre* seeks to address this decline by working with landholders (owners of the 'matrix') to:

1) protect and improve the condition of high quality sheoak remnants by excluding stock grazing and managing other other threats and encouraging the uptake of covenants and conservation agreements;
2) to manage grazing in extensive degraded (recoverable) remnants to regenerate the overstorey of sheoak trees and to improve habitat condition; and
3) and to restore significant areas of sheoak grassy woodland through active revegetation in highly cleared landscapes.

Principle 3. First priority to securing extant native vegetation; revegetation of cleared land to restore connectivity as a last resort strategy

The *WildEyre* Conservation Action Plan (CAP) identifies eight core conservations assets (vegetation systems (Table 1). Protecting these assets from on-going degradation from ferals, weeds, recreational impacts and peri-urban developed has been identified as priority strategy in the CAP. For example, WildEyre aims to "Restore and secure long term protection for an additional 10,000 ha of high quality Mallee Box and Native Pine Woodlands by 2015" (Table 3 above).

Principle 4. Ecological connectivity and biological permeability can be facilitated by small and linear wildlife corridors linking remnant patches, creation of habitat stepping stones, habitat refugia, networks of riparian zones and roadside vegetation (e.g. stock routes).

The WildEyre CAP has specific connectivity objectives to buffer and reconnect Sand Mallee Dune-top remnants in priority areas to support species dispersal by 2020 (Objective 7) and to revegetate 1,500 hectares of Sheoak Grassy Woodlands to ensure adequate and representative areas and to create vegetation buffers for linear ecosystems by 2015 (Objective 15).

Principle 5. Active management to minimise or eliminate threats including habitat destruction, introduced species, and altered fire regimes and rehabilitation of strategically important disturbed ecosystems.

Consistent with this principle the *WildEyre* CAP has specifically set objectives to:

- Protect high priority areas of Coastal Dunes and Cliff-tops from African Boxthorn and other significant weed infestations by 2015.
- Restore fire regimes in mallee communities to produce an appropriate mosaic of fire history that minimises the risk of a large fire destroying localised species populations and maximises habitat diversity by 2015.
- Maximise the distribution and populations of native fauna threatened by feral predators by 2020.

Principle 6. Connectivity conservation initiatives involve achieving conservation outcomes in an integrated way across multiple tenures and through developed of a shared vision and agreed strategic plan implemented through innovative partnerships.

WildEyre has a consistent record of participatory planning and development of strong and diverse partnerships including:

- Engagement with Native Title Groups;
- 10 CAP workshops and completion of a 1st iteration Conservation Action Plan;
- 4 Community workshops;
- And the recently signed Partnership MOU;

Principle 7. Financing connectivity conservation from a diversity of sources including philanthropic donations, innovative government investment and payment for ecosystem services.

To date *WildEyre* has gained most of its on-ground project funding through Australian Government and SA State government programs. However, the partners in *WildEyre* include NGO's that are largely supported by philanthropic donations (e.g. Wilderness Society). *WildEyre* has identified ecosystem services such as carbon bio-sequestration as a potential funding source, but this market is still largely undeveloped in Australia.

Principle 8. Connectivity conservation addresses the climate change imperative and provides economic and social benefits to complement the ecological benefits.

The *WildEyre* project area covers three existing Native Title claims: Wirangu No. 2; Nauo-Barngarla and Barngarla. The *WildEyre* project team has been engaging with these groups and will continue to seek their advice on heritage related issues prior to developing on-ground works proposals.

The *WildEyre* project recognises:

- indigenous peoples are the traditional custodians who have managed this environment since time immemorial,
- indigenous people did not voluntarily relinquish sovereignty over the project area,
- the continued existence of native title land and sea rights within the project area.

The *WildEyre* project recognises the value of improving landscape connectivity as one strategy to mitigate climate change, but specific modeling to predict benefits has not been done.

Monitoring and evaluation

The *WildEyre* project team is in the process of establishing a rigorous monitoring and evaluation program. It will provide the framework to adjust the conservation strategies and objectives over time using an adaptive management approach.

Most conservation objectives set by the *WildEyre* CAP process relate to the size and condition of conservation assets. Change in size of assets over time will be monitored using change in mapped extent. Monitoring change in condition will rely upon the establishment of ongoing bushland condition monitoring sites where vegetation attributes (e.g. species richness, structural diversity, degree of weed invasion) will be compared to benchmark values.

Currently there is a network of 50 Bushland Condition Monitoring (BCM) sites established under the *WildEyre* initiative. These sites provide the basis for understanding and tracking resource condition (asset viability) over time, and the planned expansion of the BCM network will also allow for performance monitoring to assess whether on-ground actions are having the desired effects (using a Before, After, Control framework).

Threatened flora and fauna populations will also be a strong focus of the monitoring program to ensure conservation actions are effective in protecting the region's rarest and most vulnerable plants and

animals. There are a number of existing programs with which the WildEyre team will engage as well as helping to focus future monitoring for specific outcomes.

Reference material:

PDF of the Greening Australia Document "WildEyre: Transforming our Landscapes Project Proposal, 26 October 2010, Adelaide.

Soulé, M.E., Mackey, B.G., Recher, H.F., Williams, J.E., Woinarsksi, J.C.Z., Driscoll, D., Denninson, W.C., Jones, M.E. (2004). The role of connectivity in Australian conservation. *Pacific Conservation Biology*. 266-279.

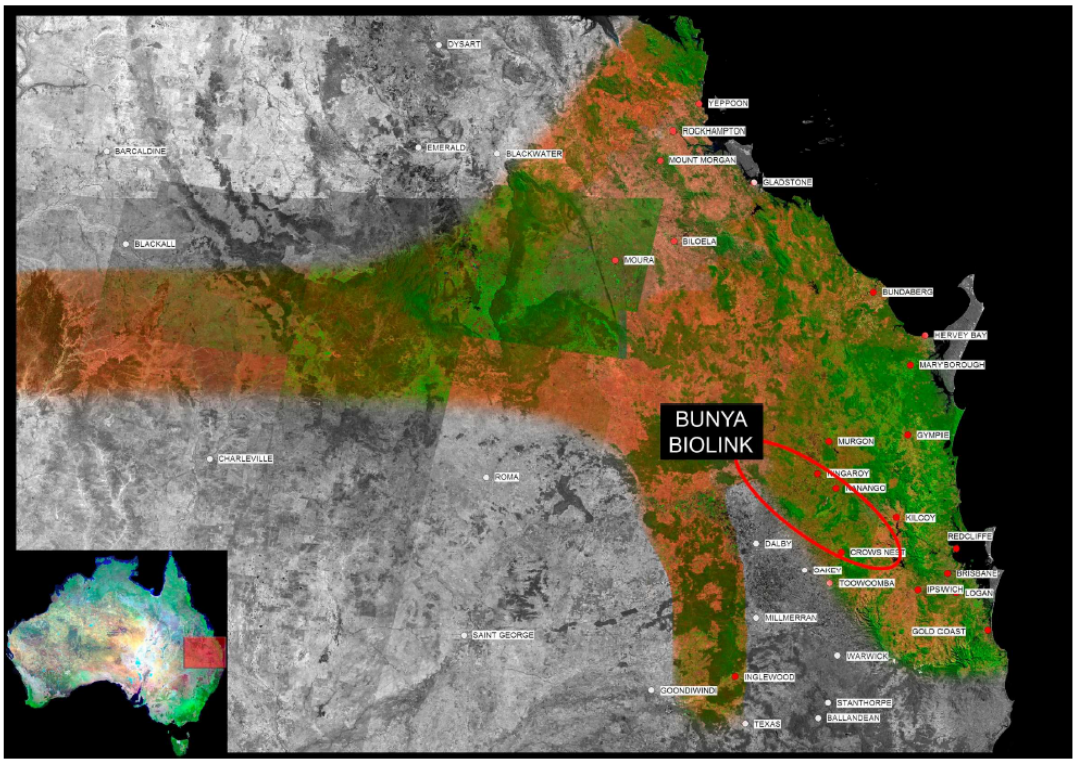
A7 BUNYA BIOLINK COMPONENT OF BIRDSVILLE TO HERVEY BAY

Compiled by: David Freudenberger

1. Basic descriptors

Name: *Bunya Biolink*, Qld

Component initiatives: An operational component of the *Birdsville to Bay* concept (Figure A7.1) that is a notional corridor which runs east-west in southern Qld, and it could be considered a 'spine' of the *Great Eastern Ranges*.



Birdsville to Bay map with the initial phase,The Bunya Biolink, highlighted in red. The Darling Downs area(grey area south of Bunya Biolink) is excluded due to the presence of intense agriculture.

