CONNECTIVITY CONSERVATION AND ECOLOGICAL RESTORATION

ADVENTURES IN A GLOBAL BIODIVERSITY HOTSPOT

BUSH HERITAGE
AUSTRALIA

A presentation addressing Aichi Targets:

5 By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

11 By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

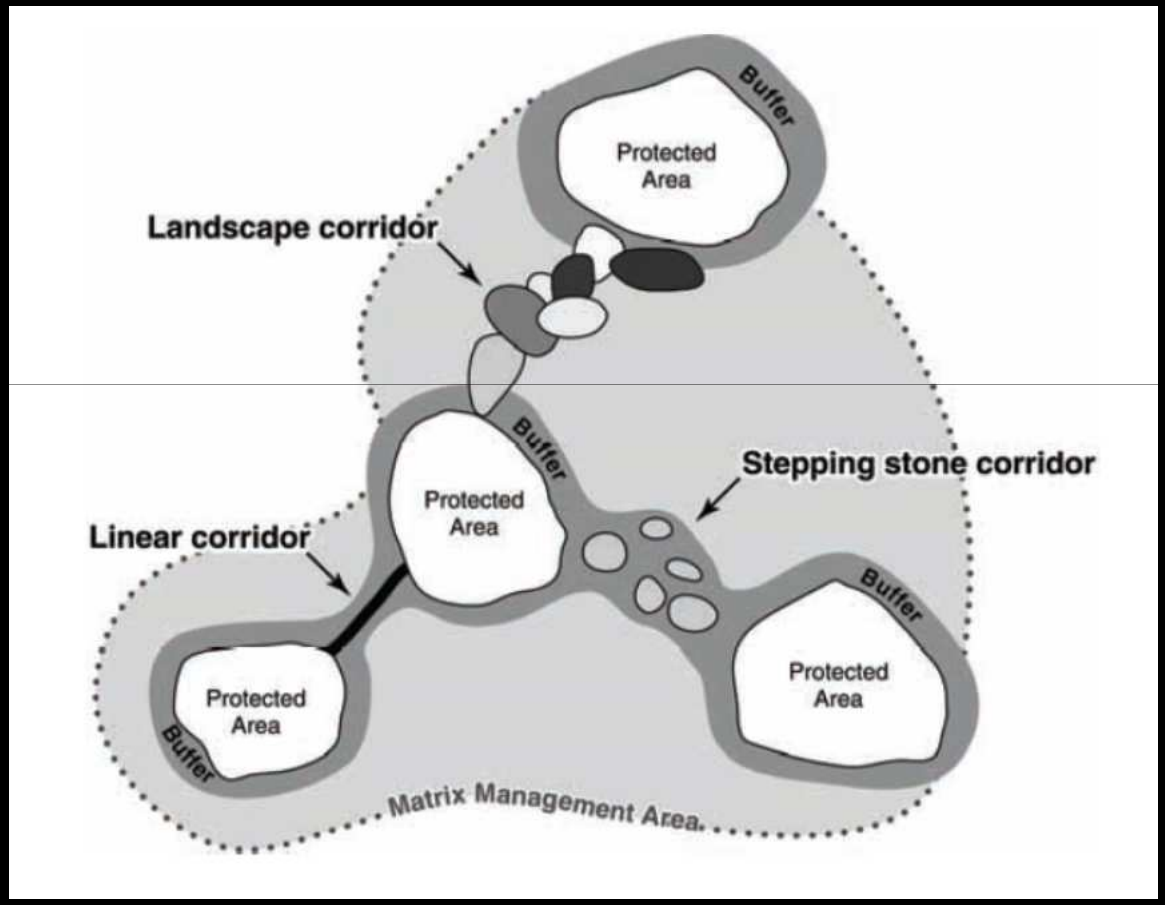
15 By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Fragmentation and Connectivity

Fragmentation of habitats and ecosystems is one of the most serious threats to biodiversity worldwide. Retaining or restoring connectivity is crucial to securing healthy, resilient and sustainable ecosystems.

Connectivity Conservation is a new, socially inclusive approach to addressing conservation on a large-landscape scale.

