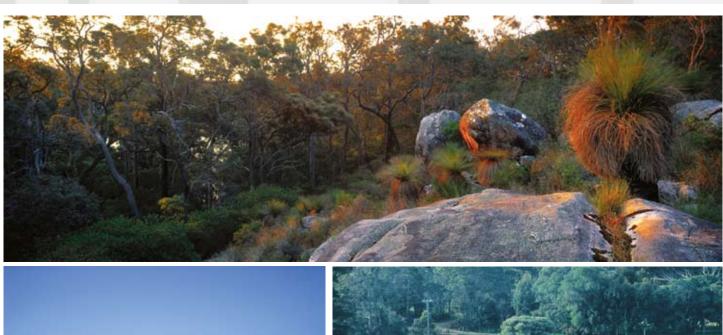


gondwana link



This plan was developed by the Cape to Cape Catchments Group with the assistance of Gondwana Link Ltd.

Augusta-Margaret River Landscape – a conservation action plan







Our vision:

"Achieve, sustain, enhance and connect a healthy, resilient and diverse landscape from forest to coast."



Gondwana Link is an ambitious ecological vision that aims to link areas of bush from the wet forests of the far south west (near Margaret River) to the mallee and woodland to the east (near Kalgoorlie).

This plan focuses on the landscape that straddles the coastal vegetation of the Leeuwin-Naturaliste National Park to the forested areas of the Darling Scarp to the east and beyond (Walpole Wilderness area) representing an important part of the Gondwana Link pathway.

Our focus area

The Shire of Augusta-Margaret River is situated at the south-western tip of Australia. The Indian and Southern oceans bound the Shire to the west and south, and state forest occurs along the eastern perimeter. The Shire covers 237,000 ha and retains over 60% native vegetation cover including 82,246 ha of state forest and 18,815 ha in national parks. The Shire contains a significant extent of the Leeuwin-Naturaliste National Park situated along the Leeuwin-Naturaliste Ridge.



Figure 1. The Augusta-Margaret River landscape showing remnant vegetation and conservation reserves.

The Shire of Augusta-Margaret River contains threatened and priority ecological communities, threatened vegetation types and habitat for a broad range of significant species including 69 declared rare or priority flora species and 43 threatened fauna species. A number of endangered species are endemic to the Shire, such as the Margaret River hairy marron and burrowing crayfish, white-bellied frog and Leeuwin snail. Biodiversity in this area is threatened by numerous processes, particularly clearing and fragmentation of natural vegetation and altered fire regimes. Despite significant efforts, environmental weeds impact large areas of native vegetation and threaten biodiversity values in all but the best bushland. Introduced feral animals threaten biodiversity and on-going efforts are required, particularly with respect to aquatic feral species. Significant threats are emerging in the realms of plant disease (phytophthora dieback and a range of tree declines). Climate change also presents challenges for local biodiversity with drying and warming trends, an increased fire risk and the prospect of new feral animals and weed threats.

As one of the fastest growing regions in Australia, the Augusta-Margaret River Shire is under enormous pressure from population increases and associated urban expansion, tourist development, agriculture including viticulture, intensive horticulture, grazing, and plantation forestry. Proactive and comprehensive conservation activity is required to prevent the irreversible loss of biodiversity, the area's unique natural heritage, and significant degradation of environmental integrity and health — a permanent legacy for future generations.

What we want to conserve

Conservation Action Planning* (CAP) methodology was used to identify six key conservation "targets"** as the focus for protection and restoration efforts. If the viability of each of these targets is improved, it is believed that in turn this will improve the ecological condition of the entire system. Each target includes "nested" targets (species or communities with similar needs, threats or situation) and has different characteristics or attributes that need to be considered when developing strategies for their protection. In an initial assessment of the viability of the targets, most were determined to be in fair condition.

Note on some of the language of Conservation Action Planning.

The word target is used interchangeably here with conservation target or ecological target. Target may be an unfamiliar word used in this context, but is internationally recognised in the methodology used for this process. The word can be substituted for conservation or biodiversity asset.









* Conservation Action Planning (CAP) is a powerful tool to guide conservation teams to develop focused strategies and measures of success. The CAP process was developed by The Nature Conservancy (http://www.nature.org/) and is used internationally to plan and manage conservation projects.

For more information visit:

http://conserveonline.org/workspaces/cbdgateway/cap/resources/index_html

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



Conservation targets

1) Scott Coastal Plain:

('nested' targets: proteaceous communities, ephemeral wetlands, ironstone communities, Quindalup dunes)

The Scott River and coastal plain represent the landscape stretching eastwards from east Augusta and is made up of headlands of granite and limestone (and a rare outcrop of columnar basalt), swampy lowlands, horizontal sandplains and a range of seasonal and permanent wetlands and waterways. The area's vegetation is unique and widely recognised for its exceptional species richness, high diversity of vegetation complexes, a high concentration of rare, restricted and threatened communities, narrowly endemic plants and wetlands of national importance containing threatened aquatic fauna. This vegetation includes proteaceous communities supporting declining mammal species such as the honey possum (pictured).