Figure A7.1: Bunya Biolink location within the Birdsville to the Bays corridor

Location and jurisdictional coverage:

- The Bunya Biolink landscape spans across 1.28 million hectares and covers the townships of Yarraman, Kingaroy, Esk, Kilcoy, Crows Nest, and Nanango, Qld. The Biolink stretches 175 km east to west, with the eastern boundary 40 km from the Brisbane CBD (Figure A7.2).
- There are four Natural Resource Management (NRM) groups within the Biolink: SEQ Catchments, Burnett Mary Regional Group, Condamine Alliance and Queensland Murray Darling Committee

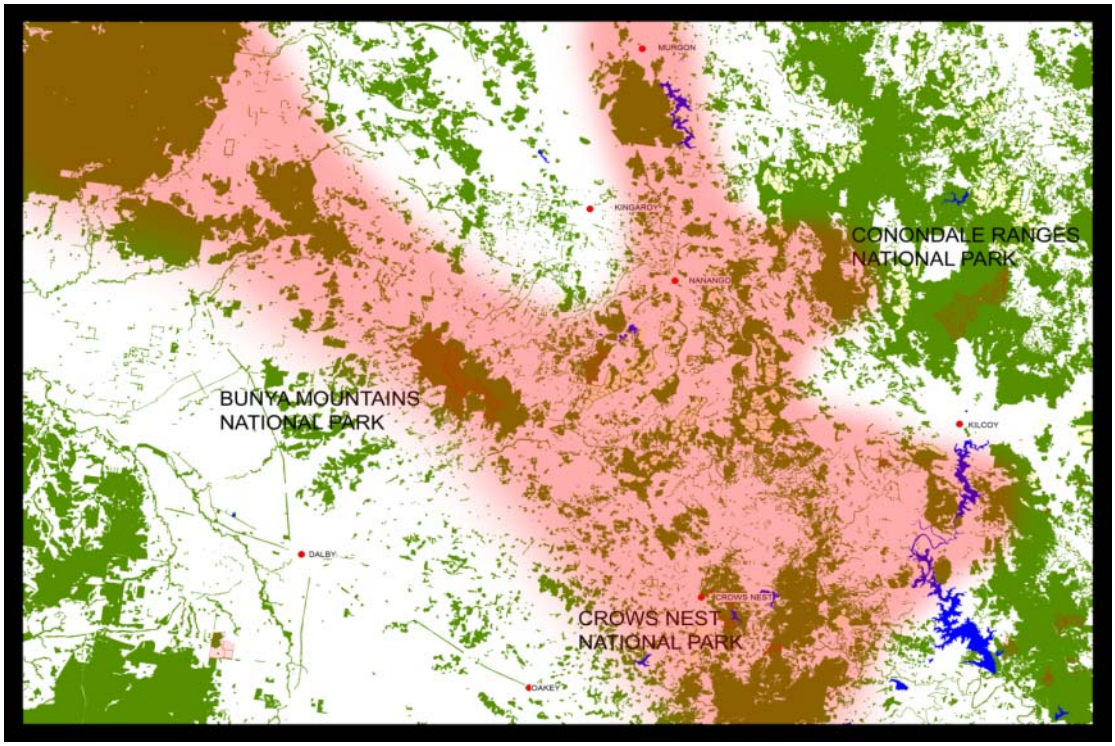


Figure A7.2: Geographical location and 'fuzzy' boundaries of the Bunya Biolink Corridor project.

The local government areas covered by the Biolink are listed in Table A7.1. Somerset and South Burnett Regional Councils have the most significant representation in the Biolink.

Table A7.1: Local government coverage by Bunya Biolink

Local Government Areas	Area (Ha)	Proportion within Bunya Biolink
South Burnett Regional Council	505,500	39.2%
Somerset Regional Council	407,000	31.6%
Toowoomba Regional Council	217,400	16.9%
Western Downs Regional Council	147,200	11.4%
Moreton Bay Regional Council	6,231	0.5%
Sunshine Coast Regional Council	4,217	0.3%
Gympie Regional Council	599.9	0.05%
Total	**1,289,000**	**100 %**

2. Drivers

Mission and purpose: The Bunya Biolink is the first stage of the Birdsville-to-Bay corridor concept. The Bunya Biolink focuses on creating significant habitat corridors encompassing several environmental gradients, thereby increasing landscape resilience for future generations. The program aims to:

- Link biodiversity of *State Significance* from Barakula State Forest to the rainforests of the iconic Bunya mountains and the eucalypt woodlands of Crows Nest National Park, as well as reconnect the rainforests of the Conondale Ranges.

- Deliver tangible improvements in river health and biodiversity which should help mitigate the impacts of climate change.
- Restore approximately 300 km of conservation corridors within a project area covering 1.28 million hectares

Champion / leadership: Greening Australia (Queensland)

The drivers for the creation of the corridor initiative:

The Bunya Biolink makes up part of Greening Australia's *Transforming Our Landscapes* national strategy which aims to "Achieve tangible improvements in biodiversity, river health and sustainable livelihoods in 50 highly valued landscapes by 2025." The *Transforming Our Landscapes* strategy is characterised by:

- Large projects, covering tens of thousands of hectares, that are focused on areas of global conservation significance;
- Protection and restoration of critical habitats that are essential to prevent further species extinctions;
- Protection and enhancement of relatively intact ecosystems such as large blocks of remnant vegetation and wetlands; and
- Integration of conservation with productive, profitable enterprises that help local communities to thrive and survive.

The threatening processes identified by the Bunya Biolinks Conservation Action Plan are shown in Table A7.2.

Table A7.2: The threats impacting on the seven key conservation assets (targets) identified in the Conservation Action Plan for the Bunya Biolink.

Threats Across Assets		1.Eucalypt	2.Scrubs	3.Brigalow/ Belah	4.Grass land	5.Rain forest	6.Riparian	7.Inland rocky areas	Overall Threat Rank
1	Grazing	Very High	High	High	High				Very High
2	Vegetation Clearing	Low	High	High		Very High	Very High		High
3	Weeds and feral animals	High	High	Medium	High	High	Medium	High	High
4	Fragmentation	High	High	High		High	High	High	High
5	Climate variability			Medium		Very High		Very High	High
6	Operation of drainage or diversion systems						Very High		High
7	Habitat Shifting & Alteration	Medium		Medium	High	Medium	Medium	Medium	High
8	Entanglement on barbed-wire fences						High		Medium
9	Intensive grazing threaten the structure and ecological integrity of remaining fragments						High		Medium
10	Lack of resources								Medium
11	Loss of hollow-bearing trees						High		Medium
12	Fire suppression			Medium	Medium		Medium		Medium
13	Poor weed removal						Medium		Low
14	Erosion								-
15	Fauna damaging vegetation								-
Threat Status for Assets		High	High	High	High	High	High	High	Very High

The project planners have developed a conservation objective to "Create 300 km of conservation corridors to reconnect the Bunya Mountains with the surrounding national reserves by 2050." The aim of these corridors is to improve "ecological resilience at a landscape scale, and is the primary action to ensure species survival in the face of climate change. Reconnection allows animals to naturally migrate or retreat and survive, when their habitat changes as a result of climate change or other threats". A 'situation analysis' has not yet been conducted for the Bunya Biolink to identify the underlying socio-economic drivers for the proximal threatening processes identified in Table A7.2.

3. Organisational structure

Host / lead organisation (if any): Greening Australia (Queensland)

Staff:

- Sean Willans, CEO for GAQ
- Lainie Grigg, General Manager Strategic Projects

Partner organisations: Organisations that have participated in the development of the Conservation Action Plan to date are:

- Condamine Alliance
- Birds Australia
- Queensland Government Ecofund and Dept of Environment, Resources and Minerals
- Toowoomba Regional Council
- SEQ Catchments
- Queensland Water Infrastructure

What is the formal governance / organisational structure

- At the working group stage focused on developing the Conservation Action Plan (CAP)
- There has been no formal endorsement of the Bunya Biolink CAP by any partner organisations.
- The Bunya CAP has been formally peer reviewed by Greening Australia's CEO Group and endorsed by the Federation's national board in 2010.
- Some pilot projects with SEQ Catchments have been implemented (details below)

How is practical organisation structured:

The Bunya Biolink is managed as a strategic project within Greening Australia. This project is notionally a zone or component of the Birdsville to Bay mega conservation corridor concept. However no planning or organisational structures have been developed for Birdsville to Bay. The Bunya Biolink project grew out of Greening Australia's *Transforming Our Landscapes* strategy. This national strategy had its origins in the pioneering planning and implementation of Gondwana Link in WA in which Greening Australia is a founding partner. The conceptualisation for the Bunya Biolink commenced in 2007 as Greening Australia (Queenslands) participation in GA's national strategy. Since this time a number of Conservation Action Planning workshops have been led by Greening Australia with a range of stakeholder organisations listed above.

Participants in the Conservation Action Planning process have been skills based (e.g. local ecological knowledge). The CAP process includes a 'CAP Coach' that has training and experience in group dynamics, conflict resolution techniques, etc.

The CAP process is based on consensus decision making and local ecological expertise. In addition a preliminary analytical spatial prioritisation has been conducted and is being refined (further details below). The geographical scope of the Biolink was based on expert opinion that considered ecological

design principles as well as institutional capacity criteria (e.g. proximity to existing Greening Australia staff, offices and local history in the area).

To date, the Bunya Biolink is led by Greening Australia (Queensland) which is a separate incorporated entity that is a member of the Greening Australia Federation. On-ground projects have been implemented with partner organisations through service agreement contracts.