Elements of connectivity conservation spatial planning

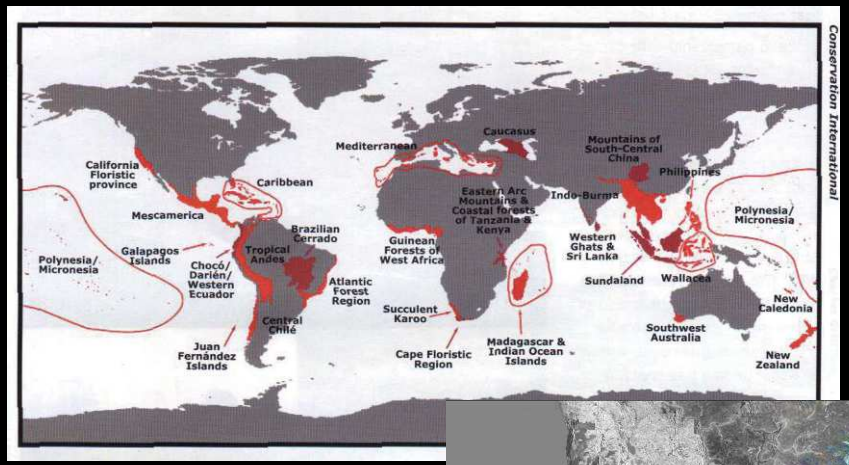


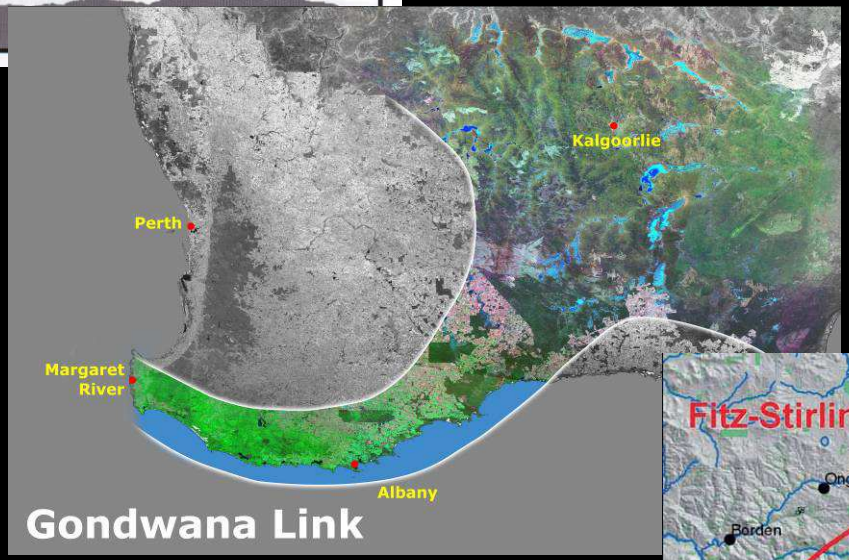
- Core protected areas
- The landscape-wide matrix management area
- Native vegetation that serves as 'stepping stones' and linear corridors of native habitat

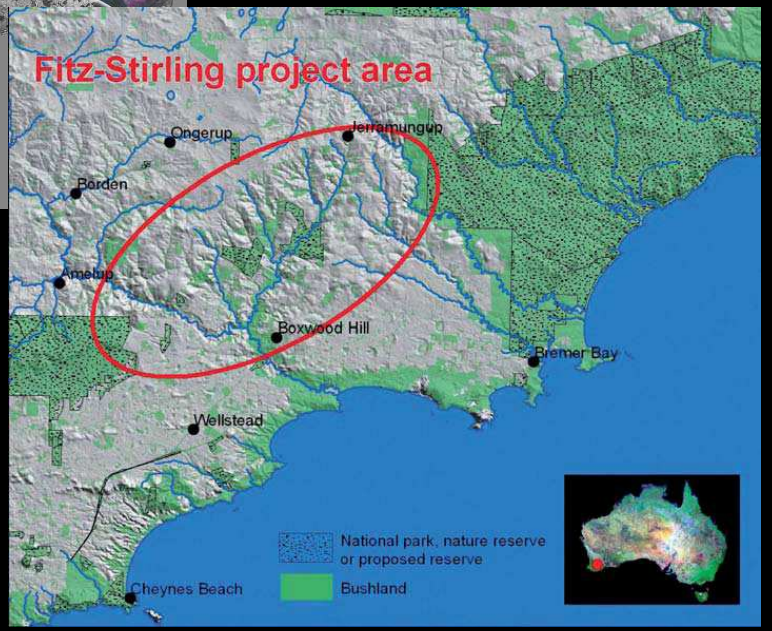
(adapted from Bennett 2004)

Connectivity Conservation in South-western Australia:

