Back to Top

ConPro

Gondwana Link: FitzStirling (ID: 33)

Back to Top

Basic

Project Information

Contact Name: Keith Bradby
Contact Organization: Gondwana Link
Project Start Date: January 15, 2005
Data Effective Date: August 15, 2007
Hectares:250,000
Sharing Status:
Ecoregion(s):

- Southwest Australia Woodlands

Operational Unit(s):

- Australia

Country(ies):

- Australia

Associated Initiative(s): None
Parent Project Name: Australia Strategic Plan (Parent's Project ID:1592)

Project Description:
This plan is to support the conservation campaign for the Gondwana Link partnership. Core area we are focusing our activities on in this plan is 10km wide reconnecting the Stirling Range and Fitzgerald River National Parks.

The Fitz-Stirling flora and fauna has evolved within a complex set of ecological processes operating at a range of scales, over a fine scale mosaic of soil and landforms. As with much of the south-western Australia hotspot, the evolutionary history has been continuous since the area was last glaciated some 250 million years ago. While there has been significant turnover of species in that time some existing plants have close affinities with leaves and fruit fossils from around 40 million years ago (Eocene siltstones). Botanical speciation appears to have been particularly intense in the last few million years.
Recent alienation and clearing of much of the Fitz-Stirling has resulted in the severing of many of the broad-scale ecological connections between the wetter forests and the drier inland. We recognise that the existing reserve system that exists as isolated habitat fragments is not likely to be capable of ensuring the survival and continued evolution of plants and animals in the future.
In the Fitz-Stirling we are aiming to achieve a landscape in which the natural processes favour the continued evolution of the region's native species. Rather than simply focussing on just the rare or threatened species, our conservation efforts are designed to address both large and fine scale ecological processes.

Project Goal Comment:
Our vision is that a restored Fitz-Stirling landscape will allow:
• bio-physical connection between bushland areas to enable viable fauna populations to be maintained;
• bio-physical connection between bushland across the landscape that enables migratory and nomadic species to continue their life cycles;
• availability of seasonal food sources to maintain viable fauna populations;
• protection of habitat to ensure the survival of the existing fauna and restoration of locally extinct fauna to the greatest degree possible;
• the maintenance of hydrological characteristics and water quality necessary to maintain viable ecological systems in streams;
• the provision of freshwater in the landscape needed for key species, to underpin the original ecological systems and to maintain refugia;
• reversing or slowing the process of accelerated landscape drying;
• genetic permeability to enable continued evolution of the area's diverse plant assemblages;
• trophic regulation by predators, favouring indigenous species and systems over introduced species;
• for "critical mass" in specific plant and animal communities to enable longer term survival and ongoing evolution; and
• fire regimes that do not degrade the ecological processes and natural values of the landscape.

Team Info:
Initially developed at Albany July 3-5, 2004 by Amanda Keesing, Keith Bradby, Angela Sanders, Paula Deegan, Stuart Cowell, Nathan McQuoid, Simon Judd and Sean Stankowski. Revised by Keith Bradby, Amanda Keesing and Simon Judd, with input from Angela Sanders, Paula Deegan and Stuart Cowell (Version 1.1, 2004).
Further revision May 2005 by Keith Bradby, Amanda Keesing and Simon Judd (Version 1.2).
Substantially revised by Angela Sanders and Paula Deegan under the Knowledge Connection project (October 2006 - 2008).
Version 3 revised by Paula Deegan following 2010 workshop (Keith Bradby, Amanda Keesing, Angela Sanders, Justin Jonson, Barry Heydenrych, Simon Smale, Natalie Holland, David Freudenberger, Anne Sparrow).

Back to Top

Action Plan:

- By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.
    - **Comment:** This is a broad objective that covers a range of actions required to improve the conservation management across all remaining native vegetation and the areas being restored in the long term. It may need to be broken down into more specific objectives relating to threats (ie include specific quantitative objectives for each of the threats) and/or to land tenures (including national parks and nature reserves).

- By 2015 restore at least 16000ha of native vegetation, including at least 2000ha of proteaceous-rich communities that support native insect, bird and other vertebrate pollinators.
    - **Comment:** Restoration can be undertaken by different groups and in different ways. Gondwana Link has developed restoration standards that give a 1 to 5 star rating for likely ecological outcomes from different restoration/revegetation efforts. As yet, there is insufficient spatial planning to identify where particular standards are required (and where lower standards need to be avoided). There needs to be clarification of the responsibilities for overall planning and raising of funds, and for individual groups in developing their organisational planning.

- 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
    - **Comment:** The creek systems are suffering from the general degradation of the catchments (hydrologically, and in terms of soil lost from cleared land and moved into creek systems), and from continued fragmentation and degradation of the riparian zones. Creekline assessments commenced in 2008 are establishing a baseline for condition and a means to identify areas where sedimentation and degradation are most significant (Corackerup catchment only as yet). Through a combination of strategic revegetation in riparian zones, broadscale restoration in catchments, and improved management of riparian zones, the resilience of the creeks can be improved.
      Bremer and Gairdner Rivers are longer term objectives for Gondwana Link, but Fitzgerald Biosphere Group have been working within the Bremer River and a longer term objective and strategy should be developed between the groups.

- By 2020 increase the populations of Tammar and Black-gloved Wallabies within the Fitz-Stirling area by 30%
    - **Comment:** Wallaby survey work has been attempting to establish a baseline habitat occupancy level so that changes can be detecting. So far, the likelihood of being able to reliably detect change appears small but survey work needs to continue while strategies for habitat restoration and predator control are implemented.

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

Targets

Focal Conservation Target	Target Type	Habitat Type
Creeks Target - 1	Single Species: Vascular plant	• Rivers, Streams, Creeks
Proteaceous rich communities Target - 2	Ecological System	• Shrubland :: Mediterranean-type Shrubby Vegetation
Tammars and Black-gloved Wallabies Target - 3	Species Assemblage: Animals: Mammals	• Shrubland :: Mediterranean-type Shrubby Vegetation
Mallet and moort woodlands Target - 4	Ecological System	
Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands Target - 5	Ecological System	• Forest • Riparian Areas
Fresh Water Systems Target - 6	Single Species: Vascular plant	• Wetlands :: Permanent Freshwater Marshes/Pools • Wetlands :: Seasonal/Intermittent Freshwater Marshes/Pools

Notes:

Target - 1 **Description**: Creeks and waterways are important natural corridors for fauna movement, have distinctive vegetation associations not found elsewhere in the landscape and are at risk because of altered hydrology and surface erosion. The river pools in particular are believed to be important habitats and an important drought refuge for fauna, but very little is actually known of their ecological values. Most creeks are believed to have disrupted flow patterns and are subject to loads of silt, sand, salt, nutrients and chemicals from agricultural land. Sand slugs are present in most systems and phyto-plankton blooms can occur (e.g. middle reaches of Corackerup Creek, June 2004, Peniup Creek December 2007). Six subcatchments have been identified in the Fitz-Stirling and initially we are concentrating on the Corackerup Creek and its tributaries. Corackerup Creek flows into the Pallinup River, which has the largest catchment of any river on the south coast of WA. The Corackerup system arises on the junction of two geological zones; the Archaean granites of the Yilgarn Block and the Phanerozoic marine deposits. Discussions with Ruhi Ferdowsian (Department of Agriculture and Food, Albany) indicate that the Corackerup System is predominantly associated with localised aquifers and as such the hydrological regime should be relatively responsive to remedial action within the subcatchments.

Target - 1 **Description Comment**: Corackerup subcatchment initially: Corackerup, Peniup, Hegarty, Chitowurup, Moorungup, Yarmalup, Culyerbullup, Cowerup, Chimney, Chereninup, Naunerup and Merrigup Creeks. Subsequently moving into Monjebup catchment: Monjebup, Moitch and Macmillan Creeks. Then Pallinup subcatchment: Pallinup River, possibly Dedatup, Ninterup and Nalyerlup Creeks Bremer: Bremer River and Devils Creek Gairdner: Gairdner River. NB Pallinup, Bremer, Devils Creek previously assessed by DoW Subcatchments 1-4 in the Fitz-Stirling together comprise approximately 37% of the total Pallinup catchment. Subcatchment 5 is approx 80% of the total Bremer catchment, while Subcatchment 6 (only partly defined by hydrological boundaries) is about 10% of the total Gairdner catchment.

Target - 2 **Description**: Proteaceous rich communities are of special significance as a structurally important component of the vegetation mosaic across the Fitz-Stirling. Their nectar and pollen production is thought to provide an important food source throughout the year, particularly during summer and autumn. These communities were amongst the most easily cleared areas during agricultural development: consequently only small areas remain and many of those remnants are subject to on-going disturbances. They are mostly found on deep sand and gravelly sand and are particularly susceptible to Phytophthora cinnamomi and a range of other disturbance agents, including fire, weeds and fertiliser drift. Communities mapped by Newbey include Banksia attenuata, B. baxteri and B. verticillata, Dryandra complex, Banksia heath and Sand associations. Other mapped associations, including Eucalyptus phaenophylla are likely to include areas that are also rich in proteaceous species. A Dryandra complex not mapped by Newbey occurs on the northern boundary of Chereninup. A precise definition of the term "Proteaceous rich communities" therefore needs to be developed and all occurences meeting the definition identified and mapped. (NB Process now underway to list Proteaceous communities of the South Coast region as a Threatened Ecological Community under Federal EPBC Act. Through the nomination process, a better definition and mapping of the community will be required - expected early 2011). Following from the April 2008 workshop, further consideration also needs to be given to the ecological functions and processes that we are attempting to capture through this target as it may be that it is the presence and pattern of distribution of proteaceous species throughout the landscape that is important.

Target - 3 **Description**: A number of the original mammal species have been lost from the Fitz-Stirling, while others are in a precarious position. Those whose position is precarious include medium weight range mammals (those between 35-5500g) that should be ubiquitous and visible and are important ecologically. Both fragmentation of habitats and introduced predator pressures are likely to be responsible for the declines in populations of these species. We chose tammar (Macropus eugenii) because they were recently abundant and widespread and are dependant on both suitable habitat and relative freedom from introduced predators. The black-gloved wallaby (Macropus irma) was also chosen as it appears to be in decline. If we can achieve strong tammar and black-gloved wallaby populations we believe we will also benefit species such as common brush-tailed possum (Trichosurus vulepecula vulpecular) and other critical weight range mammals and will be in a position to consider even more ambitious targets, such as the woylie (Bettongia penicillata), in the second decade of operation.

Target - 4 **Description**: Moort woodlands consist of more or less pure stands of Eucalyptus platypus subsp platypus, E platypus subsp congregata, E nutans or E vesiculosa (the locally endemic Corackerup Moort which occurs on Nowanup). These woodlands are generally found on hard, clayey soil but can occur on sandier soil, especially near the coast (outside the Fitz Stirling area). The occurrence of pure stands may be due to alleopathic effects or strong competition for water, or both. Mallet woodlands consist mainly of Eucalyptus astringens subsp redacta and occur on a variety of soils but are mostly found in association with the slopes of breakaways, hills and valley floors. They generally have a more diverse understorey than moort woodlands. The endemic mallet E melanophitra is also found within the Fitz Stirling, including on Nowanup and E arborella is found on Monjebup. These woodlands are included as a target because, being obligate seeders, they are particularly susceptible to inappropriate fire regimes. The other key ecological processes upon which they depend (e.g. water relations, litter accumulation and decomposition) are not well understood. The communities mapped by Newbey include Eucalyptus platypus (Common moort), and E. astringens (eastern brown mallet) and E. gardneri.