Greening Australia has identified a range of project funding sources:

1. Australian Government and Qld Govt NRM programs (e.g. *Caring for Our Country*)
2. Ecosystem services, e.g. carbon bio-sequestration and development offsets
3. Corporate Social Responsibility programs
4. Philanthropic gifts
5. Greening Australia's own funds from strategic surpluses

4. Biophysical design descriptors

Physical characteristics of the corridor: Geographic location, boundary of the corridor region, total land area

- The Bunya Biolink landscape spans across 1.28 million hectares and covers the townships of Yarraman, Kingaroy, Esk, Kilcoy, Crows Nest, and Nanango, Qld.
- It stretches 175 km east to west, with the eastern boundary 40 km from the Brisbane CBD, though the project boundaries are 'fuzzy' by design (Figure 1).
- The Biolink sits in the headwaters of the Brisbane and Burnett river catchments, which supply the drinking water for up to three million residents of southern Queensland.
- The Biolink landscape covers a wide range of environmental gradients in rainfall (600-1200 mm) and altitude (100-1100 m).

GIS shapefiles or equivalent available:

A GIS has been established for the project

Goals: The stated objectives for the Bunya Biolink are:

1. Create 300 km of vegetation corridors to reconnect the Bunya Mountains with the surrounding national reserves by 2025.
2. Improve water quality in the upper Brisbane River catchment to a B rating by 2025.
3. Increase the total area of rare and threatened vegetation communities by 30,000 hectares by 2025.
4. Improve the habitats and populations of rare and threatened species within the Bunya Biolink.

Application of biophysical design principles:

Principle 1. Connectivity Conservation focuses on geographically extensive areas that are supra-regional in scale and can extend to continental and intercontinental scales.

The Bunya Biolink is a component of the Birdsville to Bay Concept. Even at the scale of the Biolink, it is supra-regional emcompassing parts of four NRM organisations and large proportions of two major river catchments

Principle 2. The landscape matrix serves a number of critical functions including: buffering protected areas, 'de-islanding', protecting-restoring assets not found within protected areas, and maintaining large-scale ecological and evolutionary processes

The Bunya CAP recognises that large proportions of the seven conservation targets (assets) are outside the National Reserve System (Table A7.3) and embedded in an agricultural matrix dominated by cattle grazing

Table A7.3: The broad conservation assets identified for the Bunya Biolink project and the degree which they have been cleared and projected in formal conservation reserves.

Focal Conservation Assets	Pre-clearing (Ha)	Post-clearing (Ha)	Decline (Ha)	Percent remaining (%)	Area protected (Ha)	Percent protected (%)
1 Eucalypt forests and Woodlands	902,660	272,484	630,176	30.2	89,258	32.8
2 Scrubs (Dry Vine Thickets)	19,411	5,971	13,440	30.8	3,127	52.4
3 Brigalow / Belah Communities	121,424	18,847	102,577	15.5	5,006	26.6
4 Grassland Ecosystems	1,512	276	1,236	18.3	49	17.8
5 Rainforests (Vine Forests)	241,842	45,263	196,579	18.7	29,202	64.5
6 Riparian (Swamps & Lakes) [2]	614	517	97	84.2	-	-

Principle 3. First priority to securing extant native vegetation; revegetation of cleared land to restore connectivity.

The Bunya project aims to 'Increase the total area of rare and threatened vegetation communities by 30,360 ha by 2025". It does not have a specific aim to secure extant native vegetation, but identifies a range of priority actions to protect sensitive conservation assets from inappropriate grazing and weed invasion.

Principle 4. Ecological connectivity and biological permeability can be facilitated by small and linear wildlife corridors linking remnant patches, creation of habitat stepping stones, habitat refugia, networks of riparian zones and roadside vegetation (e.g. stock routes).

This principle is at the heart of the Bunya Biolink projects. It very much seeks to improve permeability across a 'variegated' landscape rather than a highly 'fragmented' landscape using the definition of these terms from (McIntyre and Hobbs 1999).

Principle 5. Active management to minimise or eliminate threats including habitat destruction, introduced species, and altered fire regimes and rehabilitation of strategically important disturbed ecosystems.

This principle is embedded in actions identified in the Bunya Conservation Action Plan

Principle 6. Connectivity conservation initiatives involve achieving conservation outcomes in an integrated way across multiple tenures and through developed of a shared vision and agreed strategic plan implemented through innovative partnerships.

This principle has been applied since the inception of the project through the participatory Conservation Action Planning process and toolbox.

Principle 7. Financing connectivity conservation from a diversity of sources including philanthropic donations, innovative government investment and payment for ecosystem services.

See above the list of identified funding sources for the Biolink.

Principle 8. Connectivity conservation addresses the climate change imperative and provides economic and social benefits to complement the ecological benefits.

The CAP states that the multiple corridors aim to mitigate the effects of climate change on biodiversity. However, the potential economic and social benefits of the project have not been examined in any detail.

- Were critical ecosystem linkages identified by the process?

The linkages were initially identified simply as obvious large gaps in structural connectivity, that is, large gaps in native vegetation cover that can be seen from any hillside or Google Earth image. Rigorous spatial analysis based on multiple criteria has recently commenced with the assistance of CSIRO and the Marxan modelling tool (Fig. 3 below).

- What did the resultant mix of landscape scale operational measures look like (in particular is there a strategy that we can see)?

Initial prioritisation analysis and mapping is shown in Figure A7.3.

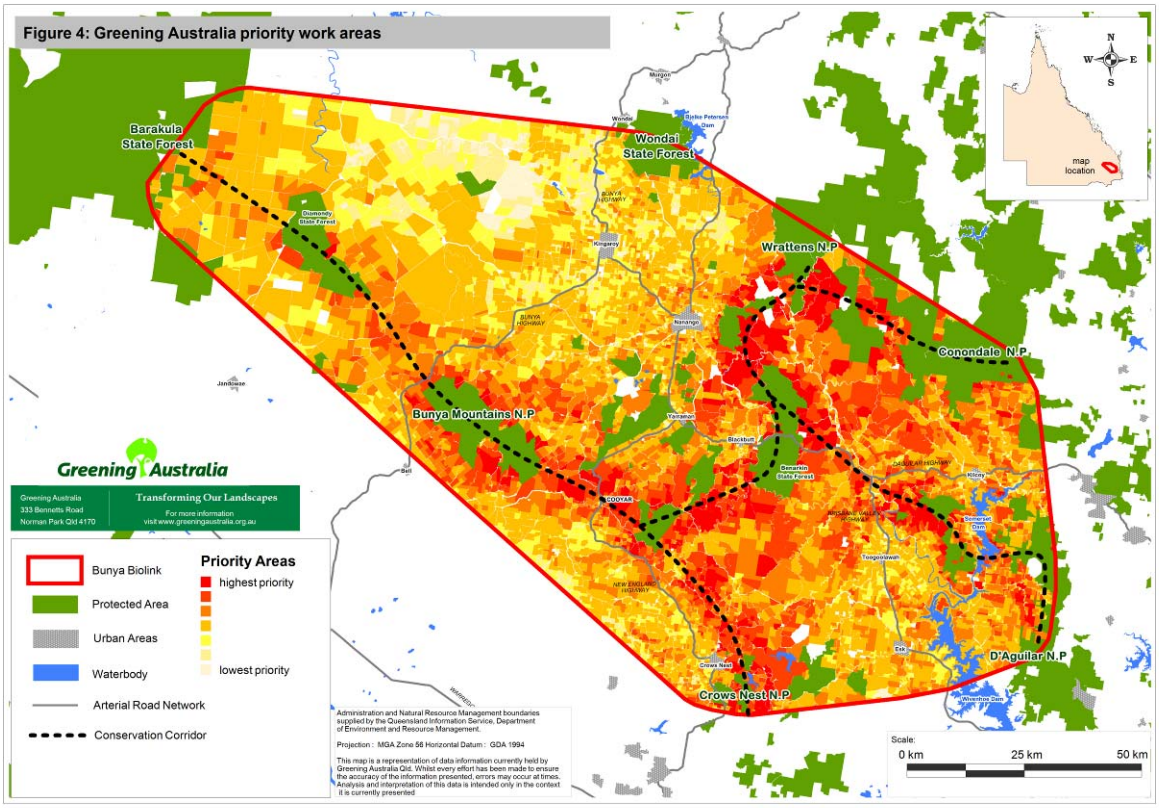


Figure A7.3: Preliminary prioritisation analysis for the Bunya Biolink

This prioritisation is based on widely used criteria (Table A7.4 below).

Table A7.4: Outline of the criteria used to identify priority work locations

Factor	Title	Description
Connectivity Factor 1	**Size of remnant patch**	To indicate ecological viability and potential stakeholder willingness
Connectivity Factor 2	**Proximity to remnant v egetation**	T o indicate local connectivity
Connectivity Factor 3	**Landscape connectivity**	Proximity to pre -clearing *of concern* or *endangered* regional ecosystems
Connectivity Factor 4	**Biodiversity significance**	Biodiversity significance of land parcel as defined by the Biodiversity Assessment and Mapping Methodology
Habitat Factor 1	**Existing populations**	Proximity to threatened species sightings
Habitat Factor 2	**Riparian vegetation**	Proximity to watercourses semi -permanent or greater
Habitat Factor 3	***Of Concern* or *Endangered* regional ecosystem**	Proximity to priority conservation corridors of the Bunya Biolink
Habitat Factor 4	**Essential vegetation regrowth**	Proximity to essential vegetation regrowth

Clearly the criteria identified in Table A7.4 are all environmental prioritisation drivers, not social or economic. To date, no climate change modelling has been incorporated into the planning process, only climate mitigation principles such as restoring functional and connectivity.