The Gondwana Link Project



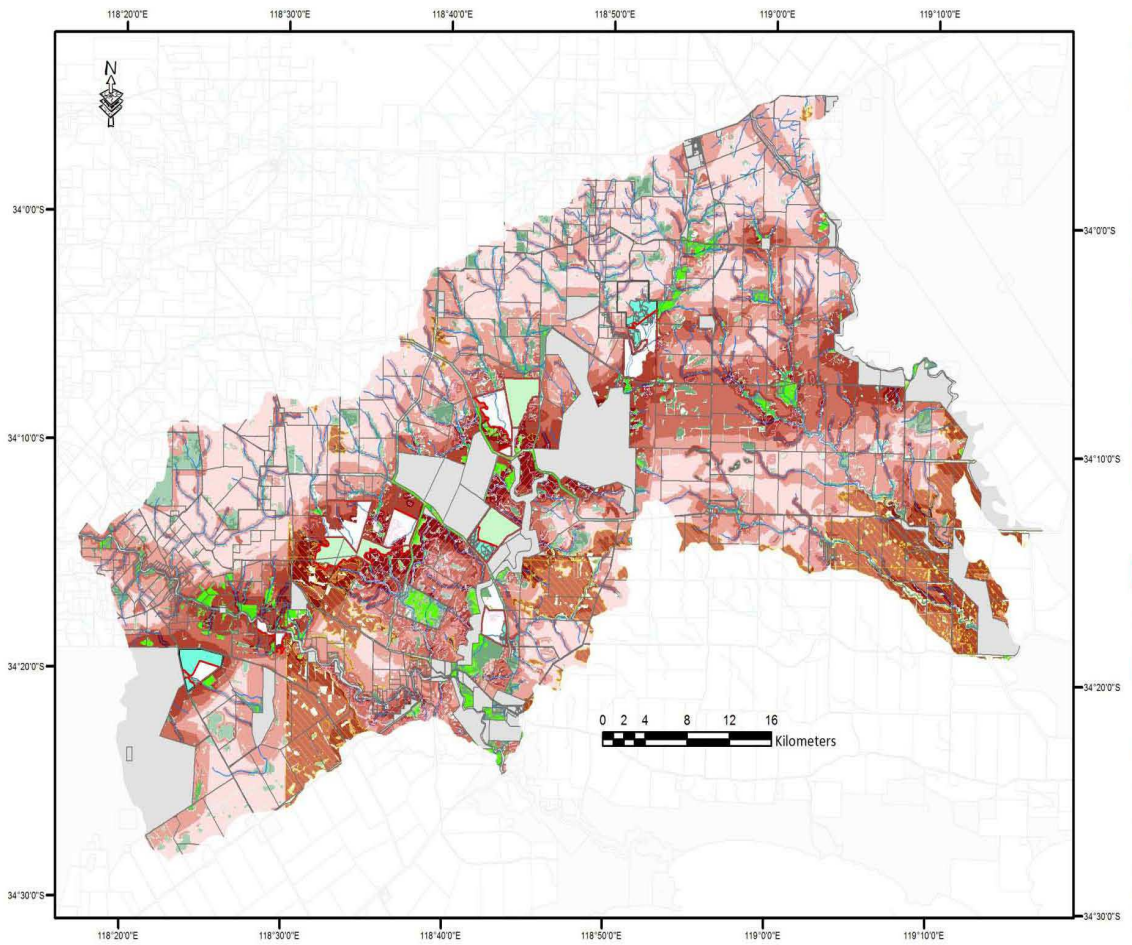




Fitz-Stirling Section of Gondwana Link

Spatial Guide for the Functional Landscape Plan

Figure 62 – Spatial Guide for the Functional Landscape Plan



Restoration Plan Priority Areas

- Proteaceous Re-Vegetation Priority
- Tammar Wallaby Priority
- Riparian Revegetation Zones

Restoration Plan Priority Values

Vegetation Priority

- Low
- High

Revegetation Priority

- Low
- High

Existing Components

- Covenented Reserves (G-Link)
- Vacant Crown Land
- Crown Reserves
- Existing Revegetation