Target - 5 **Description**: Flat-topped yate is the only common large tree across the Fitz-Stirling and is a key component of a number of distinct woodland plant communities that are suffering significant stresses. Around Jerramungup and Needilup townsites the extensive yate woodlands that occurred high in the landscape have been largely cleared. The yate woodlands that grow along every significant watercourse north and east of the Pallinup River appear to be stressed, presumably by changed hydrological regimes and increasing salinity, although there appears to be an "unknown yate decline factor" operating that is causing crown decline across most of the region. Over the past 20 - 30 years yate woodlands across the region have suffered periodic and debilitating attacks of lerp insects which has contributed to extensive defoliation. There has been insufficient research carried out to determine the long term impacts, the likely recurrence of these attacks and their interaction with other stresses. While a significant and worthy target in themselves, yate woodlands are also possibly a significant barometer of the hydrological health of the landscape. Yates are also the main hollow providing trees in this landscape and so have a vital role in supporting the continued presence of species such as Carnaby's Cockatoos. Yates occur in three very different parts of the landscape: along creek lines, in and around wetlands (swamps) and in the upland granite country. The yate woodland associations that occur in each of these three landscape sites differ considerably in their species composition (for example, upper slope communities include Melaleuca, Acacia, Senna and pea species; swamp communities include Melaleuca species; and valley communities include samphire and Acacia species). The most widespread Yate community is the valley or riparian woodland. The target may need to be split to adequately address the other Yate community types, or separate indicators and indicator ratings developed for each type.

Target - 6 **Description**: Widespread small occurrences of fresh water, adjacent to creeks, in granite systems or clay pans are believed to play a critical role in the survival of many species, including some dragonflies, mammals, frogs and seed eating birds, as well as supporting aquatic plant and invertebrate species that do not tolerate salinity. It is possible that further surveys will suggest that this target could be re-defined as a more specific species or species assemblage. Until then, two small, resident, relatively immobile species of frog, Crinia pseudinsignifera and Pseudophryne guentheri, are potential indicators of the occurence of freshwater. Anecdotal observations suggest that frog populations have declined dramatically in the Fitz-Stirling over the past 20-25 years. They are known to be sensitive to increased salinity and detrimental effects such as decreased growth rates and increased mortality have been recorded at 4% seawater (1.5mg/l). There are also other potential causes of decline in frog populations that will need to be considerd, including the cumulative impacts of agricultural chemicals and the chytrid fungus..

Threats

Back to Top

Threat (*Common Taxonomy*) *	Targets Threatened
Fragmentation (Undefined :: Undefined)	• Creeks • Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands • Fresh Water Systems • Mallet and moort woodlands • Proteaceous rich communities • Tammars and Black-gloved Wallabies
Climate change (Undefined :: Undefined)	• Creeks • Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands • Fresh Water Systems • Mallet and moort woodlands • Proteaceous rich communities • Tammars and Black-gloved Wallabies
Inappropriate fire management (Natural System Modifications :: Fire & Fire Suppression)	• Creeks • Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands • Mallet and moort woodlands • Proteaceous rich communities • Tammars and Black-gloved Wallabies
P.cinnamoni and other pathogens (Invasive & Other Problematic Species & Genes :: Invasive Non-Native/Alien Species)	• Proteaceous rich communities • Fresh Water Systems
Predation by feral species (Invasive & Other Problematic Species & Genes :: Invasive Non-Native/Alien Species)	• Fresh Water Systems • Proteaceous rich communities • Tammars and Black-gloved Wallabies
Invasive Non-Native/Alien Species (weeds) (Invasive & Other Problematic Species & Genes :: Invasive Non-Native/Alien Species)	• Creeks • Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands • Fresh Water Systems • Proteaceous rich communities
Clearing-induced hydrological change (Natural System Modifications :: Other Ecosystem Modifications)	• Creeks • Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands • Fresh Water Systems
Unknown Yate decline factor (Undefined :: Undefined)	• Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands
Cropping practices (Agriculture & Aquaculture :: Annual & Perennial Non-Timber Crops)	• Creeks • Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands • Fresh Water Systems • Mallet and moort woodlands • Proteaceous rich communities
Grazing practices (Agriculture & Aquaculture :: Livestock Farming & Ranching)	• Creeks • Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands • Fresh Water Systems • Mallet and moort woodlands • Proteaceous rich communities
In stream barriers (Undefined :: Undefined)	• Creeks

Strategies

Strategy (*Common Taxonomy*)	Threats Addressed
Control feral animals across extant vegetation and restored habitat *Undefined :: Undefined*	• Predation by feral species
Develop and implement ecologically-informed fire management across Fitz-Stirling. *Undefined :: Undefined*	• Clearing-induced hydrological change • Fragmentation • Climate change
Develop and implement restoration plan for Fitz-Stirling *Undefined :: Undefined*	• Clearing-induced hydrological change • Fragmentation

Back to Top

Strategy (*Common Taxonomy*)	Threats Addressed
Develop restoration standards and protocols for implementation of restoration under "Gondwana Link" badge *Undefined :: Undefined*	• Fragmentation
Develop spatially explicit landscape plan that identifies key areas for implementation of all strategies. *Undefined :: Undefined*	• Clearing-induced hydrological change • P.cinnamoni and other pathogens • Predation by feral species • Fragmentation • Invasive Non-Native/Alien Species (weeds) • Inappropriate fire management • Unknown Yate decline factor
Improve our understanding of habitat requirements and population drivers *Undefined :: Undefined*	• Predation by feral species • Fragmentation • Inappropriate fire management • Climate change
Manage grazing in extant native vegetation and restored habitat *Undefined :: Undefined* • **Comment:** Responsibility and mechanisms need to be determined through development of coordination & implementation agreement.	• Grazing practices
Manage Phytophthora cinnamomi in extant native vegetation and restored habitat *Undefined :: Undefined* • **Comment:** Need to determine operational responsibilities as part of developing coordination & implementation model	• P.cinnamoni and other pathogens
Manage priority invasive weeds across extant vegetation and restored habitat *Undefined :: Undefined*	• Invasive Non-Native/Alien Species (weeds)
Manage properties owned by Gondwana Link groups to demonstrate effective conservation practices in the Fitz-Stirling. *Undefined :: Undefined*	• P.cinnamoni and other pathogens • Predation by feral species • Invasive Non-Native/Alien Species (weeds) • Inappropriate fire management
Reduce sediment and nutrient loads into creeks by rehabilitating erosion-prone parts of subcatchments and restoring riparian zones *Undefined :: Undefined*	• Clearing-induced hydrological change • Fragmentation • Invasive Non-Native/Alien Species (weeds) • Climate change
Revise and get endorsement for a protocol/MOU between groups on implementation of Fitz-Stirling strategies *Undefined :: Undefined*	• P.cinnamoni and other pathogens • Predation by feral species • Fragmentation • Invasive Non-Native/Alien Species (weeds) • Inappropriate fire management

Back to Top

Viability Summary

Conservation Targets		Landscape Context		Condition		Size		Viability Rank
		Grade	Weight	Grade	Weight	Grade	Weight	
1	Creeks	Fair	1.0	Fair	1.0	-	1.0	Fair
2	Proteaceous rich communities	Fair	1.0	Fair	1.0	Fair	1.0	Fair
3	Tammars and Black-gloved Wallabies	-	1.0	-	1.0	Fair	1.0	Fair
4	Mallet and moort woodlands	Fair	1.0	Good	1.0	Good	1.0	Good
5	Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands	-	1.0	Fair	1.0	Good	1.0	Good
6	Fresh Water Systems	Fair	1.0	Fair	1.0	Fair	1.0	Fair
Project Biodiversity Health Rank								Fair

Back to Top

Threat Summary

Project-specific Threats (Common Taxonomy *)	Creeks	Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands	Fresh Water Systems	Mallet and moort woodlands	Proteaceous rich communities	Tammars and Black-gloved Wallabies	Overall Threat Rank
Fragmentation (*Undefined*)	**Medium**	**High**	**Medium**	**Low**	**High**	**High**	**High**
Climate change (*Undefined*)	**Medium**	**High**	**Medium**	**High**	**High**	-	**High**
Inappropriate fire management (*Fire & Fire Suppression*)	**Low**	**Medium**	-	**High**	**High**	**High**	**High**
P.cinnamoni and other pathogens (*Invasive Non-Native/Alien Species*)	-	-	**Medium**	-	**Very High**	-	**High**
Predation by feral species (*Invasive Non-Native/Alien Species*)	-	-	**Low**	-	**Low**	**Very High**	**High**
Invasive Non-Native/Alien Species (weeds) (*Invasive Non-Native/Alien Species*)	**Medium**	**High**	**Low**	-	**Medium**	-	**Medium**
Clearing-induced hydrological change (*Other Ecosystem Modifications*)	**Medium**	**High**	**Medium**	-	-	-	**Medium**
Unknown Yate decline factor (*Undefined*)	-	**High**	-	-	-	-	**Medium**
Cropping practices (*Annual & Perennial Non-Timber Crops*)	**Low**	**Low**	**Medium**	**Medium**	**Medium**	-	**Medium**
Grazing practices (*Livestock Farming & Ranching*)	**Low**	**Medium**	**Medium**	**Low**	**Medium**	-	**Medium**
In stream barriers (*Undefined*)	**Low**	-	-	-	-	-	**Low**
Threat Status for Targets and Project	**Medium**	**High**	**Medium**	**High**	**Very High**	**High**	**Very High**

Back to Top

Action Plan

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

Comment: This is a broad objective that covers a range of actions required to improve the conservation management across all remaining native vegetation and the areas being restored in the long term. It may need to be broken down into more specific objectives relating to threats (ie include specific quantitative objectives for each of the threats) and/or to land tenures (including national parks and nature reserves).

Strategic Action: Develop spatially explicit landscape plan that identifies key areas for implementation of all strategies.

Progress	Updated	Comments
Planned	Oct 15, 2010	Overall plan still to be developed, but commenced with Simon Neville's work on identifying priority vegetated patches.

Action Step: Scope the spatial analysis (area, criteria, data requirements and availability)

Comment: NB Simon Neville's work has already developed a model for ranking existing vegetation blocks and provides the foundation for the larger model.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Identify and source funds to engage technical expertise to complete the analysis

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Prepare draft plan and link strategies to it; revise the FLP implementation plan

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Review the plan at least annually as part of wider review and evaluation of progress against objectives.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Strategic Action: Manage properties owned by Gondwana Link groups to demonstrate effective conservation practices in the Fitz-Stirling.

Progress	Updated	Comments
Major Issues	Nov 15, 2010	-

Action Step: Build and maintain regular communication with relevant parties (neighbours, DMAs, etc) including formal and informal methods.

Progress	Updated	Comments
Minor Issues	Nov 15, 2010	-

Action Step: Develop an agreed protocol for integrating FLP objectives and planning with property scale planning and management, including developing indicators as part of Gondwana Link reporting.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Develop and implement property plans for all properties

Progress	Updated	Comments
Major Issues	Nov 15, 2010	-

Back to Top

Strategic Action: Manage priority invasive weeds across extant vegetation and restored habitat

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Identify priority weeds from spatial analysis and assessment of trends

Comment: Tagasaste on Yarrabee an example of problems when priorities aren't followed through.

Progress	Updated	Comments
Major Issues	Oct 15, 2010	Tagasaste on Yarrabee and African Love Grass on Peniup getting worse.

Action Step: Identify other partners and programs to assist in implementation; source funds

Comment: Responsibility needs to be developed as part of implementation & coordination model for Fitz-Stirling

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Manage to a high standard on Gondwana Link group properties to demonstrate commitment

Progress	Updated	Comments
Major Issues	Nov 15, 2010	Poor record so far, especially managing Tagasaste on Yarrabee. African Lovegrass on Peniup also getting away?