Greening Australia, through a corporate service contract, has conducted detailed field measurements and NCAT modelling of carbon sequestration potential ($tC0_{2\text{-}e}$/ha/yr) in the Bunya region to complement such analysis in 11 other priority landscapes. Greening Australia sees the potential of an ETS to fund the restoration of overstory species for the Bunya Biolink project and its other large scale initiatives (Freudenberger 2010).

- Brief assessment of the success or otherwise of biophysical design principles in informing corridor AND have been actually applied to resultant activities (or proposed) in the corridor.

Experience in application of biophysical design principles

The preliminary spatial prioritisation (Figure A7.3) involved a two step process:

1) A purely ecological framework for assessing target areas
2) Subject this analysis to a range of other factors (e.g. constraints) that must be considered in terms of Greening Australia's capacity to drive restoration (such as land prices).

Through a GIS framework, the Biolink area has been coded into several thousand planning units (representing minimum size patches of land that are feasible for Greening Australia to manage) and assessed according to the criteria described in the above table. The framework identifies land patches that would have the greatest contribution to the overall Biolink and focal targets. Greening Australia currently refining the spatial prioritisation by including land prices, the carbon offset potential of land, and includes preparing and undertaking a key stakeholder engagement plan. In addition, Greening Australia has investigated the use of the modelling software Marxan in collaboration with University of Queensland and CSIRO. Marxan is designed to prioritise conservation and revegetation efforts based on achieving a set biodiversity targets at least cost.

Figure A7.3 above identifies priority conservation and restoration areas that may act as ecological linkages to facilitate large scale movement of species along gradients of elevation, temperature and rainfall. However, this spatial modelling has not yet been linked to any climate change modelling.

As noted above, land price and landholder interest in conservation and restoration activities is being incorporated into the Conservation Action Plan for the Bunya Biolink. As noted above, the Bunya Biolink was chosen by Greening Australia as the first project within the Birdsville to Bay concept due to the proximity of the Bunya region to GA's operational headquarters in Brisbane and the proximity to potential corporate, government and philanthropic investors.

Greening Australia has recognised the recommendations from various scientific reports and papers that recommend restoration of structural and functional landscape connectivity as one strategy to mitigate the impact of climate change. Key research cited by GA include Buckley et al. (2007) and Driscoll (2007):

Greening Australia has conducted, for a corporate client, a comprehensive analysis of carbon yield potential within the Bunyas based on field measurements, empirical data modelling land NCAT modelling. GA sees a great potential for carbon forestry offsets to assist in the implementation of the Bunya plan, particularly as there is a massive coal mining and coal fired electricity generation industry just to the north of the Bunyas.

Implementation arrangements / achievements:

To date GA has completed a robust and scientific internal 'accreditation' of the Bunya Biolink project, confirming its high conservation value as part of GA's 'Transforming our Landscapes' initiative. Recent successes include securing over $820,000 in project funding for on-ground actions, including:

- Bunya Biolink – Cooyar Creek riparian zone rehabilitation, August 2008 – $393,000 from *Caring for Our Country* ;
- Establishment of a seed storage facility 2009 – $87,000 from Perpetual Philanthropic Services;
- GreenWorks Cooyar Creek catchment rehabilitation project – $240,000 from Powerlink, SEQ Catchments and Greening Australia; and
- Bunya Biolink – Project Planning – $100,000 from a private donation ($50,000) and a matching $50,000 from The Nature Conservancy, David Thomas Challenge Fund.

Implementation arrangements / achievements descriptors:

To date Greening Australia is the lead organisation for implementation, sourcing funding from a range of NRM, corporate and philanthropic collaborators. To date, this project does not have an agreed monitoring plan, but this is being developed within GA, based on the Bunya Biolink Conservation Action Plan. Project inputs to date have been captured by GA's project management system.

References and reference material:

Greening Australia has developed a 52 page report (April 2011) describing in detail the Bunya Biolink Conservation Action Plan and an 18 page *Information Memorandum* (2010)

Driscoll, D. (2007). The conservation challenge of sustaining spatially dependent evolution. *Pacific Conservation Biology* 13: 84-92.

Buckley, R. et al. (2007). *Climate Response: Issues, costs and liabilities in adapting to climate change in Australia*. Griffith University, Brisbane

Freudenberger, D. (2010). A carbon vision for the restoration of Eucalypt woodlands. In D. Lindenmayer, A. Bennett and R. Hobbs (eds) *Temperate Woodland Conservation and Management*, pp. 291-296, CSIRO Publishing, Collingwood.

McIntyre, S. and Hobbs. R. (1999). A framework for conceptualisation of human effects on landscapes and its relevance to management and research. *Conservation Biology* 13, 1282-92.

A8 Midlandscapes (Tasmania)

Compiled by: Stuart Cowell and others.

1. Overview

Midlandscapes is confined to the Tasmanian Midlands Biodiversity Hotspot which encompasses the lowland plains and foothills up to an altitude of approximately 600 m between the Eastern Tiers, North Eastern Highlands and the Western Tiers and Central Plateau. The total area of the *Midlandscapes* is 640,900 ha with a total of 120,000 ha of conservation assets identified to date. The target area for protection and management is 64,050 ha.

The Northern Midlands is considered by the NRS as an under reserved bioregion with less than 10% of its area under formal protection. The EPBC listed critically endangered community - Lowland Native Grasslands of Tasmania is mainly confined to the Midlands Hotspot. The dry ecosystems of the midlands provide unique habitat for at least 12 endemic species, 32 nationally listed threatened species and more than 180 plants and animals are listed as threatened at the State level.

Location and jurisdictional coverage:

Those areas of NRM North and NRM South (TAS) that intersect with the Tasmanian Midlands Biodiversity Hotspot.

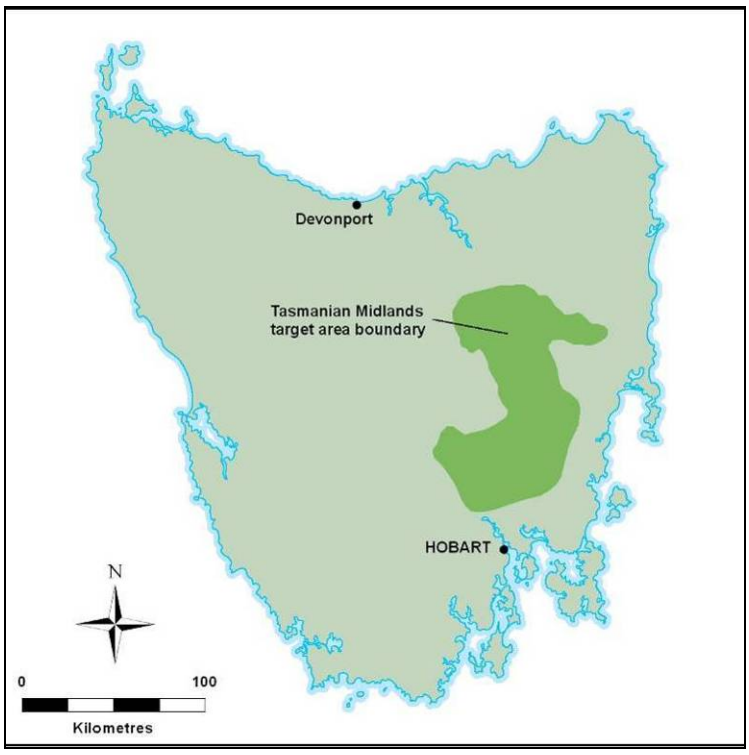


Figure A8.1: Midlandscapes priority area

Source: Richard MacNeill, Bush Heritage Australia.

2. Drivers

Mission and purpose:

The vision for *Midlandscapes* is:

> "Healthy natural ecosystems within the working landscapes of the Tasmanian Midlands".

The project objective for *Midlandscapes* is:

> "10% of the Tasmanian Midlands Biodiversity Hotspot managed primarily for biodiversity conservation by 2020, comprising 64,000 ha of six ecological communities and one fauna habitat which we have been identified as the Key Conservation (CAP) Assets".