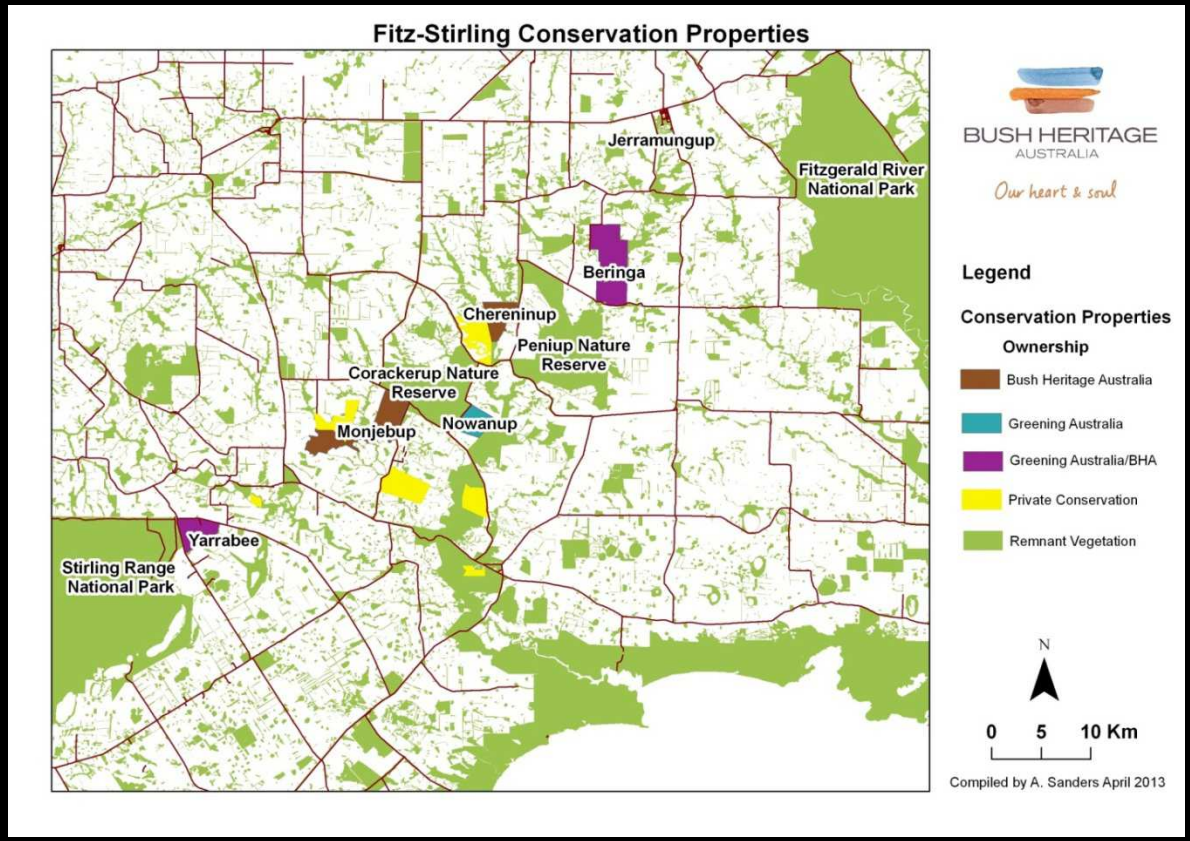
gondwana link

CARING FOR OUR COUNTRY · SOUTHCOAST · ECOTONES & ASSOCIATES

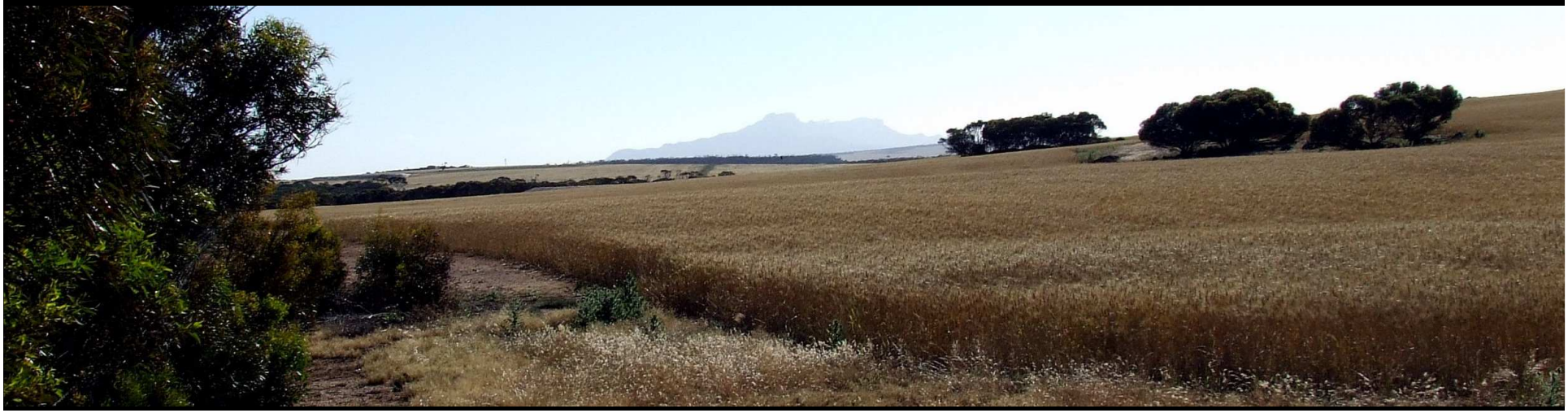
ACKNOWLEDGEMENTS
This version of the Fitz-Stirling Spatial Guide was produced by Gondwana Link Ltd (Amanda Keesing, Keith Bradby) with the active involvement of ABARES (Rob Lesslie, Jodie Mewett), Bush Heritage Australia (Angela Sanders, Simon Smith), DEC (Sarah Comer) and Paula Deegan. Our sincere thanks go to Simon Neville (Ecotones & Associates) for his role in the guide's development.

NOTE
This guide is now being discussed more widely and may be revised to accommodate feedback.

Version 1.0, September 2012



FitzStirling Landscape



Connectivity Conservation in the FitzStirling

3 key components:

1) enhanced management of existing habitat

2) restoration to consolidate existing habitat and rebuild connectivity

3) supportive natural resource management in the wider landscape matrix (particularly upper catchments)

Component 2) restoration to rebuild connectivity distinguishes connectivity conservation from more traditional approaches.

Ecological Restoration

is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.

Restoration attempts to return an ecosystem to its historic **trajectory**.
Historic conditions are therefore the ideal starting point for restoration design.

Emulation of the historic trajectory or reference conditions in the restoration process will aid in piloting the ecosystem towards improved health and integrity.

An ecosystem has recovered – and is restored – when:

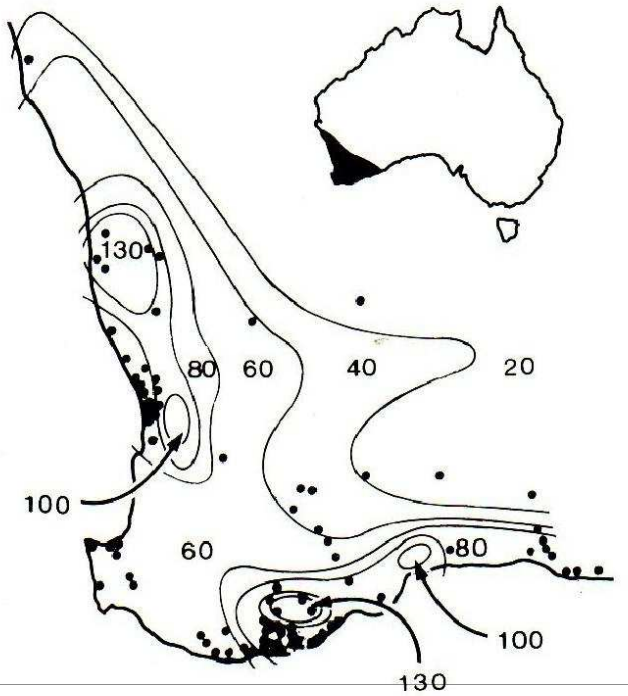
- It contains sufficient biotic and abiotic resources to continue its development without further assistance or subsidy, and will **sustain** itself structurally and functionally.
- It will demonstrate **resilience** to normal ranges of environmental stress and disturbance.
- It will **interact** with contiguous ecosystems in terms of biotic and abiotic flows and cultural interactions.

The International Society for Ecological Restoration (SERI) identifies nine attributes as a basis for determining when restoration has been accomplished. Gondwana Link has used these in developing restoration standards for the project.

1) The restored ecosystem contains a characteristic assemblage of the species that occur in the reference ecosystem and that provide appropriate community structure.

2) The ecosystem consists of indigenous species to the greatest practicable extent.

3) All functional groups necessary for the continued development and/or stability of the restored ecosystem are represented or, if they are not, the missing groups have the potential to colonise by natural means.



4) The physical environment of the restored ecosystem is capable of sustaining reproducing populations of the species necessary for its continued stability or development along the desired trajectory.

5) The restored ecosystem functions normally for its ecological stage of development, and signs of dysfunction are absent.

6) The restored ecosystem is integrated into a larger ecological landscape, with which it interacts through abiotic and biotic flows and exchanges.

7) Potential threats to the health and integrity of the restored ecosystem from the surrounding landscape have been eliminated or reduced as much as possible.

8) The restored ecosystem is sufficiently resilient to endure the normal periodic stress events in the local environment.