Strategic Action: Manage Phytophthora cinnamomi in extant native vegetation and restored habitat

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: On properties owned by Gondwana Link groups, ensure highest standards of dieback management and hygiene are implemented and staff are trained in detection and prevention of spread.

Comment: Currently no dieback protocols in force.

Progress	Updated	Comments
Major Issues	Oct 15, 2010	-

Action Step: Incorporate dieback risk assessments into restoration planning; ensure proteaceous plantings are quarantined and in dieback-free soil.

Comment: Essential that this is considered early on in the planning and siting of restoration projects

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Maintain links with research and management groups working on Phytophthora, to ensure best knowledge is being used to inform management here.

Comment: Currently there is a well-run project operating in the area that is targeted private landowners as well as local governments and which has helped fund dieback assessments on two properties (Chereninup and Yarrabee). We need to support them and work with them.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Back to Top

Action Step: Support continuation of dieback mapping and assessment, with priority for areas of highest conservation value.

Comment: Currently there is a well-run project operating in the area that is targeted private landowners as well as local governments and which has helped fund dieback assessments on two properties (Chereninup and Yarrabee). We need to support them and work with them.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Strategic Action: Control feral animals across extant vegetation and restored habitat

Progress	Updated	Comments
On Track	Nov 15, 2010	Scoping of work required currently the subject of a BHA project using consultant ecologists to develop a proposal

Action Step: Scope and prepare cross-tenure control plan for ferals (foxes, cats, rabbits) across Fitz-Stirling

Progress	Updated	Comments
On Track	Oct 15, 2010	-

Action Step: Seek funding to implement plan

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Implement plan (with other landowners and managers)

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Develop and maintain monitoring and review process that can be linked with DEC and other (NRM?) monitoring programs

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Strategic Action: Manage grazing in extant native vegetation and restored habitat

Progress	Updated	Comments
Planned	Oct 15, 2010	Nb Although mostly still "planned", there has been some progress in control of rabbits on Gondwana Link group properties, and of kangaroos in restoration areas.

Action Step: Manage grazing in restoration: include kangaroo culling where appropriate, and rabbit baiting

Comment: Responsibility and methods to be determined as part of coordination & implementation model

Progress	Updated	Comments

On Track	Nov 15, 2010	Assessed as "on track" because rabbit baiting has occured on Gondwana Link properties (but needs to be maintained) and there has been some kangaroo culling in restoration areas. Farmers generally also maintaining these controls, but as yet no systematic assessment of level of threat due to livestock in unfenced native vegetation.

Action Step: Identify where it's an issue through spatial analysis.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Develop responses based on where the highest priorities are identified: if livestock are the cause, pursue fencing

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Objective: By 2015 restore at least 16000ha of native vegetation, including at least 2000ha of proteaceous-rich communities that support native insect, bird and other vertebrate pollinators.

Comment: Restoration can be undertaken by different groups and in different ways. Gondwana Link has developed restoration standards that give a 1 to 5 star rating for likely ecological outcomes from different restoration/revegetation efforts. As yet, there is insufficient spatial planning to identify where particular standards are required (and where lower standards need to be avoided). There needs to be clarification of the responsibilities for overall planning and raising of funds, and for individual groups in developing their organisational planning.

Strategic Action: Develop spatially explicit landscape plan that identifies key areas for implementation of all strategies.

Progress	Updated	Comments
Planned	Oct 15, 2010	Overall plan still to be developed, but commenced with Simon Neville's work on identifying priority vegetated patches.

Action Step: Scope the spatial analysis (area, criteria, data requirements and availability)

Comment: NB Simon Neville's work has already developed a model for ranking existing vegetation blocks and provides the foundation for the larger model.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Identify and source funds to engage technical expertise to complete the analysis

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Prepare draft plan and link strategies to it; revise the FLP implementation plan

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Review the plan at least annually as part of wider review and evaluation of progress against objectives.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Back to Top

Strategic Action: Develop and implement ecologically-informed fire management across Fitz-Stirling.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Build a reputation for responsible fire management on properties associated with Gondwana Link so that we have a voice worth listening to.

Progress	Updated	Comments
Major Issues	Oct 15, 2010	Minimal fire management capacity at present.

Action Step: Build relationship with DEC and other potential supporters (including NRM groups and researchers) to design a better approach

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Maintain good communication with Bush Fire Brigades, local governments and neighbours on plans and management of properties and participate in longer term fire management planning in the region.

Progress	Updated	Comments
Minor Issues	Oct 15, 2010	Issues relate to longer term planning, its coordination and communication of this between groups and with neighbours

Action Step: Pursue shared data bases (including spatial ones) that allow fire history and ecological values information to be widely and easily accessible.

Comment: Also want to pursue open access to information of fire management, including eg access for journalists to details of fire causes, management and follow up practices. Open up the accountability.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Strategic Action: Develop restoration standards and protocols for implementation of restoration under "Gondwana Link" badge

Progress	Updated	Comments
On Track	Nov 15, 2010	Version 1 produced August 2009; version 1.2 Nov 2010. Peer review and testing planned for Jan/Feb 2010.

Action Step: Restoration standards (version 1) produced

Progress	Updated	Comments
Completed	Oct 15, 2010	-

Action Step: Field tested and supporting publication submitted

Progress	Updated	Comments
On Track	Oct 15, 2010	-

Action Step: Develop protocol for application of the standards and use of the "Gondwana Link badge"

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Strategic Action: Develop and implement restoration plan for Fitz-Stirling

Progress	Updated	Comments

Back to Top

Planned	Nov 15, 2010	Three components: developing the integration and coordination; planning the funding campaigns, land acquisition and (spatial) restoration requirements; and implementing and managing the restoration.

Action Step: Clarify the relationships between GLL and different groups active or likely to be active in restoration actions in Fitz-Stirling.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Develop an implementation model that identifies strategic steps for funding, land access and restoration planning & implementation.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Restore habitat and target vegetation types to a high standard across Gondwana Link

Progress	Updated	Comments
Major Issues	Nov 15, 2010	Has commenced, but stalled. Major issues include coordination, funding, spatial planning and standards

Action Step: Monitor, evaluate and share learnings between groups and others

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Objective: 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

Comment: The creek systems are suffering from the general degradation of the catchments (hydrologically, and in terms of soil lost from cleared land and moved into creek systems), and from continued fragmentation and degradation of the riparian zones. Creekline assessments commenced in 2008 are establishing a baseline for condition and a means to identify areas where sedimentation and degradation are most significant (Corackerup catchment only as yet). Through a combination of strategic revegetation in riparian zones, broadscale restoration in catchments, and improved management of riparian zones, the resilience of the creeks can be improved.
Bremer and Gairdner Rivers are longer term objectives for Gondwana Link, but Fitzgerald Biosphere Group have been working within the Bremer River and a longer term objective and strategy should be developed between the groups.

Strategic Action: Develop spatially explicit landscape plan that identifies key areas for implementation of all strategies.

Progress	Updated	Comments
Planned	Oct 15, 2010	Overall plan still to be developed, but commenced with Simon Neville's work on identifying priority vegetated patches.

Action Step: Scope the spatial analysis (area, criteria, data requirements and availability)

Comment: NB Simon Neville's work has already developed a model for ranking existing vegetation blocks and provides the foundation for the larger model.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Identify and source funds to engage technical expertise to complete the analysis

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Back to Top

Action Step: Prepare draft plan and link strategies to it; revise the FLP implementation plan

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Review the plan at least annually as part of wider review and evaluation of progress against objectives.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Strategic Action: Manage grazing in extant native vegetation and restored habitat

Progress	Updated	Comments
Planned	Oct 15, 2010	Nb Although mostly still "planned", there has been some progress in control of rabbits on Gondwana Link group properties, and of kangaroos in restoration areas.

Action Step: Manage grazing in restoration: include kangaroo culling where appropriate, and rabbit baiting

Comment: Responsibility and methods to be determined as part of coordination & implementation model

Progress	Updated	Comments
On Track	Nov 15, 2010	Assessed as "on track" because rabbit baiting has occured on Gondwana Link properties (but needs to be maintained) and there has been some kangaroo culling in restoration areas. Farmers generally also maintaining these controls, but as yet no systematic assessment of level of threat due to livestock in unfenced native vegetation.

Action Step: Identify where it's an issue through spatial analysis.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Develop responses based on where the highest priorities are identified: if livestock are the cause, pursue fencing

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Strategic Action: Manage priority invasive weeds across extant vegetation and restored habitat

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Identify priority weeds from spatial analysis and assessment of trends

Comment: Tagasaste on Yarrabee an example of problems when priorities aren't followed through.

Progress	Updated	Comments
Major Issues	Oct 15, 2010	Tagasaste on Yarrabee and African Love Grass on Peniup getting worse.

Back to Top

Action Step: Identify other partners and programs to assist in implementation; source funds

Comment: Responsibility needs to be developed as part of implementation & coordination model for Fitz-Stirling

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Manage to a high standard on Gondwana Link group properties to demonstrate commitment

Progress	Updated	Comments
Major Issues	Nov 15, 2010	Poor record so far, especially managing Tagasaste on Yarrabee. African Lovegrass on Peniup also getting away?

Strategic Action: Reduce sediment and nutrient loads into creeks by rehabilitating erosion-prone parts of subcatchments and restoring riparian zones

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Source funds and develop implementation strategy.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Use spatial analysis and creek assessment results to identify sediment sources and riparian areas needing rehabilitation.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Develop options for management with other programs (eg through Department of Water, Dept of Agriculture and NRM groups). Identify priorities for action.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Establish programs that address sources of sediment on farm-land and prioritise areas for inclusion in restoration program.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Objective: By 2020 increase the populations of Tammar and Black-gloved Wallabies within the Fitz-Stirling area by 30%

Comment: Wallaby survey work has been attempting to establish a baseline habitat occupancy level so that changes can be detecting. So far, the likelihood of being able to reliably detect change appears small but survey work needs to continue while strategies for habitat restoration and predator control are implemented.

Strategic Action: Develop spatially explicit landscape plan that identifies key areas for implementation of all strategies.

Progress	Updated	Comments
Planned	Oct 15, 2010	Overall plan still to be developed, but commenced with Simon Neville's work on identifying priority vegetated patches.

Action Step: Scope the spatial analysis (area, criteria, data requirements and availability)

Comment: NB Simon Neville's work has already developed a model for ranking existing vegetation blocks and provides the foundation for the larger model.

Back to Top

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Identify and source funds to engage technical expertise to complete the analysis

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Prepare draft plan and link strategies to it; revise the FLP implementation plan

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Review the plan at least annually as part of wider review and evaluation of progress against objectives.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Strategic Action: Control feral animals across extant vegetation and restored habitat

Progress	Updated	Comments
On Track	Nov 15, 2010	Scoping of work required currently the subject of a BHA project using consultant ecologists to develop a proposal

Action Step: Scope and prepare cross-tenure control plan for ferals (foxes, cats, rabbits) across Fitz-Stirling

Progress	Updated	Comments
On Track	Oct 15, 2010	-

Action Step: Seek funding to implement plan

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Implement plan (with other landowners and managers)

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Develop and maintain monitoring and review process that can be linked with DEC and other (NRM?) monitoring programs

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Strategic Action: Improve our understanding of habitat requirements and population drivers

Progress	Updated	Comments
Planned	Nov 15, 2010	Probably on track for wallabies but with some issues (funding, coordination with other knowledge needs, integration into a workplan etc)

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

Strategic Action: Develop and implement ecologically-informed fire management across Fitz-Stirling.