History

There is a long and diverse history of precursor projects leading to the development of the *Midlandscapes* initiative: Projects include:

- Whole Farm Planning demonstration farms (facilitated by Greening Australia and funded through the National Soil Conservation Program, 1980s). These demonstration farms sought to show how native vegetation could enhance the sustainability of farms in the Midlands.
- Midlands Habitat Corridor (Greening Australia, early 1990s, funded by *Save the Bush*) The project objectives were several, but included ensuring the long-term viability of native flora and fauna populations in the northern midlands on private land by addressing the negative effects of isolation and fragmentation of remnants via the establishment of a habitat corridor from the Ben Lomond National Park through Epping Forest in the northern midlands to Millers Bluff in the Great Western Tiers
- Upper South Esk Corridors and Green and Derwent Valley Corridors of Green (Greening Australia, late 1990s, funded by the *National Corridors of Green*). This project aimed to encourage regional scale native vegetation management to achieve environmental, economic and social benefits as well as facilitate community-driven, strategic native vegetation protection and replacement projects on a priority basis across the nation.
- BushWeb (Northern Midlands Council/Southern Midlands Council/Break O'Day Council, funded NHT, late 1990s, early 2000s). Its vision was to help landowners protect remnant vegetation and rehabilitate vegetation in poor condition. It also aimed to re-establish vegetation where it would maximise the benefits for wildlife.
- The Non-forest Vegetation Program (DPIWE/Tas Farmers and Graziers Assn, funded by NHT, mid 2000s). This program aimed to implement measures to protect threatened and under-reserved, non-forest, native vegetation on private land. The program worked with landowners to provide for the long-term management of non-forest vegetation communities, providing benefits for conservation and primary production. The program had a particular focus on native grasslands due to their role as diverse vegetation types that provide important functions at both the property and catchment level. By the conclusion of the NFVP, 20,476 ha had been secured.
- In 2007 and 2008 The National Reserves System, via Protected Areas on Private Land Program, the Private Land Conservation Program, Bush Heritage Australia and Tasmanian Land Conservancy provided resources for the Midlands Landscape Project, which was designed to: facilitate the creation of a conservation vision for the Midlands including a detailed landscape scale biodiversity conservation plan; develop an income stream for conservation management including investigating options for an investment fund and market based instruments; ensure a large proportion of the Midlands landowners are aware of

biodiversity values within their area; and make a significant contribution towards the development of a protected area network.

- In 2007 and 2008 Maintaining Australia's Biodiversity Hotspots Program provided funding to Tasmanian Land Conservancy for delivery of the Midlands Biodiversity Hotspot Tender. The Midlands Biodiversity Hotspot Tender provided an opportunity to road test innovations developed under the Midlands Landscape Project.

Champion / leadership:

Tasmanian Land Conservancy (TLC), Bush Heritage Australia (BHA) and the Department of Primary Industry, Parks, Water and Environment (DPIPWE) (via the Private Land Conservation Program or PLCP) lead the project initiative as a partnership.

The drivers for the creation of the corridor initiative:

The project has been developed using the following tools:

- Conservation Action Planning (a method developed by The Nature Conservancy)
- Business Planning
- Participatory Planning

Through the Midlandscapes business planning process a detailed analysis of the following was undertaken

- Ownership of the Conservation assets in the Midlands
- Financial values of the Conservation Assets
- Feasibility and cost of land acquisitions
- Feasibility and cost of a range conservation agreements and covenants on private land.
- Funding sources – philanthropic, public and private ecosystem services income
- Establishment of a perpetual conservation fund – The Midlands Conservation Fund (MCF).

Consultations with landholders covering several focal landscapes and rural business advisers were undertaken in order to better understand the social and economic issues that either impede or support private land conservation of biodiversity in the Midlands. This covered such issues as:

- Land-use: direct agricultural, economic, recreational and community benefits.
- Indirect benefits of maintaining intact ecological systems across the landscape
- The economic values of environmental services and conservation outcomes
- Appropriateness of funding models for long term delivery of environmental services and conservation outcomes
- Conservation security and tenure – e.g. fixed term agreements, evergreen stewardship contracts and in perpetuity covenants.
- Opportunities forgone in favour of biodiversity conservation.

3. Organisational structure

Host / lead organisation (if any):

Andrew Cameron
Midlandscapes Coordinator
Tasmanian Land Conservancy
PO box 392, Launceston, Tas

Staff:

One fulltime coordinator is employed by TLC and jointly funded by TLC and BHA. The partner organisations make available administrative and specialist ecologists staff when required during stages

of program delivery. These partner staff include operational officers for landowner liaison, on ground site assessments, landscape ecological analysis including site mapping, metric data and conservation prioritisation, as well as administrative staff.

Partner organisations:

- Tasmanian Land Conservancy (TLC),
- Bush Heritage Australia (BHA) and the
- Private Land Conservation Program (PLCP) of the Department of Primary Industries, Parks, Water and Environment (DPIPWE)

Governance and organisational structure:

Midlandscapes is an incorporated head organisation with a board and constitution. There is a formalised MOU between TLC and BHA with PLCP as an agreed partner. The partners have developed and agreed to the *Midlandscapes* program of conservation work in the Tasmanian Midlands which is supported by the Midlands Conservation Action Plan and accompanying Business Plan. The Program is directed by the *Midlandscapes* Steering Committee comprising senior management staff from each of the partner organisations.

DPIPWE provides ongoing monitoring and stewardship services for all conservation covenants over private land in Tasmania (approaching 80,000ha), and is active in supporting the TLC and BHA through technical advice, access to data and expertise and institutional support for private conservation.

There is a *Midlandscapes* Steering Committee and Midlands Conservation Fund Operations Advisory Group that provides management direction and advice on what areas of the program efforts and investment will be targeted at any given time considering the form and scale of investment available at that time.

Midlandscapes Steering Committee and Midlands Conservation Fund Operations Advisory Group comprising senior managers from each of the partners:

- TLC – Conservation Programs Manager
- BHA – Conservation Partnerships Manager
- DPIPWE – Private Land Conservation Program Manager
- Other – it is envisaged that suitable skills and community based representatives can also be invited onto this Committee when necessary.

There is also a Technical Working Group that provides advice to the Steering Committee on, conservation prioritisation, landscape scale mapping and identification of Conservation Assets, Focal landscapes and potential landscape linkages.

The coordinator oversees implementation and operations under direction from the Steering Committee.

Operations

In 2007, with funding support from the National Reserves System (via PAPL) and the Myer Foundation, the PLCP, Bush Heritage Australia (BHA) and Tasmanian Land Conservancy (TLC) provided resources for the Midlands Landscape Project, which was designed to:

- Facilitate the creation of a conservation vision for the Midlands including a detailed landscape scale biodiversity conservation plan;
- Develop an income stream for conservation management including investigating options for an investment fund and market based instruments;

- Ensure a large proportion of the Midlands landowners are aware of biodiversity values within their area; and
- Make a significant contribution towards the development of a protected area network.

By the end of 2008 the Midlands Conservation Action Plan and Business Plan, out to 2020, had been completed. The application of site assessment methodologies, GIS data sets and interrogation methods for landscape scale conservation prioritisation and use of the Midlands Metric had been successfully trialled during delivery of the Midlands Biodiversity Hotspot Tender. With combined funding from MABH and the Forest Conservation Fund of approximately $5.1 million the Tender resulted in the protection of 6,200 hectares of forests woodlands and grasslands mostly through conservation covenants in perpetuity.

In late 2008 Midlands Landscape Project was renamed *Midlandscapes*, a program coordinator was appointed, and the implementation phase of the 12 year conservation program commenced. This coincided with the announcement of a Bush Heritage Australia's successful funding application to the Sydney Myer Fund and Myer Foundation's Commemorative Grants Program of $2 million that could be used for either acquisition of land for conservation in the Midlands or establishment of the Midlands Conservation Fund, a concept developed as part of the business plan to provide a permanent income stream for funding annual payments for stewardship contracts.

In 2010 TLC and BHA agreed to jointly establish the Midlands Conservation Fund (MCF) as a company limited by guaranteed with start up donations amounting to $2.6 million from two major philanthropic foundations and one private donor. The Fund aims to increase the capital base to at least $10 M by 2020. The Midlands Conservation Fund is a perpetual fund; as funds are received as donations they securely invested as capital to earn income and only the income is used to fund annual payments to landowners providing conservation stewardship services.

Official registration of the Midlands Conservation Fund as a company occurred in April 2011. The Fund is controlled by a board of five directors comprising the CEOs and directors of BHA and TLC. Whilst the Midlands Conservation Fund Directors are solely responsible for investment and expenditure of funds, they are guided by the advice of the Midlands Conservation Fund Operations Advisory Group (which is currently also *Midlandscapes* Steering Committee) on how available funds should be expended on conservation outcomes.

Midlandscape partners are represented as equals on the *Midlandscapes* Steering Committee. The Steering Committee reports to the partner organisations (and the Midlands Conservation Fund). The Coordinator reports to the Steering Committee and the NGO partners who fund and host the position.

The Technical Advisory Group reports and makes recommendations to the Steering Committee via the Coordinator. Project staff report to the coordinator.

The concept of *Midlandscapes* has been strongly supported by the CEOs, Managers and Directors of the partner organisations from the outset. However the program has also evolved from a Conservation Action Planning process which was driven by technical experts and community members who have worked closely with the Midlands farming community and its ecosystems for many years.

As the program has progressed through the implementation phase, the focus has been on establishing program's operational procedures for which good management, governance and financial expertise and accountability are critical. There is a high level of "project ownership" by staff and management involved in *Midlandscapes*.

Operational activities are devolved to the project partners – including fund raising, delivery of interim projects and establishing conservation contracts and covenants with private landholders in the Midlands. Project monitoring includes photopoints, and modified VCA Scores using CAP Asset attribute condition indicators. Monitoring reports are presented to the Steering Committee, program partners and funding bodies. All PLCP monitoring is captured in a database and property owners are

given individual reports that interpret Vegetation Condition Assessment (VCA) scores, provide photos etc.

A review of the program will be undertaken in 2012/13.

Funding

There is no single financial management structure for the whole program. The *Midlandscapes* Business plan identifies a range of strategies and mechanisms for protecting the conservation assets as well a range of potential funding strategies. Financial management structures are in part often determined by the requirements of the funding provider. However the establishment of the Midlands Conservation Fund creates a focal point for investment in conservation in the Midlands.