9) The restored ecosystem is self-sustaining to the same degree as its reference ecosystem, and has the potential to persist indefinitely. Species composition and other attributes may evolve as environmental conditions change.

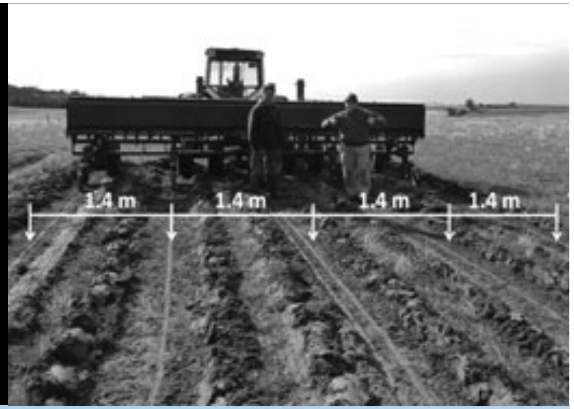
Other attributes should be added to this list if they are identified as goals of the restoration project. For example, one of the goals of restoration might be to provide specified natural goods and services for social benefit in a sustainable manner e.g. carbon sequestration.

Another goal might be for the restored ecosystem to provide habitat for specified target species.

Social Goals: Healing Country, Healing People

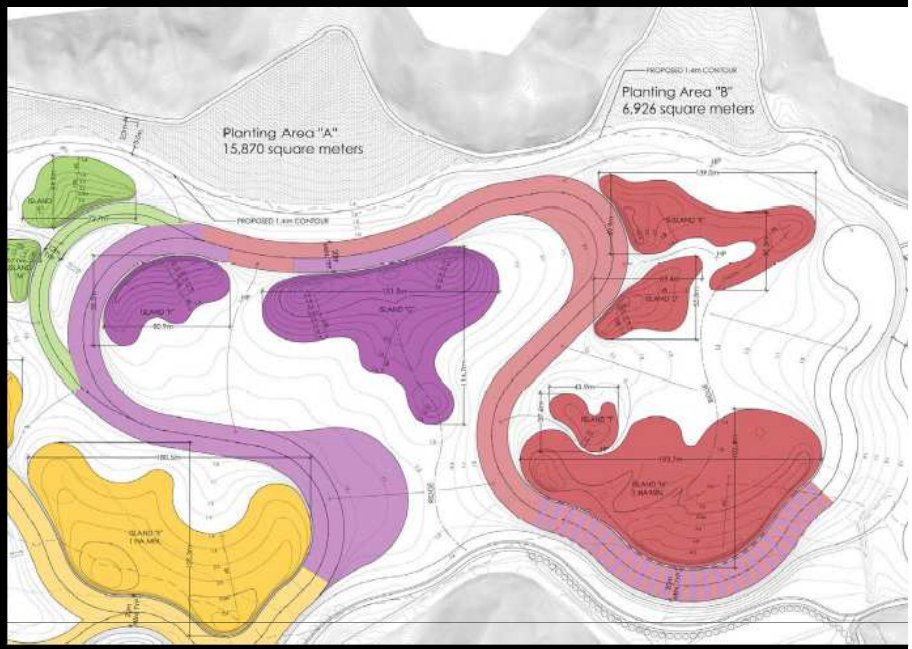
Additional Gondwana Link attributes

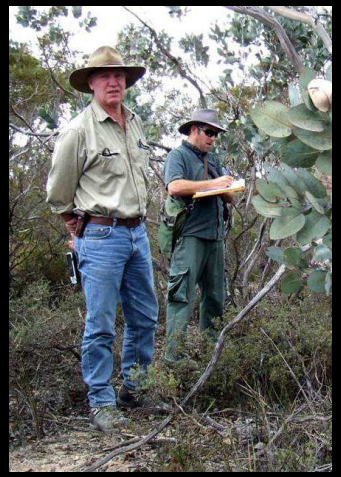
e.g. spatial patterning



Nick's Head Station, Te Tai Rawhiti, New Zealand
(a project by landscape architect Thomas Woltz)

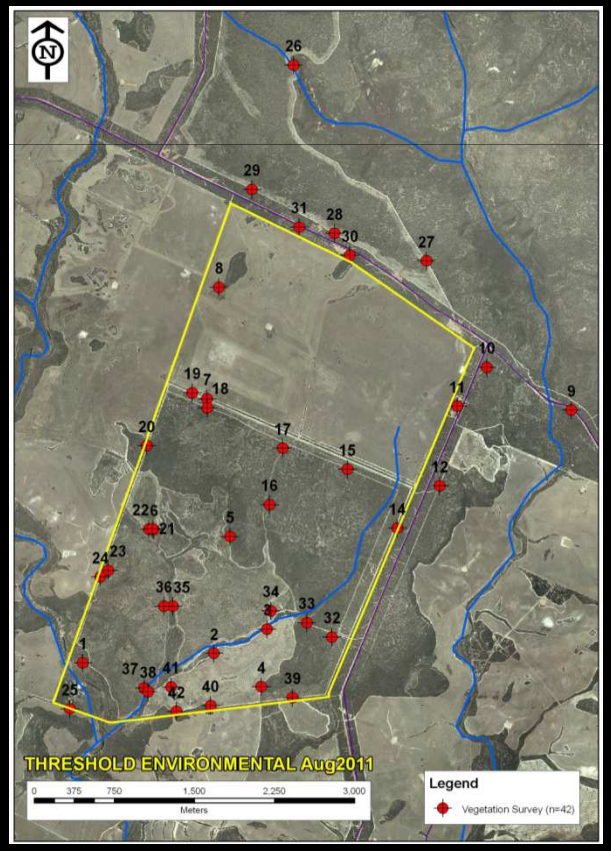
High Value Restoration 'Nodes'