Progress	Updated	Comments

Back to Top

Planned	Nov 15, 2010	-

Action Step: Build a reputation for responsible fire management on properties associated with Gondwana Link so that we have a voice worth listening to.

Progress	Updated	Comments
Major Issues	Oct 15, 2010	Minimal fire management capacity at present.

Action Step: Build relationship with DEC and other potential supporters (including NRM groups and researchers) to design a better approach

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Maintain good communication with Bush Fire Brigades, local governments and neighbours on plans and management of properties and participate in longer term fire management planning in the region.

Progress	Updated	Comments
Minor Issues	Oct 15, 2010	Issues relate to longer term planning, its coordination and communication of this between groups and with neighbours

Action Step: Pursue shared data bases (including spatial ones) that allow fire history and ecological values information to be widely and easily accessible.

Comment: Also want to pursue open access to information of fire management, including eg access for journalists to details of fire causes, management and follow up practices. Open up the accountability.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Strategic Action: Develop and implement restoration plan for Fitz-Stirling

Progress	Updated	Comments
Planned	Nov 15, 2010	Three components: developing the integration and coordination; planning the funding campaigns, land acquisition and (spatial) restoration requirements; and implementing and managing the restoration.

Action Step: Clarify the relationships between GLL and different groups active or likely to be active in restoration actions in Fitz-Stirling.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Develop an implementation model that identifies strategic steps for funding, land access and restoration planning & implementation.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Restore habitat and target vegetation types to a high standard across Gondwana Link

Progress	Updated	Comments
Major Issues	Nov 15, 2010	Has commenced, but stalled. Major issues include coordination, funding, spatial planning and standards

Action Step: Monitor, evaluate and share learnings between groups and others

Progress	Updated	Comments

Back to Top

Planned	Nov 15, 2010	-

Strategic Action: Develop spatially explicit landscape plan that identifies key areas for implementation of all strategies.

Progress	Updated	Comments
Planned	Oct 15, 2010	Overall plan still to be developed, but commenced with Simon Neville's work on identifying priority vegetated patches.

Action Step: Scope the spatial analysis (area, criteria, data requirements and availability)

Comment: NB Simon Neville's work has already developed a model for ranking existing vegetation blocks and provides the foundation for the larger model.

Progress	Updated	Comments
Planned	Oct 15, 2010	-

Action Step: Identify and source funds to engage technical expertise to complete the analysis

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Prepare draft plan and link strategies to it; revise the FLP implementation plan

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Action Step: Review the plan at least annually as part of wider review and evaluation of progress against objectives.

Progress	Updated	Comments
Planned	Nov 15, 2010	-

Strategic Action: Revise and get endorsement for a protocol/MOU between groups on implementation of Fitz-Stirling strategies

Progress	Updated	Comments
Major Issues	Nov 15, 2010	Previously attempted to do this but had very limited commitment from groups to make it happen.

Back to Top

All Monitoring Indicators

Methods	Objectives	Key Indicator References by Target (w/Current Indicator Measurement)	Threat References by Target (w/Current Indicator Measurement)
Indicator: **% of pre-European extent**			
• Produce map using remote sensing using Newbey veg mapping as pre European baseline and on ground record of areas revegetated.	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area. • By 2015 restore at least 16000ha of native vegetation, including at least 2000ha of proteaceous-rich communities that support native insect, bird and other vertebrate pollinators.	**Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands** • Size: Community size **Mallet and moort woodlands** • Size: Community size **Proteaceous rich communities** • Size: Community size	
Indicator: **Age classes present**			
• Assessment of age classes present at designated sites (Based on Michelle Carey's methodology)	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.	**Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands** • Condition: Recruitment	
Indicator: **Area extent of individual patches**			
-	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area. • By 2015 restore at least 16000ha of native vegetation, including at least 2000ha of proteaceous-rich communities that support native insect, bird and other vertebrate pollinators.	**Proteaceous rich communities** • Size: Patch size	
Indicator: **Area of native vegetation excluded from stock grazing**			
-	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.		
Indicator: **Area subject to Phytophthora cinnamomi management plans or protocols**			
-	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.		
Indicator: **Area under conservation covenants or with conservation reserve status**			
-	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.		
Indicator: **Cat and fox populations**			
-	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.		**Tammars and Black-gloved Wallabies** • Predation by feral species
Indicator: **Condition of soils and organic matter**			

Back to Top

Methods	Objectives	Key Indicator References by Target (w/Current Indicator Measurement)	Threat References by Target (w/Current Indicator Measurement)
• Measure litter density and depth (need to develop sampling design)	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.	**Mallet and moort woodlands** • Condition: Soil and litter dynamics	
Indicator: **crown condition**			
-	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.	**Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands** • Condition: Community Condition **Mallet and moort woodlands** • Condition: Community Condition	
Indicator: **Density of bird pollinators**			
• Bird counts (standardised methods)	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.	**Proteaceous rich communities** • Condition: Pollination	
Indicator: **Distribution across fire age classes**			
• Fire history mapping (based on Vegmachine and aerial photo interpretation) and vegetation association mapping (based on Ken Newbey mapping and additional aerial photo interpretation for Moort woodlands).	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.	**Mallet and moort woodlands** • Landscape Context: Fire frequency **Proteaceous rich communities** • Landscape Context: Fire frequency	**Mallet and moort woodlands** • Inappropriate fire management **Proteaceous rich communities** • Inappropriate fire management **Tammars and Black-gloved Wallabies** • Inappropriate fire management
Indicator: **Environmental Index**			
• Stream Condition Indicator to be developed from Penn-Scott with additional parameters (instream + vegetation/habitat condition). Angela to determine rating levels.	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area. • By 2015 restore at least 16000ha of native vegetation, including at least 2000ha 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	**Creeks** • Condition: Stream condition	
Indicator: **Level of occupancy**			
• Mapping historic and recent sightings; identifying habitat characteristics at sightings points; surveying additional areas with similar characteristics for presence/absence	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area. • By 2020 increase the populations of Tammar and Black-gloved Wallabies within the Fitz-Stirling area by 30%	**Tammars and Black-gloved Wallabies** • Size: Wallaby abundance	
Indicator: **Number and area covered by effective partnership arrangements being implemented to abate specified threats**			
-	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.		**Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands** • Inappropriate fire management
Indicator: **Number and extent of invasions of specified weed species**			

Back to Top

Methods	Objectives	Key Indicator References by Target (w/Current Indicator Measurement)	Threat References by Target (w/Current Indicator Measurement)
-	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.		
Indicator: **Number and extent of known Phytophthora cinnamomi infestations**			
-	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.		
Indicator: **Numbers of seeds stored on plants or in soil**			
• Incorporate in Habitat Hectares approach	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.	**Proteaceous rich communities** • Condition: Seed storage	
Indicator: **Occurence and distribution of small-scale freshwater bodies**			
• TBD: combination of survey observations, Blue Pits analysis, Frog call surveys	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area. • 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	**Fresh Water Systems** • Landscape Context: Availability of freshwater in the landscape	
Indicator: **percentage of catchment with perennial veg cover**			
• GIS based on extent of perennial vegetation (datasets obtained through Land Monitor)	• By 2015 restore at least 16000ha of native vegetation, including at least 2000ha 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	**Creeks** • Landscape Context: Catchment hydrology	
Indicator: **Physical, chemical and biological Ausrivas indices**			
• Standard monitoring River Health program methods (macroinvertebrates and water quality parameters); initial years will be to build baseline; ratings to be developed in consultation with CENRM to reflect south coast rivers (rather than national, state Ausrivas criteria)	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.	**Fresh Water Systems** • Condition: Water quality	
Indicator: **Physical, chemical and biological indices TBD**			
• Standard monitoring River Health program methods (macroinvertebrates and water quality parameters); initial years will be to build baseline; ratings to be developed in consultation with CENRM to reflect south coast rivers (rather than national, state Ausrivas criteria)	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area. • 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	**Creeks** • Condition: Water quality	
Indicator: **Pools affected by sedimentation**			

Back to Top

Methods	Objectives	Key Indicator References by Target (w/Current Indicator Measurement)	Threat References by Target (w/Current Indicator Measurement)
• Identify pools from Blue Pits layer in Vegmachine and compare with most recent aerial photos. Pools >100m to be chosen (allows for 25m pixel resolution of Vegmachine). Ground truthing required - combine with creek assessment. Measure will be % or total number of pools either filled or affected by sedimentation. Rating to be developed for each creek identified for assessment.	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area. • 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	**Creeks** • Condition: Permanent pools	
Indicator: **Species richness**			
• For Yate, based on adaptation of Michelle's Species richness surveys (flora and fauna, including macroinvertebrates)	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area. • 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	**Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands** • Condition: Community Condition **Fresh Water Systems** • Size: Population of dependent species	
Indicator: **Species richness and composition**			
• Based on modified Habitat Hectares approach. Use 40m x 40m quadrats and assess species richness, % cover, lifeforms, structure, weeds, litter. Include one off soil profile description.	• By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.	**Proteaceous rich communities** • Condition: Community Condition	

Back to Top

Project Resources

Categories & Measures	Score
People	
Staff Leadership	**Medium**
Multidisciplinary Team	**Medium**
People Average	**Medium**
Internal Resources	
Institutional Learning	**Medium**
Funding	**Medium**
Internal Resources Average	**Medium**
External Resources	
Social/Legal Framework for Conservation	**High**
Community and Constituency Support	**High**
External Resources Average	**High**
Overall Project Resource Rank	**Medium**

Back to Top

Assessment of Target Viability

Conservation Target	Key Attribute (Category)	Indicator	Current Indicator Measurement	Rating Comments: (Poor, Fair Good Very Good)	Current Rating and Date	Desired Rating and Date
Creeks	Permanent pools [1] (Condition)	Pools affected by sedimentation [2]	TBD - likely to vary from poor to good within micro catchments. Status will need to be established by subcatchment.	**Poor:** Pools lost through sedimentation; others being affected **Fair:** All or most pools affected by sedimentation **Good:** Some pools affected by sedimentation **Very Good:** No "unnatural" sedimentation of pools	Fair [3] *Feb 15, 2008*	Good [4]
Creeks	Stream condition [5] (Condition)	Environmental Index [6]	20% of Corackerup Ck system assessed; 86% rated at VG, 13% G. Other 80% assessed from aerial photos 48% VG, 30% G, 19% F, 3% P. Most surveys have been in NRs, bush onGL properties or other Pub land.	**Poor:** 2-31 **Fair:** 32-44 **Good:** 45-59 **Very Good:** 60-65	Good [7] *Apr 15, 2007*	Very Good [8]
Creeks	Water quality [9] (Condition)	Physical, chemical and biological indices TBD [10]	TBD: Ratings to be determined with CENRM and Department of Water to ensure consistency with wider south coast databases	**Poor:** tbd **Fair:** tbd **Good:** tbd **Very Good:** tbd	Fair [11] *Feb 15, 2008*	Good [12]
Creeks	Catchment hydrology [13] (Landscape Context)	percentage of catchment with perennial veg cover [14]	26.7% (Fair) (Based on 6 subcatchments - individual subcatchments vary from poor - good)	**Poor:** <20% **Fair:** 20%-50% **Good:** 51%-80% **Very Good:** >80%	Fair [15] *Apr 15, 2007*	Good [16]
Proteaceous rich communities	Community Condition [17] (Condition)	Species richness and composition [18]	-	**Poor:** tbd **Fair:** tbd **Good:** tbd **Very Good:** tbd	Fair *Oct 15, 2010*	Good
Proteaceous rich communities	Pollination [19] (Condition)	Density of bird pollinators [20]	-	**Poor:** tbd **Fair:** tbd **Good:** tbd **Very Good:** tbd	Fair *Oct 15, 2010*	Good
Proteaceous rich communities	Seed storage [21] (Condition)	Numbers of seeds stored on plants or in soil [22]	TBD	**Poor:** Little / no seed stored on plants or in soil **Fair:** tbd **Good:** tbd **Very Good:** Sufficient	Fair *Oct 15, 2010*	Good
Proteaceous rich communities	Fire frequency [23] (Landscape Context)	Distribution across fire age classes [24]	-	**Poor:** most of total community/ies extent is within the same fire age class **Fair:** tbd **Good:** tbd **Very Good:** total community has an even distribution across the defined fire age classes	Fair [25] *Oct 15, 2010*	Good
Proteaceous rich communities	Community size [26] (Size)	% of pre-European extent [27]	16% = Fair	**Poor:** 0-10% **Fair:** 10-30% **Good:** 30-70% **Very Good:** >70%	Fair [28]	Good
Proteaceous rich communities	Patch size [29] (Size)	Area extent of individual patches [30]	TBD. Likely to be poor - fair	**Poor:** TBD **Fair:** TBD **Good:** TBD **Very Good:** TBD	Fair [31]	Good