Government Funding, in relation to delivering related conservation projects such as NRS, NRM and Stewardship proposals, will be managed in accordance with government requirements at the time. Individual partners will lead and deliver a given project and will hold the contractual responsibility for financial management. All partners have experienced staff and proven governance and financial management structures.

Carbon trading, biodiversity offsets brand licensing, and conservation research rights are potential funding sources for effecting conservation protection and management of the targeted conservation assets.

4. Biophysical design principles and analyses

The Midlands Landscape report provides a detailed outline of the Conservation Action Planning processes used by a group of conservation NGOs, a state government department and a number of scientists and landowners to develop a landscape scale action plan for conservation in the Tasmanian Midlands.

Eight Conservation Assets comprising the essential elements of the landscape for long term conservation were identified. Six ecological communities and one fauna habitat have been defined and mapped in relation to data sets for TASVEG communities, hydrological attributes, slope and altitude. The targets for protecting and managing the Conservation Assets by 2020 are:

1. Lowland Native Grasslands, 8200 ha
2. Grassy Woodland Bush Runs, 7700 ha
3. Dry Heathy Forests, 27,800 ha
4. Lowland Alluvial Systems, 5,500 ha
5. Upland Riparian Systems, 9,100 ha
6. Valley-Floor Wetlands, 3,550 ha
7. Wedge-tailed eagles (nest buffers). 2,200 ha
8. Vulnerable Marsupials and Birds (This asset has not been spatially defined but their habitat was considered when defining the six ecological communities).

Through the Conservation Action Planning process sixteen critical threats to biodiversity ranked from very high to low were identified across the conservation assets and focal landscapes:

1. Clearance and conversion for agriculture
2. Climate change and variability
3. Overstocking with domestic animals
4. Clearance and conversion for plantations
5. Rural tree decline
6. Dam footprint and altered hydrology
7. Fertiliser use

8. Feral carnivores (foxes and cats)
9. Browsing damage by wildlife
10. Riparian access by stock
11. Drainage
12. Gravel mining
13. Inappropriate fire regimes
14. Weeds
15. Native forest logging
16. Deer

A sub regional CAP encompassing an important cluster of focal landscapes (see below) has also been prepared.

Principles to guide selection of potential landscape linkages include:

- Altitude connections to provide habitat choice for species seeking to move under the pressure of climate change;
- Suitable habitat connections for focal or keystone species though this approach has not yet been explored in the *MidlandsLandscape* Project;
- Riparian connections (or hydro-ecological connections - note that these are usually conservation assets already);
- Existing protected areas (formal or informal, for instance skyline protection under Local Government planning schemes); and
- Gross connections across the landscape at the largest scale.

There is unassessed capacity to protect and enhance natural stores of carbon in several of the ecological communities identified as conservation assets. The project partners are currently scoping the potential for carbon farming initiatives to provide new income streams for landowners as well as deliver long term conservation outcomes in line with the *Midlandscapes*' objectives.

Planning and prioritisation has also been supported by the Protected Areas on Private Land Program (PAPL) to "Develop a state-wide map identifying focal landscapes for targeted effort for future additions to the National Reserve System". PAPL aims to take a strategic, landscape-scale approach to identifying private land for potential inclusion in the private reserve system that considers the role or functions of natural systems within individual private land titles.

The purpose of the focal landscapes spatial layer is "To provide a spatial representation of Tasmania's focal landscapes to guide program effort for future additions to the National Reserve System. The layer is to be used as an authoritative source of information for conservation planning."The purpose of the PAPL metric grid spatial layer is "To inform PAPL of the geographic distribution of co-occurring natural values in Tasmania to guide program effort for future additions to the National Reserve System". The purpose of the PAPL Prioritisation Map is "To provide a visual representation of the geographic distribution of co-occurring natural values in Tasmania, including priority areas called focal landscapes, to guide program effort for future additions to the National Reserve System".

The focal landscapes mapped have a high concentration of the defined range of natural values and are areas that PAPL may find particularly useful to allocate greater attention to. This will direct the focus of PAPL in the medium term, in the interests of promoting conservation management in those parts of Tasmania with the highest concentrations of natural values and specific priorities that are identified in the PAPL project plan. PAPL has directly targeted 413 landowners within 11 of the 14 focal landscapes (as at April 2011). This engagement has resulted in 1 registered and 21 conservation agreements actively proceeding to finalisation.

This spatial is being advanced by a collaborative project between Greening Australia (Tas), PAPL and Tasmanian Land Conservancy to jointly work on developing a GIS optimising procedure for guiding

investment in restoration in the Northern Midlands of Tasmania to buffer and connect existing vegetation remnants (and other NRM assets) with the aim of maximising connectivity and biodiversity at the landscape scale. This project will produce a database and map of optimisation of links (to be revegetated) between remaining high value native vegetation remnants (and other NRM assets) to provide landscape-scale connectivity and biodiversity in the Northern Midlands.

Implementation arrangements and achievements:

- "The Midlands Biodiversity Hotspot Tender" was targeted in the Midlands only and trialled the efficacy of the Midlands Metric and market based approach to achieve targeted outcomes. This project was Completed in 2008 and secured 9 stewardship Contracts (760 ha) and 22 covenants (5500 ha).
- "The Non-forest Vegetation Program" (NFVP) achieved 24 perpetual conservation covenants (10,478 ha), 2 fixed-term conservation covenants covering (1,000 ha), and approximately 9,659 ha under Vegetation Management Agreements (total of 20,476 ha managed for conservation). The program pioneered the use of 'Evergreen Agreements', 'Alliance Agreements' and outcomes-based grazing approaches in the Tasmanian conservation context.
- "Forest Conservation Fund Direct Approach" was a targeted statewide program for large tracts of forest completed in 2009. Approximately 4000 ha in the Midlands of upland forests were protected by covenants in perpetuity.
- "Roaring 40s Eagles nest protection Program" was a Statewide offsets program funded by Roaring 40s Ltd to offset potential eagle losses from their windfarms. Five eagles' nests and 160 ha were protected under covenant in the Midlands and the program is on going.
- "Protected Areas on Private Land Program". This covenanting program targeted properties in focal landscapes and is ongoing, but lacks incentive funds has limited its effectiveness in such a highly productive landscape.

All of the covenants secured through these programs are on-title agreements between the landowner and the Crown. The DPIPWE's PLCP provides ongoing support through its monitoring and stewardship team.

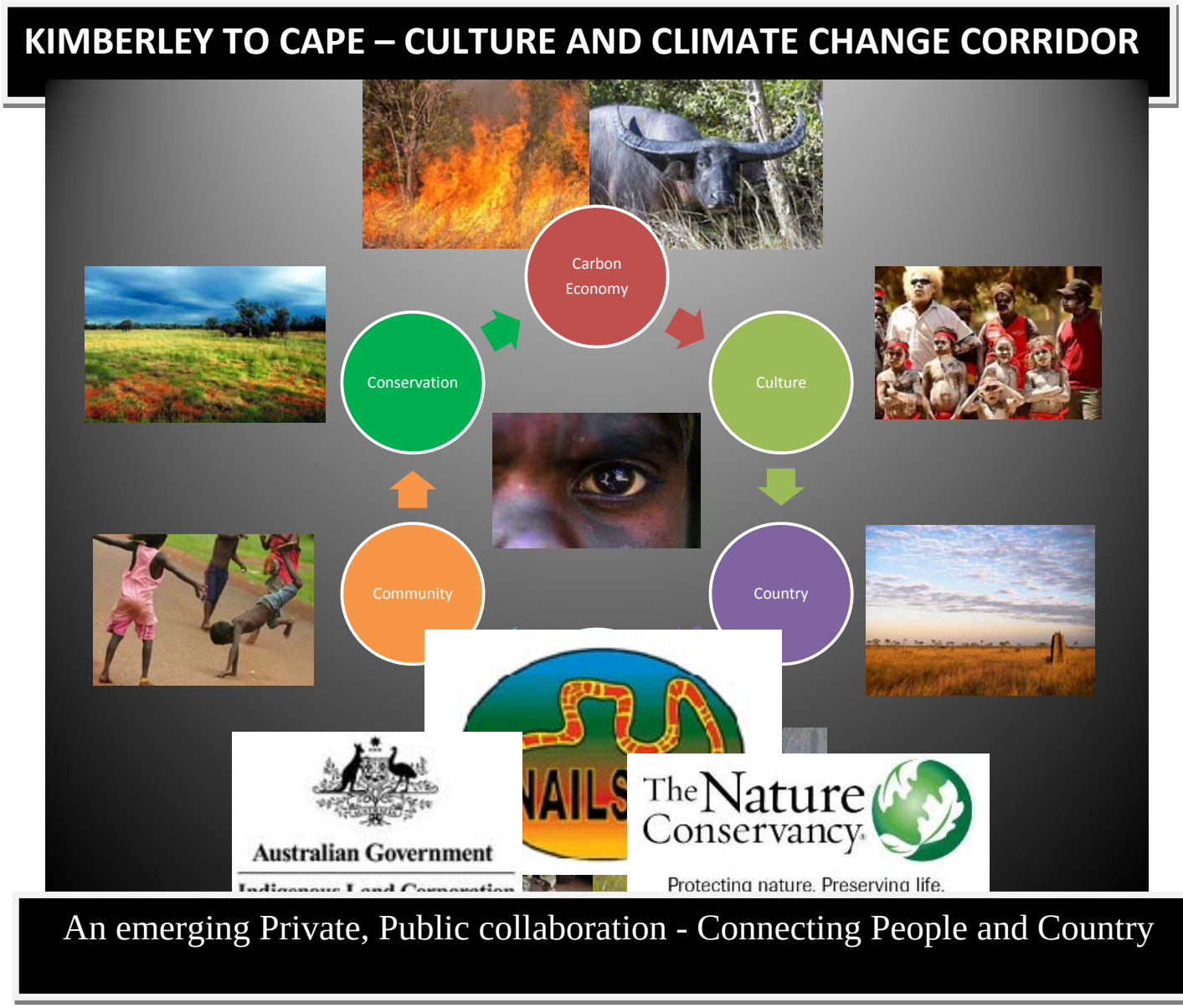
Additional achievements include:

- Completion of a Conservation Action Plan and Business Plan for the Midlands out to 2020.
- Protection of an additional 21,000 ha of native vegetation in the Midlands Hotspot including approximately 7000 ha of key conservation assets identified in the Conservation Action Plan.