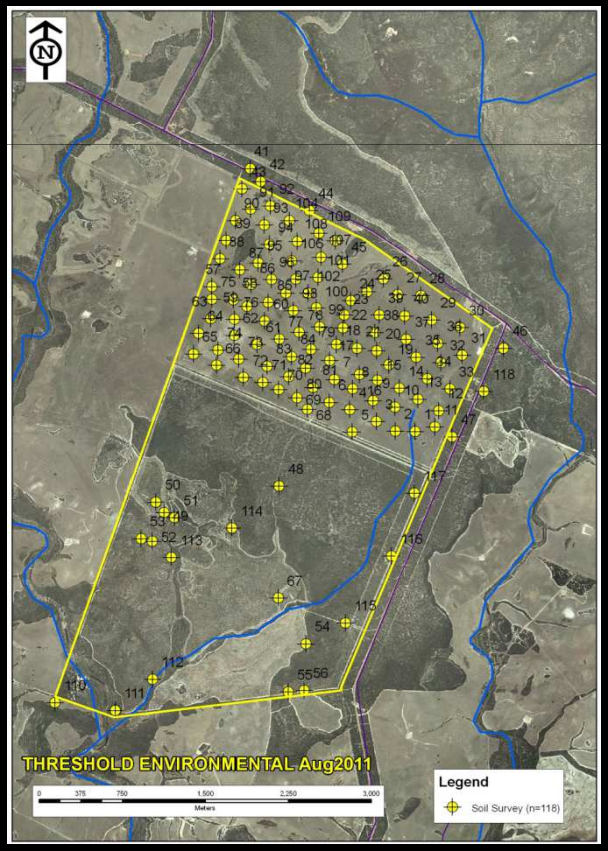


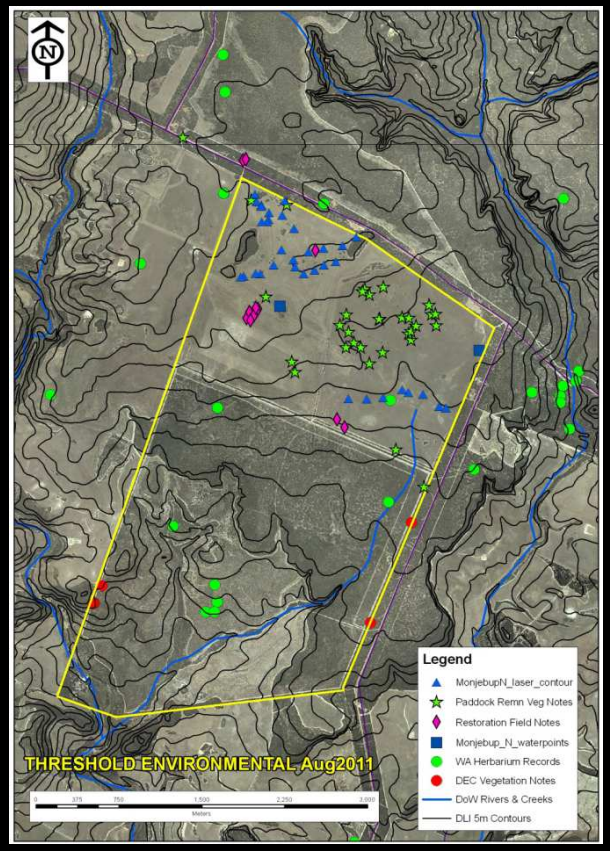


Restoration Planning and Design

- an ecological description of the restoration site
- a statement of the goals and objectives of the project
- a description of the reference
- plans, schedules and budgets for site preparation, installation and post-installation activities