Back to Top

Conservation Target	Key Attribute (Category)	Indicator	Current Indicator Measurement	Rating Comments: (Poor, Fair Good Very Good)	Current Rating and Date	Desired Rating and Date
Tammars and Black-gloved Wallabies	Wallaby abundance [32] (Size)	Level of occupancy [33]	TBD. Believed to be poor (Tammars) to Fair (Black gloved).	**Poor:** Target animals are absent from most or all habitats surveyed. **Fair:** Target animals are found occasionally in some habitats but their distribution is contracted **Good:** Target animals are found in numerous habitats. **Very Good:** Target animals are regularly found in most habitats.	Fair [34]	Good [35]
Mallet and moort woodlands	Community Condition [36] (Condition)	crown condition [37]	Expect this to be good-very good	**Poor:** tbd **Fair:** tbd **Good:** tbd **Very Good:** tbd	Good [38]	Very Good
Mallet and moort woodlands	Soil and litter dynamics [39] (Condition)	Condition of soils and organic matter [40]	Unknown. Further work required to determine parameters and their significance.	**Poor:** tbd **Fair:** tbd **Good:** tbd **Very Good:** tbd	Good [41]	Very Good
Mallet and moort woodlands	Fire frequency [42] (Landscape Context)	Distribution across fire age classes [43]	TBD	**Poor:** TBD **Fair:** TBD **Good:** - **Very Good:** TBD	Fair	Good [44]
Mallet and moort woodlands	Community size [45] (Size)	% of pre-European extent [46]	43% = Good (Based on 6 subcatchments for which we have Newbey mapping)	**Poor:** 0-10% **Fair:** 10-30% **Good:** 30-70% **Very Good:** >70%	Good [47]	Very Good
Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands	Community Condition [48] (Condition)	Species richness [49]	TBD for different community types	**Poor:** 11-18spp **Fair:** 19-26spp **Good:** 27-34spp **Very Good:** 35-40spp	Fair	Good
Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands	Community Condition [50] (Condition)	crown condition [51]	TBD for different community types	**Poor:** C4 or 5 **Fair:** C3 **Good:** C2 **Very Good:** C1	Fair	Good
Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands	Recruitment [52] (Condition)	Age classes present [53]	TBD	**Poor:** Class D only **Fair:** Class C and D **Good:** - **Very Good:** All age classes present	Fair	Good
Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands	Community size [54] (Size)	% of pre-European extent [55]	49.6% (all Yate community types) = Good	**Poor:** 0-10% **Fair:** 10-30% **Good:** 30-70% **Very Good:** >70%	Good [56]	Very Good
Fresh Water Systems	Water quality [57] (Condition)	Physical, chemical and biological Ausrivas indices [58]	TBD	**Poor:** tbd **Fair:** tbd **Good:** tbd **Very Good:** tbd	Fair [59]	Good [60]
Fresh Water Systems	Availability of freshwater in the landscape [61] (Landscape Context)	Occurence and distribution of small-scale freshwater bodies [62]	TBD	**Poor:** tbd **Fair:** tbd **Good:** tbd **Very Good:** tbd	Fair	Good
Fresh Water Systems	Population of dependent species [63] (Size)	Species richness [64]	-	**Poor:** tbd **Fair:** tbd **Good:** tbd **Very Good:** tbd	Fair *Oct 15, 2010*	Good [65]

COMMENTS:

1. Permanent pools provide habitat for fish, invertebrates and aquatic and terrestrial plants in the Fitz-Stirling's creeks and function as refugia for many species during summer and dry seasons, although the extent of their ecological functions and values is not fully understood. These permanent pools are vulnerable to both sedimentation and physico-chemical changes in water quality, and in very degraded sections some pools have disappeared entirely after filling with sand. It appears that much of the sandy sediment may have entered the creek systems during major rainfall events in the past (eg in the 1950s and 1980s). These "sand slugs" are now relatively stable as they have been colonised by shrubs (mainly Acacia saligna), grasses and chenopods. These slugs may not move any further

downstream unless there is further disturbance or major flooding before they are fully stabilised. There is also evidence of more recent and continuing movement of sediments into creeklines at sites where a combination of overstocking and cropping practices which deplete soil cover and reduced extent of riparian vegetation occurs. Identifying the sources of the sediments and its movement will assist in the management of the creeks by pinpointing priority areas for restoration works. (Prosser & Karsssies 2001) (Wilkinson et al 2004)

2. Initially, we considered measuring the sediment movement along several creek systems and monitoring a number of parameters such as pool depth, length etc. This is currently impractical for us, but should be considered in the portfolio of future research/investigations projects we would like to support. We have chosen instead to look at the change that has occurred, initially within the Corackerup subcatchment, to determine the extent of loss of habitat and, presumably, ecological function. In addition, we will do more detailed monitoring at one or more specific locations (eg on the Peniup Creek/Corner Farm property where surface erosion is affecting both Peniup and Hegarty Creek). Previous pool locations will be determined from an analysis of aerial photos, the "Blue Pits" layer from Vegmachine (this may indicate where pools would have been expected to occur but have been filled through sedimentation, although the spatial resolution and derivation of the layer imposes limits on the reliability of this method), and on site investigations. The indicator ratings will be reviewed once the initial surveys in the Corackerup subcatchment have been completed. Confidence of these indicator rating descriptions: Low

3. Estimating that the rating may only be "Fair" across the 6 subcatchments, although for Corackerup it is more likely to be "Good" (although there are a number of creeks in the upper catchment that are almost totally degraded, most of the middle and lower reaches where the pools occur are in reasonable condition). Confidence of the current rating: Low

4. TBD. Desired rating may not differ from current. Objective will be to ensure no further loss of pools. In very long term, restoration of some pools may be contemplated.

5. Pen-Scott method of assessing riparian vegetation and stream condition has been used succesfully on many south coast rivers. (Jansen et al 2003) (Price & Lovett (1999)) (Lovett & Price (1999)) (W & R Comm (1999)) (W & R Comm 2000) (W & R Comm 2002) (W & R Comm 2002) We are using as a "Stream Condition Index" a modification from Pen-Scott that incorporates Foreshore Condition Assessments (predomainantly reflects weeds and ersosion, ranked as A-D) with "Environmental Condition" (which incorporates Floodway and Bank vegetation, verge vegetation, stream cover, bank stability and erosion and in-stream habitat diversity. A combined numerical score is thus assigned to each length of creek.

6. Based on Penn-Scott methodologies, modified to provide one numeric score derived from assessments of several parameters (see Monitoring Methodology) and four rankings. Confidence of these indicator rating descriptions: High

7. Baseline surveys (2007/2009) Confidence of the current rating: High

8. Increase of overall condition rating by one rank (To be confirmed once the initail baseline is developed)

9. Water quality within the waterways of the south coast of WA has not been extensively studied or regularly monitored (with the exception of quarterly monitoring of the central south coast estuaries since 1991 and some flow gauging and salinity measurements on the Pallinup River at Bull Crossing). The Pallinup, Bremer and Gairdner Rivers were identified as among those at highest risk of nutrient enrichment (SCRIPT 2004) with all three of their estuaries (Beaufort, Wellstead and Gordon respectively) already showing signs of eutrophication. The AusRivAS program undertook nation-wide sampling and developed a model to predict macroinvertebrate communities that should occur in the absence of impacts (and therefore also developed an indicator of river health based on observed vs expected communities present). In 2006, the Department of Water commenced a project with CENRM to apply the same methodology across 29 river systems on the south coast to develop a more specific set of reference points for this region. We have therefore decided to use the same indicators and methodologies and to work closely with this project so that we are in a better position to interpret results and so that we can contribute to wider national and south coast datasets in future. (Bailey et al 2002) (Halse et al 2002b) (Halse et al 2002) (ANZECC & ARMCANZ 2000)

10. The ratings need to be established for south coast systems, rather than using national or state wide systems. This will be done through the current DoW/CENRM project. Confidence of these indicator rating descriptions: Low

11. To be developed as baseline dataset during first five years of monitoring. Confidence of the current rating: Low

12. TBD following evaluation of survey information and in association with DoW and CENRM

13. There are extensive references correlating hydrological function and catchment "health" to the area of the catchment covered by native perennial vegetation. There is however very little data to demonstrate the quantitive relationship between catchment clearing and hydrological function, and even less data to show relationships between hydrological functions (eg streamflow, runoff) with channel morphology or ecological functions for any of the waterways in the south coast catchments east of Albany. In the absence of any reliable quantitiative data on which to base threshold indicator levels, we have set the lower and upper thresholds at 20% and 80% of catchment clearing. These coincide with the levels used in the Water Resources Background Paper to the South Coast Regional Strategy for NRM (2004) to identify rivers at high risk of salinisation and nutrient pollution, and "near pristine" rivers respectively. The intermediate threshold of 50% vegetation cover is merely a midpoint and should be used cautiously. While the % of catchment vegetated will be used as an indicator, we will also need to do some calibration of catchment cover vs groundwater hydrology so that we are able to verify our assumptions. Direct groundwater level monitoring will be required. (Lillicrap 2004) (Rutherford et al 2000) (Water & Rivers Commission 2002) (NLWRA 2002) (SCRIPT 2004)

14. See Rationale (previous step). Current (2007) % of catchments vegetated is: Pallinup Bull Crossing 25% Pallinup Confluence 65% Monjebup 32% Corackerup 33% Bremer 13% West Gairdner 30% Confidence of these indicator rating descriptions: Medium

15. Based on the datasets Remnant Vegetation (supplied 2007?) by Damian Shepherd Dept of Agriculture and subcatchment boundaries supplied by Dept of Water (2006) Confidence of the current rating: High

16. Desired ratings in all cases are one rating above current until better information suggests otherwise.

17. Proteaceous communities are susceptible to a range of threats including Phytophthora cinnamomi, weed invasion, spray and nutrient drift, inappropriate fire regimes and clearing.These disturbances can result in a highly altered floristic composition. The patches of proteaceous-rich communities that have been identified within the Fitz-Stirling so far and which are relatively undisturbed also exhibit significant variation in species composition, so the use of reference or benchmark sites may be inappropriate for these communities.Further testing of the use of species richness and composition as indicators of condition in disturbed communities is therefore required.