Establishing the Midlands Conservation Fund with a start up capital of $2.6 million donated by 2 major philanthropic foundations and a private individual.

A9 Kimberley to Cape

Compiled by: NAILSMA, ILC and TNC



***DRAFT VISION** – The Tropical Savannas of northern Australia are connected from the Kimberley to Cape York through contiguous habitat and effective land management. Indigenous People maintain an intimate link to country through culture and land and sea management networks. Indigenous communities are living on, and caring for country and receiving tangible benefits for their conservation and management supported by a carbon economy through innovative payments for ecosystem service arrangements. Indigenous and other Protected Areas sit alongside grazing lands in a mosaic landscape that maintains healthy broad-scale ecological processes. The rivers across the north remain intact, maintaining natural flows and flooding regimes. Appropriate fire management regimes are reinstated by Traditional Owners and this service is provided to other landholders across the region. Indigenous long-standing connection and capacity development allows Indigenous people and nature to respond effectively to climate change challenges that arise across the vast northern savannas. There are few feral animals and weeds and small mammals are no longer in decline. Amongst disparate stakeholders there is a shared vision for the human and physical landscape in concert with mutual respect, honesty and willingness to find common ground. Innovative models of sustainable production and enterprise development provide expanding employment opportunities and social, cultural and conservation benefits beyond government programs.*

Executive Summary

Indigenous people in northern Australia recognise the importance of collaboration and sharing of knowledge and resources to achieve conservation and livelihoods goals, underpinned by a strong economic base to sustain Indigenous management and development of country. Indigenous organisations have created a vehicle for collaboration in the North Australian Indigenous Land and Sea Management Alliance (NAILSMA). A shared mission has been articulated through an agreed statement of goals and publications that articulate traditional and new approaches to the effective management and conservation of natural resources.

Indigenous people want to build a culture-based economy. In short, this concept rests on the premise that where Indigenous people remain and work on country, cultural and natural values are maintained or enhanced, with the actions of traditional owners serving national interests. Customary environmental services already make significant contributions to both local and mainstream economies which presently go largely unrecognised, but for which new markets (biodiversity offsets, environmental and cultural conservation, offsetting greenhouse gas emissions and bio-sequestration) are emerging. NAILSMA is committed to working with Indigenous people to improve livelihoods. It seeks to reduce dependence on governments through the creation of conservation-related and agricultural enterprises, which contribute to effective management of natural resources. The Nature Conservancy and the Indigenous Land Corporation are committed to collaborating with NAILSMA to achieve these outcomes, and to help build strategic approaches and new business models involving governments, the private, corporate and philanthropic sectors.

The Kimberley to Cape York Culture and Climate Change Corridor (K2CCCC) provides a geographical frame for focused application of shared Indigenous goals, approaches and practices. It draws on well-established NAILSMA-supported institutions such as the Saltwater Peoples' Network, Water Policy Group, Fire Management and Carbon Programs. The design is unique in seeking to protect ecological and cultural linkages both within and across terrestrial, freshwater and saltwater environments. It draws on traditional recognition of the connectedness of all natural systems and the associated need to do more than manage one's own country, but also to assist neighbours linked culturally through kinship and strongly shared understandings of human obligations to country.

Conservation lands in northern Australia have increased dramatically in the past few decades, with the declaration of new national parks and other public protected areas, the establishment of Indigenous Protected Areas, the acquisition of leasehold land for the formation of private protected areas and the establishment of conservation covenants. Increasing the coordination of the conservation estate

between tenures and jurisdictions integrated with the aspirations of Indigenous Australians will be an important objective for the coming decade.

Northern Australia landscapes of high conservation value have not been isolated by large areas of intensive agriculture or urban development, but this relatively undeveloped state and sparse population raises its own set of problems. Savannas are maintained by particular disturbance regimes, which make them especially vulnerable to changes in those regimes that will flow from climate change and its interactions with natural and anthropogenic fires, invasive species, vegetation patterns, erosion and sedimentation processes, and sea levels. Establishing a comprehensive, adequate and representative reserve network, across a range of tenures, is a key national objective for the north. Ensuring this system is well connected, incorporates key refugia and allows for species movement and adaptation in response to climate change is increasingly important. The regions that make up northern Australia and their extraordinary cultural and environmental values demand active management across all tenures at the very large spatial scales. This can only be achieved through the coordinated responses that a commitment to the K2CCCC will bring.

Host/lead: Joe Morrison (CEO – NAILSMA)

Initial Coordination – Initial Steering Group: NAILSMA (Joe Morrison); Mike O'Ryan - Indigenous Land Corporation (ILC); Michael Looker - The Nature Conservancy (TNC)

Location of designated Office: North Australian Indigenous Land and Sea Management Alliance Tel: 08 8946 7691/www.nailsma.org.au/Fax: 08 8946 6388/Bld 12.3.27, Charles Darwin University/Darwin, NT 0909.

Supporting partners

- The ILC delivers land acquisition and land management programs that seek to achieve social, cultural, environmental and economic benefits for Indigenous Australians. Key priorities are the creation of enterprises and employment; collaboration with government agencies, industry and the not-for-profit sectors; and funding projects that are demonstrably viable and sustainable.
- TNC is a global not-for-profit organisation that taps knowledge, resources and lessons from around the world to help deliver large-scale conservation projects. TNC partners with Indigenous Australians, governments and businesses to develop innovative programs that assist Indigenous Australians to reconnect with their traditional lands in concert with delivering tangible biodiversity, social and cultural outcomes.

Kimberley to Cape – Culture and Climate Change Corridor (K2CCCC) spans roughly 3,700 km of contiguous terrestrial, freshwater and near shore marine habitat from Broome in the far west to Bamaga at the tip of Cape York in the far northeast. It is a landscaped joined by vast largely intact tropical savannas, freshwater and marine habitats, where natural ecological processes of fire and flood continue, and where people and nature are strongly linked through culture.

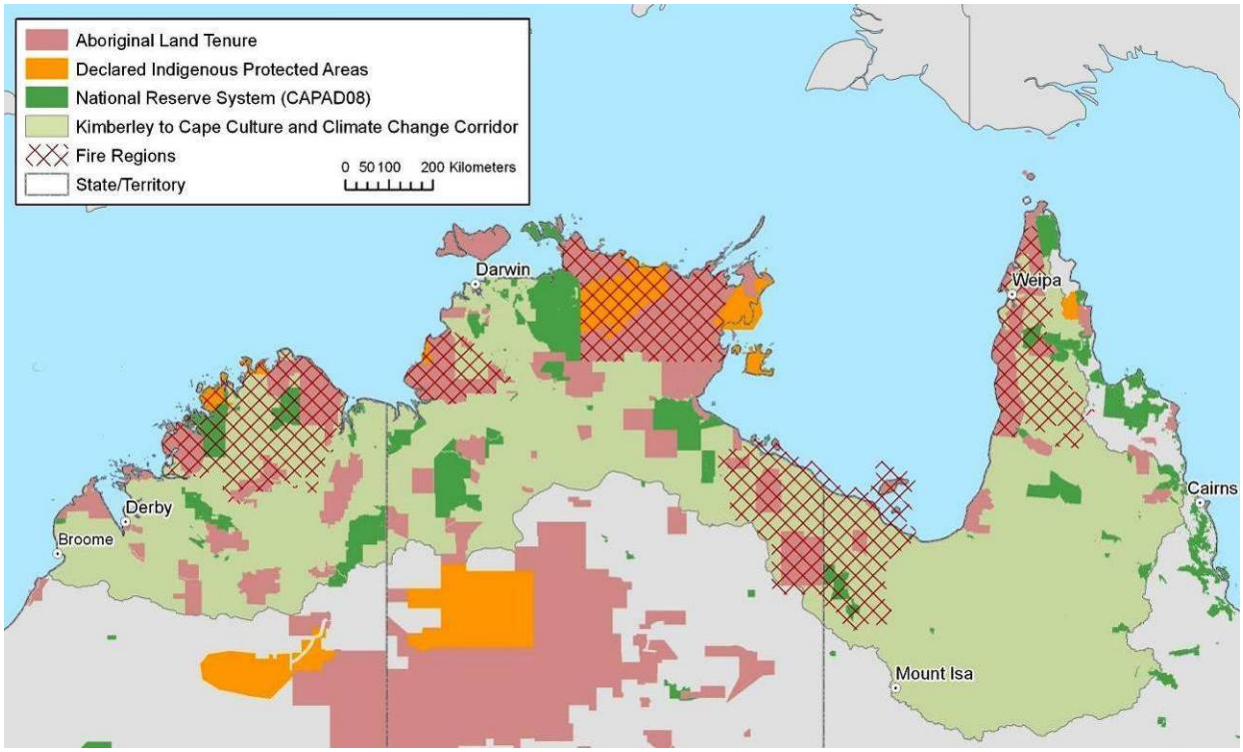


Figure A9.1: Kimberley to Cape Culture and Climate Change Corridor (Pale Green)