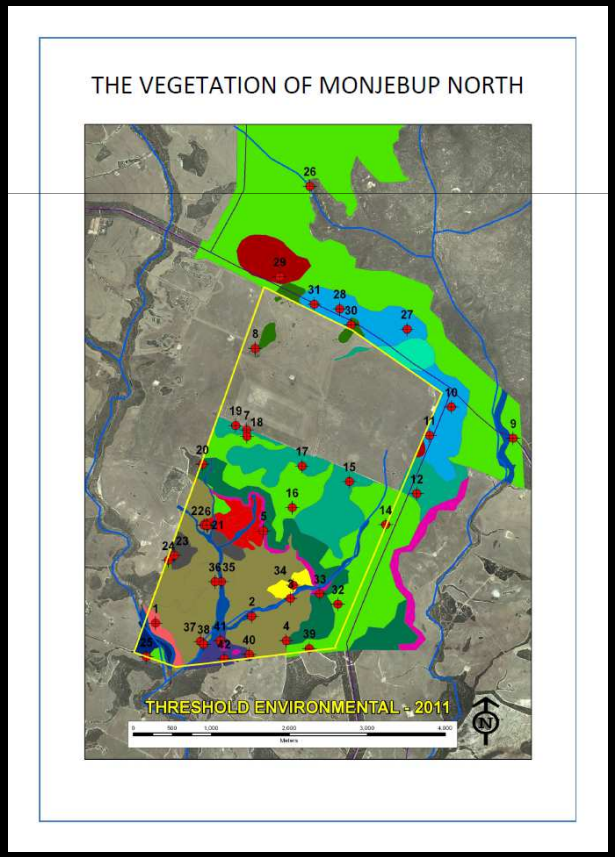


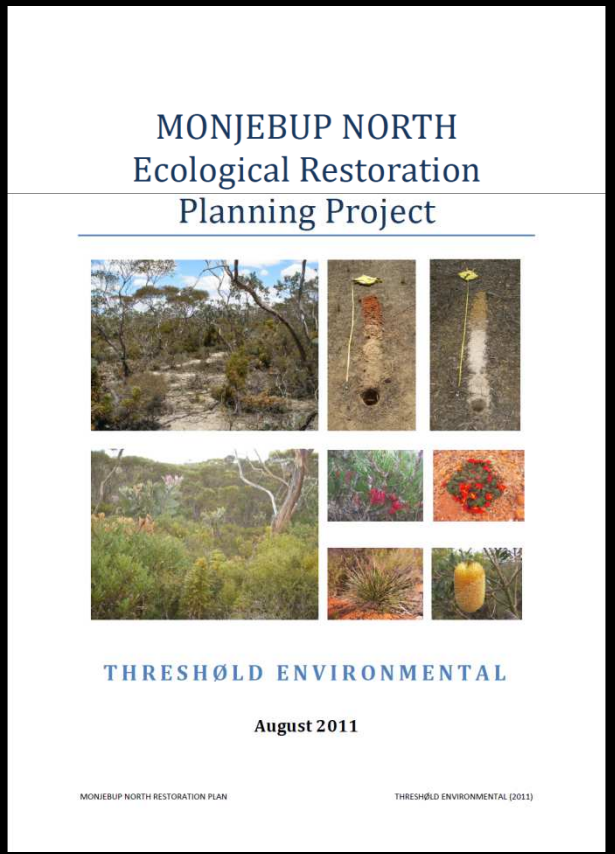




- performance standards, with monitoring protocols by which the project can be evaluated;
- strategies for long-term protection and maintenance of the restored ecosystem.

Where feasible, at least one untreated control plot should be included at the project site, for purposes of comparison with the restored ecosystem.





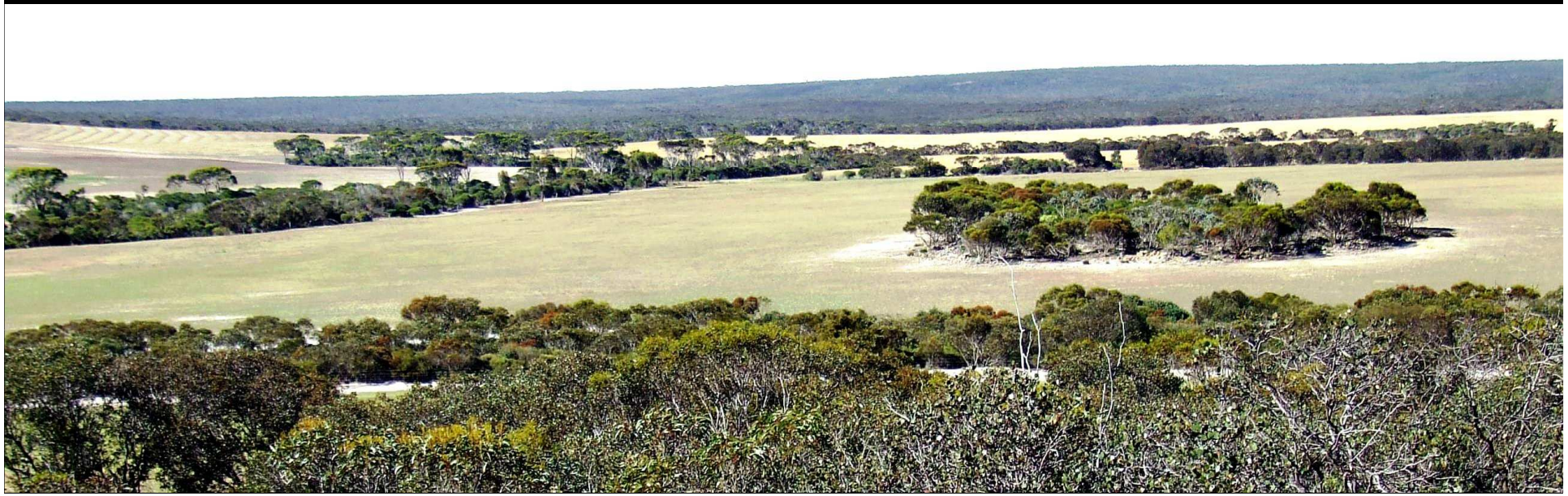
Restoration Design in the FitzStirling Landscape

Objective is re-establishment of self-replicating, diverse plant systems that are consistent with the heterogeneous mosaic of plant associations found in the FitzStirling landscape.

Alternative Models

1) Community convergence/deterministic
2) Alternative community states/ historically contingent

FitzStirling restoration design informed by 'alternative community states' model of ecological succession.