18. Need to be developed. Poor: Highly altered floristic composition: high proportion of introduced species, low native species diversity due to previous disturbance. (Community deviates significantly from benchmark). Good: There may be some "minor" alteration of species richness or composition (The

community deviates from the benchmark but is assumed to be functioning within its normal parameters). Very Good: High species richness with few or no introduced species (Benchmark conditions) Confidence of these indicator rating descriptions: Low

19. A representative suite of pollinators is important to produce viable seed and to maintain gene flow within and between plant populations. The original (pre-disturbance) distribution of these communities is believed to have been relatively small and scattered patches within a matrix of other plant communities. For the proteaceous patches to have survived it is assumed that adequate pollination occurred within and/or between patches. Proteaceous species are mainly populated by birds and mammals (except Conospermum species which seem to have a fairly specific relationship with certain colletid bees (Houston 1989). Many proteaceous species are visited by more than one pollinator with some local Banksia species attracting as many as six species of honeyeater, three species of mammal as well as native bees and wasps. A total of 13 species of honeyeater and seven species of mammal that have been recorded as pollinating local flora species can be found within the Fitz-Stirling. All the honeyeaters are wide ranging and move large distances in search of nectar. In contrast mammal pollinators are sedentary, less mobile and are more difficult to census. The density of bird pollinators has therefore been chosen as the indicator for this attribute, and the "bird minutes" method of sampling will be used (Gilmore in prep). Little is known of invertebrate pollinators within the Fitz-Stirling and further information about pollinator dependencies and specificities are urgently required. Additional indicators, such as invertebrate densities, may need to be included.

20. Will need to determine a bird pollinators /ha rating for different conditions. Base methodology on Sandy Gilmore's Bird Minutes method - so in fact all bird species will be monitored.

21. Pollination is vital to seed set which but subsequent seed storage can also be influenced by a range of other factors such as seed attrition from pre-fire release, abortion, decay, granivory and senescence. Refer to David Paton's work. Seed storage is a factor of a number of parameters including fire, population size, pollination success, destruction by insects and birds, etc. Likely to be also affected by climate change? (Witkowski et al 1991)

22. Need to discuss with Peter Luscombe. May need to be separate indicator ratings for different species. We may choose a subset of species for determination of ratings (eg choose across resprouters, transient seed banks, etc) and different pollinator reliances.

23. Many of the species within these communities have very specific fire requirements (e.g. resprouters, transient seed bank, exclusive pyrogenic reproduction) and need a sufficient inter-fire period to ensure continued populations. The species composition would therefore be expected to vary depending on fire history, and the "optimal" fire regime potentially differing between species within each community. Determining the specific fire regime that is optimal for maintenance of the community across the Fitz-Stirling area is likely to be complex and more input from botanists and fire ecologists will be required to refine the indicator. These communities generally occur in relatively small and widely distributed patches. Analysis of their distribution against the fire history for the area will allow the "fire age" for each patch to be identified. The initial indicator will then be the proprtion of the total community extent within (possibly four) defined fire age classes.

24. We don't have adequate knowledge of what are the optimal distributions of fire ages across the different communities that make up this target. Assessments of condition, florisitic composition and fire histories will help to determine what the ratings should be. Neil Burrows' database should also assist in this. Confidence of these indicator rating descriptions: Low

25. Fire history presently being mapped. Proteaceous communities still to be mapped.

26. Based on remnant vegetation extent and Newbey vegetation association mapping, using Banksia attenuata, B baxteri, B verticillata, Dryandra complex, Banksia heath, Sand. We will also include E decipiens subsp adesmophloia. Several of the other mallee heath associations that Newbey mapped include patches of communities that are rich in proteaceous species, while some of the Newbey associations we are using (eg Sand) include significant areas of myrtaceous rather than proteaceous heaths. We will need to identify the remaining patches first, then compare with Newbey and with soil mapping to determine whether we are likely to be able to make a reliable estimate of "pre-European extent". Given the variability exhibited between patches, we also need to consider whether total extent is very meaningful or whether the patch size attribute is more significant. We are yet to determine whether alternative mapping eg using radiometrics, will help to identify the well drained sands or sands over gravel that are characteristically rich in proteaceous species.

27. Indicator ratings are generally based on the levels used in assessment of native vegetation status by ANZECC (2000) and EPA (2000) and described by Shepherd et al (2001): "From a purely biodiversity perspective and taking no account of any other land degradation issues, there are several key criteria now being applied where clearing is still occurring: - The threshold level below which species loss occurs appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30% of the pre-clearing extent of the vegetation type; - A level of 10% of the original extent is regarded as being a level representing "endangered" (EPA 2000). We have included an additional threshold of 70% between the "good" and "very good" ratings but this has not been substantiated. Better understanding of the systems may lead us to lift the 10% and 30% thresholds for these systems. It is also possible that comparisons with pre-clearinf extents may be irrelevant in a fragmented landscape and that proportional representation of proteaceous communities should be higher to maintain ecological (including genetic) processes to be maintained. (ANZECC & ARMCANZ 2000) Confidence of these indicator rating descriptions: Low

28. Based on Newbey mapping of the Newbey associations previously identified (B attenuata, B verticillata, B baxteri, Dryandra complex, Sand, E phaenophylla subsp adesmophloia). NB Doesn't cover western 3/4 of Pallinup-Bull Crossing catchment.

29. Some of the patches of proteaceous rich communities that have been identified to date are extremely small remnants surviving on roadsides or in other isolated stands. Both the size of these remnants and their distribution across the landscape are likely to affect their viability as they are exposed to a range of threats (dieback, weed infestation, fire, road and track widening) and some species are possibly subject to decreasing cross-pollination. Unitl we have identified and surveyed the remaining patches, the indicator will be simply the size of the individual patches. Subsequent review may also lead to including a distance or separation indicator, or including population size indicators for individual species.

30. Initial need is to identify and survey the remaining remanants; then develop indicator ratings. Confidence of these indicator rating descriptions: Low

31. Observations to date.

32. In the absence of major disturbances, Tammar and Black-gloved wallabies should occur within any suitable habitat across the Fitz-Stirling area. Both species require low, dense vegetation for shelter and more open areas for foraging, with tammar utilising grassy areas including paddocks. The Black-gloved wallaby forages in bushland and is not usually seen far from cover. Tammars tend to be "group territorial" with individuals within a group having overlapping home ranges, whereas Black-gloved wallabies tend to be more solitary although there may still be some overlap in their home ranges. We currently have very limited knowledge of population levels or their distribution across the Fitz Stirling area although some survey work commenced in 2007. Determining population sizes with limited survey resources and for animals with such low population densities is very difficult however. An alternative approach is to consider the proportion of area occupied by the species. (MacKenzie et al (2003)) (MacKenzie, (2005))

33. No basis for these as yet - seek to develop ratings by end of 2010. Confidence of these indicator rating descriptions: Low

34. Only based on very preliminary information gained from Sandra's work. Needs to be different for the two species

35. Information does support recent and continuing decline in species numbers across the link, so any improvement will be beneficial in improving viability

36. The attribute is included to ensure that we consider factors other than fire interval that may determine the extent and condition of these woodlands. The indicator will be reviewed once we have mapped and surveyed all of the existing mallet and moort stands. The parameters we are likely to include in our "condition" assessment are crown cover, possibly crown condition, species richness/composition, stem density, and diameter at breast height. When surveying the stands, we will also include soil and litter descriptions, particularly soil type, structure and (if resources permit) some soil nutrient analysis. May assist in longer term assessment of eg climate change impacts.

37. These will need to be established after sufficient surveys have been done.

38. As yet we are unaware of any mallet and moort woodlands that we would instictively desribe as less than good condition.

39. The litter and presumably the soil dynamics appear to be very different in moort and mallet stands than in other associations. We are unsure whether this reflects some inherent site characteristic that makes the sites suitable for moort and mallet woodlands or whether they are products of the woodlands. The relationship with fire interval suggests it may be the latter. However, we need to understand more about the dynamics within the woodlands to be able to determine with more certainty what are in fact the key attributes to monitor. There have been suggestions that the presence of these woodlands in clays is either because they are high water users or because they are opportunistic and few other associations will survive in these soils.Some soil analysis may be necessary to determine whether there are other factors that limit these sites to mallets and moorts.

40. Ratings will be determined after exisitng woodland stands are surveyed and soil and litter characteristics determined.

41. Good or very good for current populations.

42. Mallets and moorts are obligate seeders which means that the fire frequency is likely to be a determinant of population extent (in that too frequent fire will destroy populations before seed set). However, the appropriate fire regime and time required for seed set are not yet known.

43. Further analysis of the ages of existing stands, the fire history and the age to onset of seeding are required before indicator ratings can be determined. Confidence of these indicator rating descriptions: Low

44. Obligate seeder, almost monoculture, thick leaf litter, fire sensitive, significant role as habitat that we don't understand, local endemics and restricted ad interbreeding. Moort grow on 'difficult' soils (Sunday clays); our thinking in 2005 was that this indicated some special feature of these sites, whereas current thinking (2007) is that moorts survive here because nothing else can. Determinants of where moort occurs are really not well understood.

45. As for other systems. Newbey mapping (incomplete for the Fitz Stirling area) includes the associations E astringens and E platypus although the mapping of these particular associations appears to be inaccurate in some areas and may not provide reliable pre- and post-clearing estimates. Once we have more reliably mapped moort and mallet stands we will be in a better position to determine whether the indicator should remain as "% of pre-European extent" or should be simply an areal extent (with current extent to be the benchmark and future extent to remain at least as large).

46. URGENT TASK Map current extent obligate seeding woodlands communities and reassess the indicator ratings. Use aerial photo interpretation and Mobile Mappers (Newbey mapping hasn't been adequate) Similar points to Proteaceous communities. Confidence of these indicator rating descriptions: Low

47. Remnant vegetation and Newbey mapping. (NB Newbey mapping incomplete for Fitz-Stirling and did not map all moort woodlands separately). So far we have considered E. astringens and E. platypus only as these were the only associations mapped by Newbey. Two of the short range endemics, E. melanophitra and E. vesiculosa also need to be identified and mapped (although we will have no pre-clearing extent for comparison - may need to develop separate desired rating for these to be better than current). Note also the unreliability of Newbey mapping for the two associations.

48. Carey (2003) identified understorey plant species richness as a useful indicator of hydrological distrurbance in Yate communities, particularly low in the landscape where declining species richness was associated with increasing disturbance. For her sites in the Gairdner catchment, Carey developed "survival thresholds" based on soil and groundwater properties. The Gairdner catchment has some different characteristics to Corackerup; we will therefore need to establish whether such thresholds apply in the three Yate community types in the Fitz-Stirling and determine rankings criteria for them.

49. Based on Michelle's work but will be refined after floristic composition and species richness work on "healthy" and other quadrats. Confidence of these indicator rating descriptions: Low

50. Carey (2003) identified understorey plant species richness as a useful indicator of hydrological distrurbance in Yate communities, particularly low in the landscape where declining species richness was associated with increasing disturbance. For her sites in the Gairdner catchment, Carey developed "survival thresholds" based on soil and groundwater properties. The Gairdner catchment has some different characteristics to Corackerup; we will therefore need to establish whether such thresholds apply in the three Yate community types in the Fitz-Stirling and determine rankings criteria for them.