Source: Map by Nate Peterson (TNC)

K2CCCC core components:

Context

- Indigenous people own approximately 40% of the land north of the Tropic of Capricorn including a large portion of the coastline. In addition, Native Title (pending and determined) has extended interests across the majority of Northern Australia
- Indigenous people of Northern Australia are represented by approximately 130 language groups
- The Indigenous population in northern Australia is young and growing at a higher rate than non-Indigenous people.
- North Australia Indigenous Communities are socio-economically disadvantaged compared with non-Indigenous Australians in many areas. They have fewer opportunities and greater social, education and health issues.

Current conservation lands

- Established Indigenous Protected Areas: (Western Australia, Northern Territory and Queensland)
- Existing public protected areas including iconic national parks such as: Kakadu, Nitimiluk, Iron Range and Prince Regent National Park and other existing protected areas across the north
- Commonwealth, State and Territory government support for establishment an management of IPAs
- NT Government EcoLink (K2CCCC links (East – West) with NT EcoLink (North –South)
- Strategic acquisitions for Traditional Owners
- Strategic acquisitions for private protected areas
- Conservation Covenants over portions of pastoral properties

- Biodiversity Offsets

Broader land management

- Carbon Abatement Programs and fire management areas (existing and proposed): (1) WALFA – West Arnhem Land Fire Area (Proof of concept), (2) North Kimberley, (3) Daly River/Port Keats, (4) CALFA, (5) Gulf NT, (6) Gulf Qld Fire, (7) Western Cape York.

Current coastal and riverine assets

- Much of the north Australian coastline adjoins Indigenous land or is accessible only through Indigenous land
- Control over access to 85% of intertidal zone and tidal rivers abutting Indigenous land in the NT (High Court decision on Blue Mud Bay)
- Catchments of many major rivers are substantially or predominantly Indigenous-owned
- Several IPAs include coastal waters

Potential participating lands base

- Indigenous Pastoral Properties: Indigenous and ILC-held, NT Indigenous Pastoral Program, Kimberley Indigenous-owned pastoral properties
- Pastoral Properties (Sustainable Grazing and Threat Abatement)
- Native Title areas (Parks, exclusive and non-exclusive areas)
- Indigenous freehold
- Aboriginal Land Trusts and Community Living Areas

Funding for conservation and management

- The Corporate Sector (Financing emissions reductions): Conoco Phillips (WALFA)
- Government support: CfoC, WoC, National Reserve System
- Philanthropic Support: Conservation and Indigenous land management (TNC)
- Enterprise Development: Pastoral activities, Protected Areas, Ecotourism (ILC)

Location and jurisdictional coverage: States: (Western Australia, NT, Qld) and **NRM regions**: (WA Rangelands, NT, Qld Southern Gulf, Northern Gulf and Cape York).

Conceptual Model

The conceptual model for connectivity for the K2CCCC is based on connectivity through the maintenance contiguous habitat and ecological connectivity or connectedness of ecological processes at multiple scales, while simultaneously managing to reduce key threatening processes. The model recognizes that the key ecological process for Northern Australia over which we have greatest control is fire. The model also recognizes that there is a continuum of management from early dry season fire management in concert with broad-scale threat abatement (removal of feral herbivores, stock and invasives) to intensive grazing with late dry season wildfires to maintain pastures. The most connected landscapes are likely those where the adjoining tenure is managed with early dry season mosaic fires and threat abatement (top left hand of figure). The least connected lands are those where intensive grazing of livestock and late dry season wildfires are used to maintain pastures. The primary aim of the K2CCCC will be to enhance connectivity from the Kimberley to the Cape by working to strengthen and expand effective management providing tangible biodiversity, social and cultural benefits (Figure below).

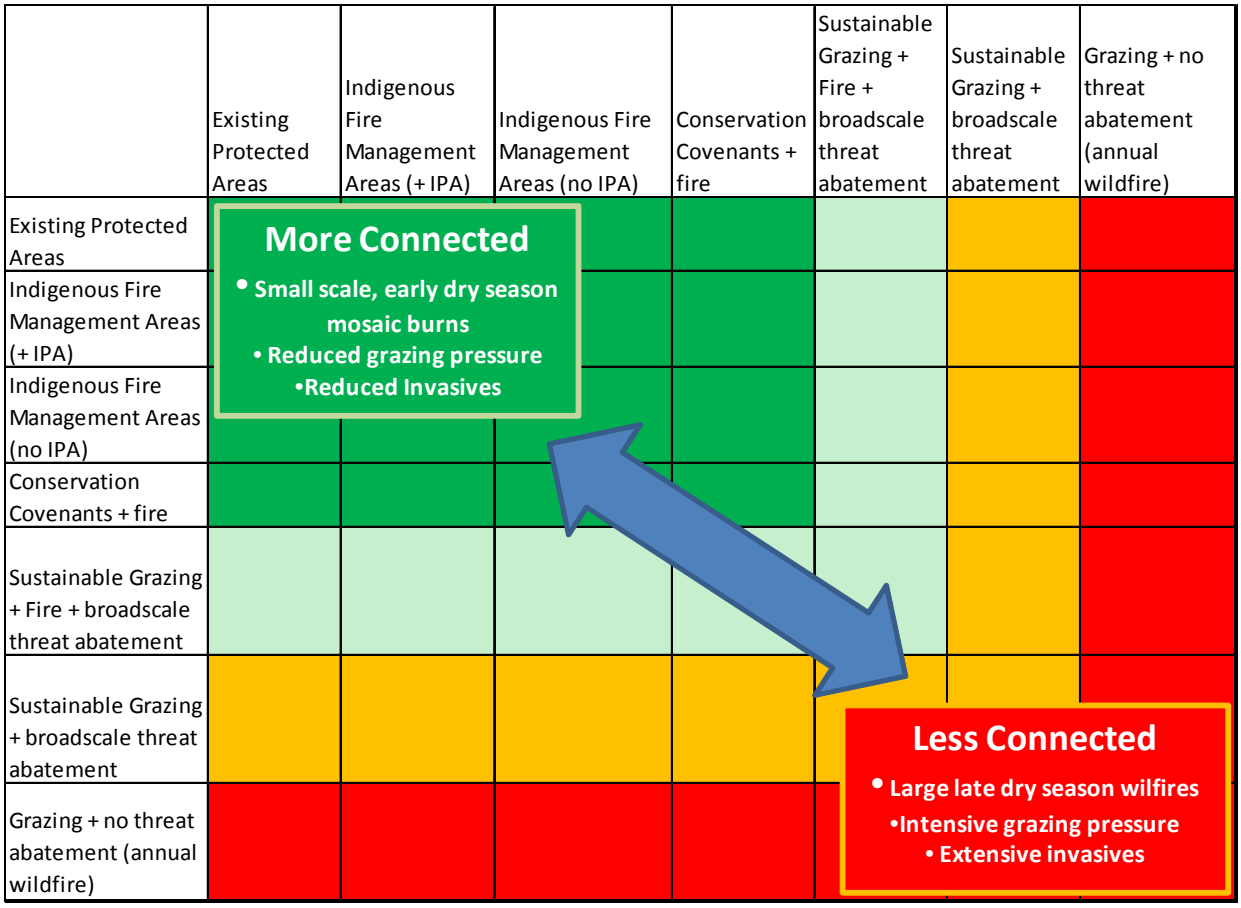


Figure A9.2: Conceptual model for the K2CCCC

Importantly, this is an emerging Private Public collaboration centred on strengthening connectivity in the landscape, connections of people to country and connection of people to emerging economies, enterprises and jobs that go beyond current government support. Significant work will be required to provide the necessary consultation with Traditional Owners and Stakeholders to shape this initiative to provide secure, lasting and constructive outcomes.

Sustainable finance: WALFA (West Arnhem Land Fire Abatement) has clearly demonstrated that landscapes can be effectively managed by traditional owners and that traditional owners can in turn receive tangible benefits through jobs on country that benefit people and nature. The WALFA project results in emissions reductions of > 100,000 tonnes/year. In turn, ConocoPhillips pays $1 million/year for the next 17 years for these emissions reductions. This approach will be expanded across Northern Australia as part of the Kimberley to Cape Culture and Climate Change Corridor to provide: (1) connectivity across Northern Australia, (2) significant emissions reduction through savanna burning, sequestration and feral animal management through the Carbon Farming Initiative, (3) biodiversity benefits through effective management and (4) social and cultural benefits for traditional owners.

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