Plan the Work, Work the Plan

Monitoring and Evaluation : 1) Direct Comparison

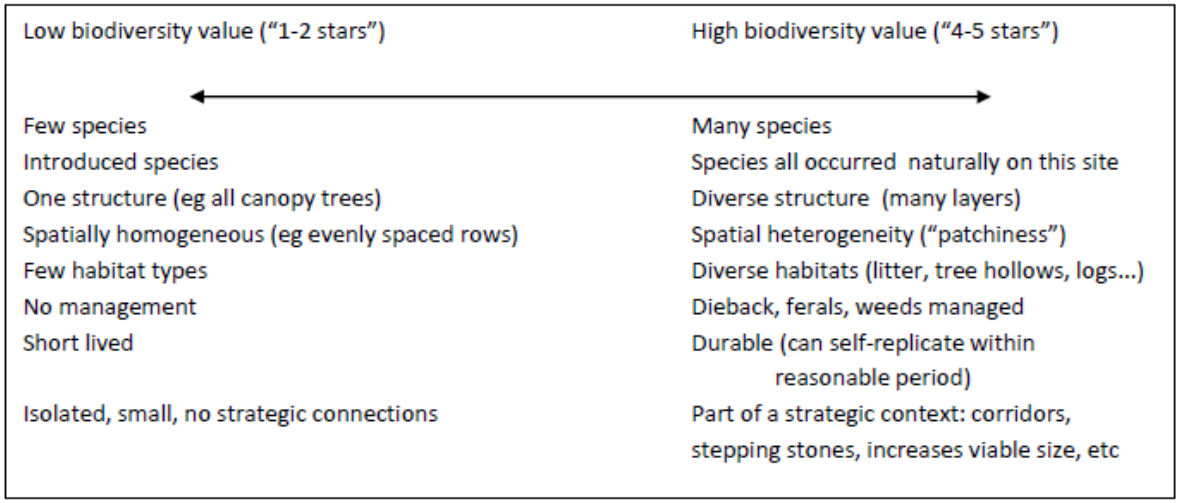
(Bush Heritage Australia)

Selected biotic and abiotic parameters are measured in the reference and restoration sites. The most pragmatic approach is to carefully select a coherent suite of traits that collectively describe an ecosystem fully yet succinctly.

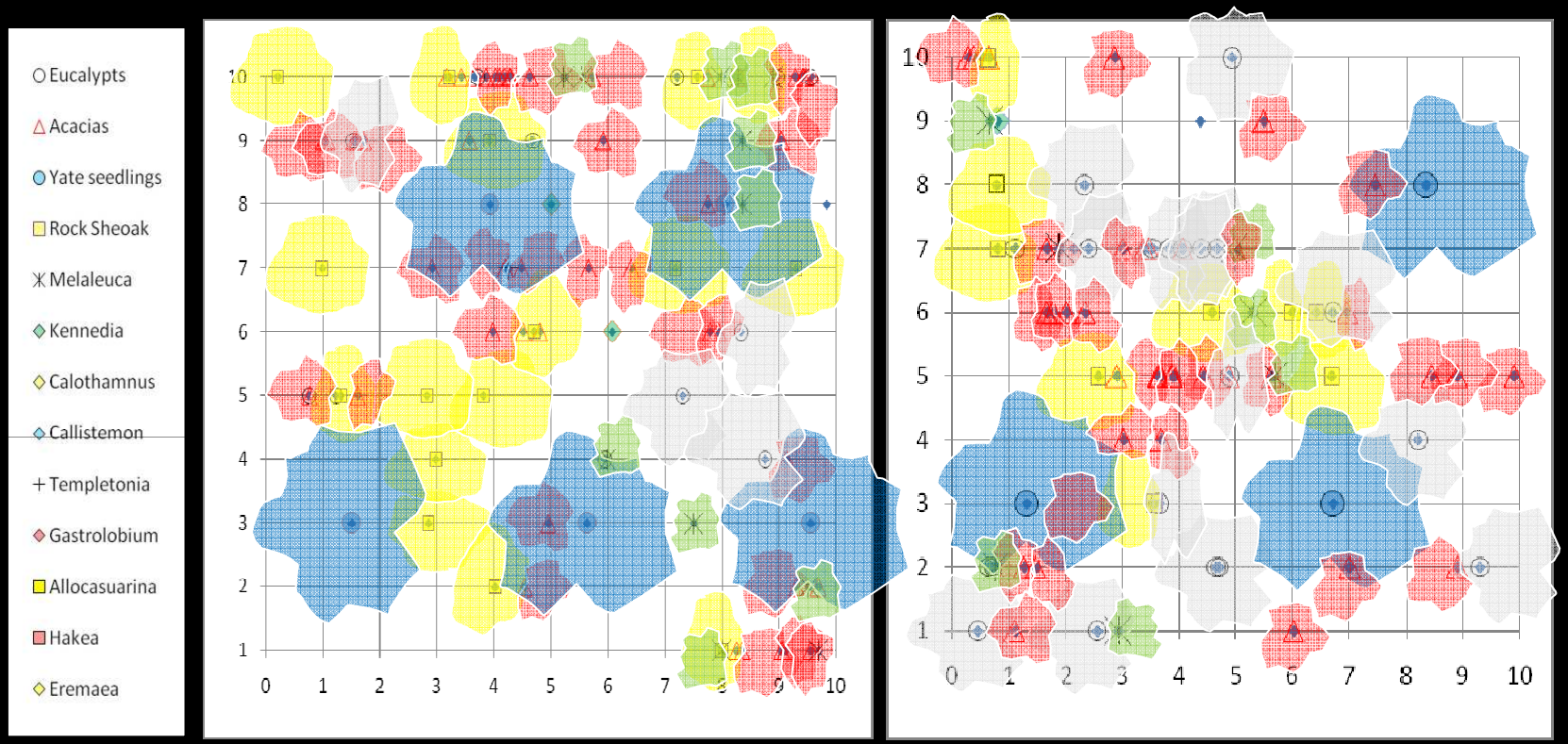
2) Attribute Analysis (Gondwana Link Ltd)

Attributes are assessed against agreed criteria. Quantitative and semi-quantitative data from scheduled monitoring and other inventories are useful in judging the degree to which each goal has been achieved.

Figure 1. Continuum of biodiversity and ecological values (illustrative example)



3) Trajectory analysis (Threshold Environmental Ltd)



Data collected periodically at the restoration site are plotted to establish trends. Trends that lead towards the reference condition confirm that the restoration is following its intended trajectory.

Connectivity conservation operates at landscape scale.

Landscape comprises **people** and **place**.

Involve people in as many aspects of the work as possible, and keep them informed and enthused.