51. Based on Wandoo Recovery project. C4/5: >75% of foliage absent; may have epicormic growth and/or dead epicormic growth; dead branches and/limbs being shed at a majority of sites C3:30-50% foliage absent; epicormic growth may be present at a majority of sites C2: <25% of foliage absent; epicormic growth may be present at a majority of sites C1: Healthy foliage; may have a few dead branches; no epicormic growth at a majority

52. Seedling establishment is one of the most important stages in the recruitment process and studies in other temperate environments have found that disturbance influences each recruitment stage, from seed release to seedling establishment. Disturbance may also stimulate the germination of more opportunistic species and further alter community structure and recruitment. Carey (2003), working in the Gairdner catchment, found that there were distinct seasonal trends associated with the release of reproductive material.Yate seeds appeared to either germinate immediately during moist winter conditions, or not at all. The timing of maximum seed dispersal coincided with the optimum germination and emergence peiods in winter and because seed longevity was low, immediate germination was required. In contrast, other studies have shown that similar eucalypts in the Western Australian wheatbelt release seed during summer. Recruitment and the subsequent development of a plant community are intrinsically linked to the soil and water regimes (groundwater depth, duration and frequency of inundation, salinity), so changes to hydrology can potentially lead to failure of recruitment and survival. (Carey 2003)

53. A. seedling B. non-reproductive C. reproductive - immature D. reproductive - mature Currently only three rankings are identified (based on Habitat Hectares) but this may be re-assessed once initial surveys are completed. NB The different Yate indicators are closely correlated and may be simplified or combined when sufficient progress is made on characterising systems within the study area.

54. Flat-topped Yate woodland communities once provided valuable habitat across the Fitz-Stirling. Much of the upland Yate has been cleared and riparian Yate communities have been severely degraded. The extent and condition of the remaining yate swamp communities has not yet been determined. Newbey mapping of Yate associations has been used to determine the pre-clearing and current extent of the three community types combined. The three communities should however be separately rated as the pressures on each type differ.

55. 10% and 30% threshholds are based on levels used in assessments of native vegetation status by ANZECC and EPA, described by Shepherd et al. The 70% threshold has been proposed by us but has no ecological basis at this time. Confidence of these indicator rating descriptions: Very High

56. Based on remnant vegetation and Newbey vegetation mapping (1976). (NB There are some areas in which Newbey mapping may noy give accurate association extent. Figures may therefore change slightly as survey effort increases). Confidence of the current rating: High

57. Water quality is likely to be the main attribute that will be subject to change, especially if hydrological changes are occurring within the catchments. Using the same water quality parameters as Ausrivas will allow some relative assessments to be made against freshwater systems elsewhere. It will be complemented by monitoring of macroinvertebrates (under Population of Target Organisms attribute). (ANZECC & ARMCANZ 2000) (Halse et al 2002) (Halse et al 2002b)

58. To be based on south coast indices to be developed by the current CENRM/DoW project

59. To be established as baseline on first five years monitoring

60. To be determined once the baseline is established

61. Based on a belief that freshwater is an essential part of the landscape and several fauna species will be dependent on it; that there will be specific assemblages of flora associated with them; and that it is likely that their occurence in the landscape has been decreased through hydrological and physical changes. There may also be increased artificial occurrences, some of which will also have high conservation values because of their dependent species. Without some further investigations to establish either a "benchmark" for number and distribution of freshwater seeps and pools, or a valid ecological measure such as a requirement for a certain number/density of breeding sites to maintain a population of an associated species, the use of indicator ratings may not be appropriate for this indicator.It may be that the number and location of current sites can be established using several methods, and these then become our baseline sites for monitoring of other attributes.

62. Difficulty in identifying all of the locations. Until we do this, we can't know their relative importance. Ratings are likely to be on a basis of at least maintaining what we currently have, as it will be near impossible to determine "pre-disturbance" occurrence. Condition of current occurrences may prove to be the most important attribute to monitor.

63. The reasoning behind the inclusion of these systems as a target is that there are possibly species or communities that are dependent on them and that loss of the systems would therefore lead to a loss of these species and communities. Certain frogs have been identified as possible dependent species and may therefore be monitored (recognising that there are likely to be other threatening processees such as use of agricultural chemicals that may be contributing to loss of species). If initial surveys support the assumptions behind inclusion of this target (ie dependent species/communities) the indicator will then become the number of individuals of those species or the number of communities/populations present at selected sites across the Fitz Stirling.

64. Ratings may need to be established for differrent species/communities chosen for monitoring. Objective will then be to at least maintain the number of species (will be reviewed once we have sufficient data to determine trends and/or narrow the monitoring to particular freshwater sensitive species).

65. Paula filled in current rating 25 Oct 2010 because there wasn't a rating. We need to verify this. (It may be Poor rather than Fair)

Back to Top

Strategy Effectiveness

Objective: By 2015 exclude stock grazing and manage foxes, other feral predators, plant pathogens (including Phytophthora cinnamomi), and invasive weeds over at least 60,000ha of native vegetation in the Fitz-Stirling area.
Comment: This is a broad objective that covers a range of actions required to improve the conservation management across all remaining native vegetation and the areas being restored in the long term. It may need to be broken down into more specific objectives relating to threats (ie include specific quantitative objectives for each of the threats) and/or to land tenures (including national parks and nature reserves).

Percent Complete: 10%

% Met	Date Updated	Comments
10	Oct 15, 2010	This is a rough guess based on minimal engagement to date in addressing region-wide issues. Some specific actions (eg BHA property management) are more advanced than others (GA property management, region-wide coordination and communication)

Indicator: % of pre-European extent
Methods:

1. Produce map using remote sensing using Newbey veg mapping as pre European baseline and on ground record of areas revegetated.

Measurement Report:

Measure	Date	Source	Trend	Comments
Target: Mallet and moort woodlands, Category: Size, KEA: Community size				
43% = Good (Based on 6 subcatchments for which we have Newbey mapping)	-	Not Specified	Not Specified	Remnant vegetation and Newbey mapping. (NB Newbey mapping incomplete for Fitz-Stirling and did not map all moort woodlands separately). So far we have considered E. astringens and E. platypus only as these were the only associations mapped by Newbey. Two of the short range endemics, E. melanophitra and E. vesiculosa also need to be identified and mapped (although we will have no pre-clearing extent for comparison - may need to develop separate desired rating for these to be better than current). Note also the unreliability of Newbey mapping for the two associations.
Target: Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands, Category: Size, KEA: Community size				
49.6% (all Yate community types) = Good	-	Not Specified	Not Specified	Based on remnant vegetation and Newbey vegetation mapping (1976). (NB There are some areas in which Newbey mapping may noy give accurate association extent. Figures may therefore change slightly as survey effort increases). Confidence of the current rating: High
Target: Proteaceous rich communities, Category: Size, KEA: Community size				
16% = Fair	-	Not Specified	Not Specified	Based on Newbey mapping of the Newbey associations previously identified (B attenuata, B verticillata, B baxteri, Dryandra complex, Sand, E phaenophylla subsp adesmophloia). NB Doesn't cover western 3/4 of Pallinup-Bull Crossing catchment.

Progress Report:

Progress	Updated	Comments
Target: Mallet and moort woodlands, Category: Size, KEA: Community size		
On Track		
Target: Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands, Category: Size, KEA: Community size		
On Track		
Target: Proteaceous rich communities, Category: Size, KEA: Community size		
On Track		

Back to Top

Indicator: Age classes present

Methods:

1. Assessment of age classes present at designated sites (Based on Michelle Carey's methodology)

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD	-	Not Specified	Not Specified	

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: Area extent of individual patches

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD. Likely to be poor - fair	-	Not Specified	Not Specified	Observations to date.

4. **Indicator:** Area of native vegetation excluded from stock grazing

5. **Indicator:** Area subject to Phytophthora cinnamomi management plans or protocols

6. **Indicator:** Area under conservation covenants or with conservation reserve status

Indicator: Cat and fox populations

Measurement Report:

Measure	Date	Source	Trend	Comments
None	Nov 15, 2009	Not Specified	Unknown	

Indicator: Condition of soils and organic matter

Methods:

1. Measure litter density and depth (need to develop sampling design)

Measurement Report:

Measure	Date	Source	Trend	Comments
Unknown. Further work required to determine parameters and their significance.	-	Not Specified	Not Specified	Good or very good for current populations.

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: crown condition

Measurement Report:

Measure	Date	Source	Trend	Comments

Back to Top

Target: Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands, Category: Condition, KEA: Community Condition				
TBD for different community types	-	Not Specified	Not Specified	
Target: Mallet and moort woodlands, Category: Condition, KEA: Community Condition				
Expect this to be good-very good	-	Not Specified	Not Specified	As yet we are unaware of any mallet and moort woodlands that we would instictively desribe as less than good condition.

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: Density of bird pollinators

Methods:

1. Bird counts (standardised methods)

Measurement Report:

Measure	Date	Source	Trend	Comments
	Oct 15, 2010	Rough Guess	Not Specified	

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: Distribution across fire age classes

Methods:

1. Fire history mapping (based on Vegmachine and aerial photo interpretation) and vegetation association mapping (based on Ken Newbey mapping and additional aerial photo interpretation for Moort woodlands).

Measurement Report:

Measure	Date	Source	Trend	Comments
Target: Proteaceous rich communities; Threat: Inappropriate fire management				
	-	Not Specified	Not Specified	TBD
Target: Tammars and Black-gloved Wallabies; Threat: Inappropriate fire management				
	-	Not Specified	Not Specified	TBD
Target: Proteaceous rich communities, Category: Landscape Context, KEA: Fire frequency				
	Oct 15, 2010	Rough Guess	Not Specified	Fire history presently being mapped. Proteaceous communities still to be mapped.
Target: Mallet and moort woodlands, Category: Landscape Context, KEA: Fire frequency				
TBD	-	Not Specified	Not Specified	
Target: Mallet and moort woodlands; Threat: Inappropriate fire management				
	-	Not Specified	Not Specified	TBD

Progress Report:

Progress	Updated	Comments
Target: Tammars and Black-gloved Wallabies; Threat: Inappropriate fire management		
Planned		
Target: Proteaceous rich communities; Threat: Inappropriate fire management		
Planned		
Target: Proteaceous rich communities, Category: Landscape Context, KEA: Fire frequency		
Planned		
Target: Mallet and moort woodlands, Category: Landscape Context, KEA: Fire frequency		

Back to Top

Planned		
Target: Mallet and moort woodlands; Threat: Inappropriate fire management		
Planned		

Indicator: Environmental Index

Methods:

1. Stream Condition Indicator to be developed from Penn-Scott with additional parameters (instream + vegetation/habitat condition). Angela to determine rating levels.

Measurement Report:

Measure	Date	Source	Trend	Comments
20% of Corackerup Ck system assessed; 86% rated at VG, 13% G. Other 80% assessed from aerial photos 48% VG, 30% G, 19% F, 3% P. Most surveys have been in NRs, bush onGL properties or other Pub land.	Apr 15, 2007	Not Specified	Not Specified	Baseline surveys (2007/2009) Confidence of the current rating: High

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: Level of occupancy

Methods:

1. Mapping historic and recent sightings; identifying habitat characteristics at sightings points; surveying additional areas with similar characteristics for presence/absence

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD. Believed to be poor (Tammars) to Fair (Black gloved).	-	Not Specified	Not Specified	Only based on very preliminary information gained from Sandra's work. Needs to be different for the two species

Progress Report:

Progress	Updated	Comments
On Track		

Indicator: Number and area covered by effective partnership arrangements being implemented to abate specified threats

Measurement Report:

Measure	Date	Source	Trend	Comments
None in place that Gondwana Link is party to	Nov 15, 2009	Not Specified	Flat	Still no clear responsibilities defined for cross-tenure relationships

Progress Report:

Progress	Updated	Comments
Not Specified	Nov 15, 2009	No defined responsibility for this

15. **Indicator:** Number and extent of invasions of specified weed species

Back to Top

16. **Indicator:** Number and extent of known Phytophthora cinnamomi infestations

Indicator: Numbers of seeds stored on plants or in soil
Methods:

1. Incorporate in Habitat Hectares approach

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD	Oct 15, 2010	Rough Guess	Not Specified	

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: Occurence and distribution of small-scale freshwater bodies
Methods:

1. TBD: combination of survey observations, Blue Pits analysis, Frog call surveys

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD	-	Not Specified	Not Specified	

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: Physical, chemical and biological Ausrivas indices
Methods:

1. Standard monitoring River Health program methods (macroinvertebrates and water quality parameters); initial years will be to build baseline; ratings to be developed in consultation with CENRM to reflect south coast rivers (rather than national, state Ausrivas criteria)

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD	-	Not Specified	Not Specified	To be established as baseline on first five years monitoring

Progress Report:

Progress	Updated	Comments
On Track		

Indicator: Physical, chemical and biological indices TBD
Methods:

1. Standard monitoring River Health program methods (macroinvertebrates and water quality parameters); initial years will be to build baseline; ratings to be developed in consultation with CENRM to reflect south coast rivers (rather than national, state Ausrivas criteria)

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD: Ratings to be determined with CENRM and Department of Water to ensure consistency with wider south coast databases	Feb 15, 2008	Not Specified	Not Specified	To be developed as baseline dataset during first five years of monitoring. Confidence of the current rating: Low

Back to Top

Progress Report:

Progress	Updated	Comments
On Track		

Indicator: Pools affected by sedimentation

Methods:

1. Identify pools from Blue Pits layer in Vegmachine and compare with most recent aerial photos. Pools >100m to be chosen (allows for 25m pixel resolution of Vegmachine). Ground truthing required - combine with creek assessment. Measure will be % or total number of pools either filled or affected by sedimentation. Rating to be developed for each creek identified for assessment.

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD - likely to vary from poor to good within micro catchments. Status will need to be established by subcatchment.	Feb 15, 2008	Not Specified	Not Specified	Estimating that the rating may only be "Fair" across the 6 subcatchments, although for Corackerup it is more likely to be "Good" (although there are a number of creeks in the upper catchment that are almost totally degraded, most of the middle and lower reaches where the pools occur are in reasonable condition). Confidence of the current rating: Low

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: Species richness

Methods:

1. For Yate, based on adaptation of Michelle's Species richness surveys (flora and fauna, including macroinvertebrates)

Measurement Report:

Measure	Date	Source	Trend	Comments
Target: Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands, Category: Condition, KEA: Community Condition				
TBD for different community types	-	Not Specified	Not Specified	
Target: Fresh Water Systems, Category: Size, KEA: Population of dependent species				
	Oct 15, 2010	Rough Guess	Not Specified	

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: Species richness and composition

Methods:

1. Based on modified Habitat Hectares approach. Use 40m x 40m quadrats and assess species richness, % cover, lifeforms, structure, weeds, litter. Include one off soil profile description.

Measurement Report:

Measure	Date	Source	Trend	Comments
	Oct 15, 2010	Rough Guess	Not Specified	

Progress Report:

Progress	Updated	Comments
Planned		

Back to Top

Objective: By 2015 restore at least 16000ha of native vegetation, including at least 2000ha of proteaceous-rich communities that support native insect, bird and other vertebrate pollinators.

Comment: Restoration can be undertaken by different groups and in different ways. Gondwana Link has developed restoration standards that give a 1 to 5 star rating for likely ecological outcomes from different restoration/revegetation efforts. As yet, there is insufficient spatial planning to identify where particular standards are required (and where lower standards need to be avoided). There needs to be clarification of the responsibilities for overall planning and raising of funds, and for individual groups in developing their organisational planning.

Percent Complete: 8%

% Met	Date Updated	Comments
8	Oct 15, 2010	This is a rough estimate at this time becaise we haven't clearly defined how we will measure progress on this strategy. Is all revegetation included, or only revegetation that scores highly (4-5 star) on the Gondwana Link Restoration Standards? The target figure of 16,000ha will also need revision once the spatial plan is prepared.

Indicator: % of pre-European extent

Methods:

1. Produce map using remote sensing using Newbey veg mapping as pre European baseline and on ground record of areas revegetated.

Measurement Report:

Measure	Date	Source	Trend	Comments
Target: Mallet and moort woodlands, Category: Size, KEA: Community size				
43% = Good (Based on 6 subcatchments for which we have Newbey mapping)	-	Not Specified	Not Specified	Remnant vegetation and Newbey mapping. (NB Newbey mapping incomplete for Fitz-Stirling and did not map all moort woodlands separately). So far we have considered E. astringens and E. platypus only as these were the only associations mapped by Newbey. Two of the short range endemics, E. melanophitra and E. vesiculosa also need to be identified and mapped (although we will have no pre-clearing extent for comparison - may need to develop separate desired rating for these to be better than current). Note also the unreliability of Newbey mapping for the two associations.
Target: Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands, Category: Size, KEA: Community size				
49.6% (all Yate community types) = Good	-	Not Specified	Not Specified	Based on remnant vegetation and Newbey vegetation mapping (1976). (NB There are some areas in which Newbey mapping may noy give accurate association extent. Figures may therefore change slightly as survey effort increases). Confidence of the current rating: High

Progress Report:

Progress	Updated	Comments
Target: Mallet and moort woodlands, Category: Size, KEA: Community size		
On Track		
Target: Flat-topped Yate or Swamp yate (Eucalyptus occidentalis) woodlands, Category: Size, KEA: Community size		
On Track		

Indicator: Area extent of individual patches

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD. Likely to be poor - fair	-	Not Specified	Not Specified	Observations to date.

Back to Top

Indicator: Environmental Index

Methods:

1. Stream Condition Indicator to be developed from Penn-Scott with additional parameters (instream + vegetation/habitat condition). Angela to determine rating levels.

Measurement Report:

Measure	Date	Source	Trend	Comments
20% of Corackerup Ck system assessed; 86% rated at VG, 13% G. Other 80% assessed from aerial photos 48% VG, 30% G, 19% F, 3% P. Most surveys have been in NRs, bush onGL properties or other Pub land.	Apr 15, 2007	Not Specified	Not Specified	Baseline surveys (2007/2009) Confidence of the current rating: High

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: percentage of catchment with perennial veg cover

Methods:

1. GIS based on extent of perennial vegetation (datasets obtained through Land Monitor)

Measurement Report:

Measure	Date	Source	Trend	Comments
26.7% (Fair) (Based on 6 subcatchments - individual subcatchments vary from poor - good)	Apr 15, 2007	Not Specified	Not Specified	Based on the datasets Remnant Vegetation (supplied 2007?) by Damian Shepherd Dept of Agriculture and subcatchment boundaries supplied by Dept of Water (2006) Confidence of the current rating: High

Progress Report:

Progress	Updated	Comments
On Track		

Objective: 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

Comment: The creek systems are suffering from the general degradation of the catchments (hydrologically, and in terms of soil lost from cleared land and moved into creek systems), and from continued fragmentation and degradation of the riparian zones. Creekline assessments commenced in 2008 are establishing a baseline for condition and a means to identify areas where sedimentation and degradation are most significant (Corackerup catchment only as yet). Through a combination of strategic revegetation in riparian zones, broadscale restoration in catchments, and improved management of riparian zones, the resilience of the creeks can be improved. Bremer and Gairdner Rivers are longer term objectives for Gondwana Link, but Fitzgerald Biosphere Group have been working within the Bremer River and a longer term objective and strategy should be developed between the groups.

Percent Complete: 3%

% Met	Date Updated	Comments
3	Oct 15, 2010	On basis that Peniup and Chereninup restoration have contributed towards total effort needed (but this is a very rough guess because we haven't clearly identified the area of restoration required)

Indicator: Environmental Index

Methods:

Back to Top

1. Stream Condition Indicator to be developed from Penn-Scott with additional parameters (instream + vegetation/habitat condition). Angela to determine rating levels.

Measurement Report:

Measure	Date	Source	Trend	Comments
20% of Corackerup Ck system assessed; 86% rated at VG, 13% G. Other 80% assessed from aerial photos 48% VG, 30% G, 19% F, 3% P. Most surveys have been in NRs, bush onGL properties or other Pub land.	Apr 15, 2007	Not Specified	Not Specified	Baseline surveys (2007/2009) Confidence of the current rating: High

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: Occurence and distribution of small-scale freshwater bodies

Methods:

1. TBD: combination of survey observations, Blue Pits analysis, Frog call surveys

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD	-	Not Specified	Not Specified	

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: percentage of catchment with perennial veg cover

Methods:

1. GIS based on extent of perennial vegetation (datasets obtained through Land Monitor)

Measurement Report:

Measure	Date	Source	Trend	Comments
26.7% (Fair) (Based on 6 subcatchments - individual subcatchments vary from poor - good)	Apr 15, 2007	Not Specified	Not Specified	Based on the datasets Remnant Vegetation (supplied 2007?) by Damian Shepherd Dept of Agriculture and subcatchment boundaries supplied by Dept of Water (2006) Confidence of the current rating: High

Progress Report:

Progress	Updated	Comments
On Track		

Indicator: Physical, chemical and biological indices TBD

Methods:

1. Standard monitoring River Health program methods (macroinvertebrates and water quality parameters); initial years will be to build baseline; ratings to be developed in consultation with CENRM to reflect south coast rivers (rather than national, state Ausrivas criteria)

Measurement Report:

Measure	Date	Source	Trend	Comments

Back to Top

TBD: Ratings to be determined with CENRM and Department of Water to ensure consistency with wider south coast databases	Feb 15, 2008	Not Specified	Not Specified	To be developed as baseline dataset during first five years of monitoring. Confidence of the current rating: Low

Progress Report:

Progress	Updated	Comments
On Track		

Indicator: Pools affected by sedimentation

Methods:

1. Identify pools from Blue Pits layer in Vegmachine and compare with most recent aerial photos. Pools >100m to be chosen (allows for 25m pixel resolution of Vegmachine). Ground truthing required - combine with creek assessment. Measure will be % or total number of pools either filled or affected by sedimentation. Rating to be developed for each creek identified for assessment.

Measurement Report:

Measure	Date	Source	Trend	Comments
TBD - likely to vary from poor to good within micro catchments. Status will need to be established by subcatchment.	Feb 15, 2008	Not Specified	Not Specified	Estimating that the rating may only be "Fair" across the 6 subcatchments, although for Corackerup it is more likely to be "Good" (although there are a number of creeks in the upper catchment that are almost totally degraded, most of the middle and lower reaches where the pools occur are in reasonable condition). Confidence of the current rating: Low

Progress Report:

Progress	Updated	Comments
Planned		

Indicator: Species richness

Methods:

1. For Yate, based on adaptation of Michelle's Species richness surveys (flora and fauna, including macroinvertebrates)

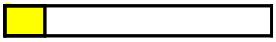
Measurement Report:

Measure	Date	Source	Trend	Comments
TBD for different community types	-	Not Specified	Not Specified	

Objective: By 2020 increase the populations of Tammar and Black-gloved Wallabies within the Fitz-Stirling area by 30%

Comment: Wallaby survey work has been attempting to establish a baseline habitat occupancy level so that changes can be detecting. So far, the likelihood of being able to reliably detect change appears small but survey work needs to continue while strategies for habitat restoration and predator control are implemented.

Percent Complete: 15%



% Met	Date Updated	Comments
15	Oct 15, 2010	-

Indicator: Level of occupancy

Methods:

1. Mapping historic and recent sightings; identifying habitat characteristics at sightings points; surveying additional areas with similar characteristics for presence/absence

Measurement Report:

Measure	Date	Source	Trend	Comments

Back to Top

TBD. Believed to be poor (Tammars) to Fair (Black gloved).	-	Not Specified	Not Specified	Only based on very preliminary information gained from Sandra's work. Needs to be different for the two species

Progress Report:

Progress	Updated	Comments
On Track		

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

Percent Complete: 2%

% Met	Date Updated	Comments
2	Oct 15, 2010	-