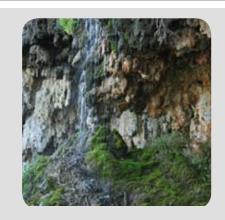
The area is threatened by clearing for agriculture, Phytophthora dieback, a drying climate, water abstraction, high levels of water use by horticulture and plantation forests and altered burning regimes.



2) Leeuwin-Naturaliste Ridge:

('nested targets': caves & associated communities, tufa & rimstone pools, Austroassiminea letha (Leeuwin snail), Gondwanan relictual spp., karri communities, phascogale, coastal wetlands, granite communities, Western spinebill)

The Leeuwin-Naturaliste Ridge is a granite and limestone ridge running approximately north-south through the western-most portion of the Augusta-Margaret River land-scape. This includes a range of ecological communities and values including unique granite communities, coastal heathland, karri communities, coastal wetlands, tufa (pictured) and rimstone pools and an extensive network of limestone cave systems including threatened aquatic root mat communities. The ecological values of the ridge are being threatened by a drying climate, increased impacts of wildfires and fire management, weeds (especially arum lily), clearing for development and recreational pressures along the coast.



3) Wetland Systems:

The wetland systems covered within this target include both the organic acid and alkaline wetlands. The organic acid wetlands include peaty swamps, 'Reedia' swamps and the Blackwood plateau wetlands. These areas include some Threatened Ecological Communities (TECs) and short range endemic fauna populations including the endangered white-bellied frog (pictured).

The alkaline wetlands occur on limestone associated with the Leeuwin-Naturaliste Ridge and in some cases these areas also support TECs such as tufa communities and short range endemics such as the endangered Leeuwin freshwater snail.

These areas are highly vulnerable to changes in hydrology resulting from a drying climate, water abstraction, altered fire regimes, water impoundment and increased water use demand from adjoining agricultural activities. In some instances they are also threatened by weed encroachment and grazing pressures.



4) Waterways:

('nested' targets: Margaret River system, Lower Blackwood River system, short coastal streams flowing off the Leeuwin-Naturaliste Ridge, ring-tailed possum, Scott River, native fish, water rats, mussels and crayfish)

Waterways within the Augusta-Margaret River landscape either flow either into the Blackwood River or westwards to the Capes coast. They represent important natural corridors for fauna movement and have a number of distinctive communities not found elsewhere. Permanent river pools provide habitat for fish, invertebrates and aquatic plants and function as important refugia during summer. The waterways support a number of iconic species that are highly threatened and/or endemic to the region including the Margaret River hairy marron, Margaret River burrowing crayfish, White-bellied frog, Orange-bellied frog and Balston's pygmy perch. The Blackwood River has experienced salinization resulting from clearing in the upper catchment and the Scott River has experienced eutrophication. Across the area the waterways are being impacted by a drying climate and increasing pressure and demand for water resources, feral aquatic fauna and adjacent agricultural activities including grazing and polluted runoff.



5) Jarrah-marri Systems:

('nested' targets: small mammals (smaller than wallabies), nectar feeding birds, black cockatoos, marri, phascogale, black-gloved wallaby, chuditch, Whicher Scarp)Jarrahmarri systems (ecosystems where jarrah (Eucalyptus marginata) and marri (Corymbia calophylla) dominate the overstorey) make up the bulk of the remnant vegetation within the Augusta-Margaret River area. Significant structural and floristic variation occurs within these systems ranging from tall forest to low woodland occurring on a range of soil types from bare rocky, granite to lateritic ironstone through to sandy soils. These systems support a wide diversity of understorey species and habitat and food sources for fauna. They support a number of iconic and threatened flora and fauna species including critical weight range mammals. These systems are susceptible to a range of threats including Phytophtora dieback, feral animals impacting on fauna and ecological processes and climate change. In recent years marri decline has had significant impact on fragmented remnants.



6) Black-gloved wallaby:

('nested' targets: chuditch, jarrah marri understorey, echidnas)

The black-gloved or western brush wallaby (Macropus irma) (pictured), represents the second largest mammal species in the region and relies on good habitat (in particular understorey vegetation) and connectivity. The black gloved wallaby is understood to have been very common in the early days of settlement and periodically large numbers were traded commercially for skins. Whilst the current status of the species in the area is largely unknown it is thought to have had its range seriously reduced and a significant decline in abundance within most remaining habitats. Both fragmentation of habitats and introduced predator pressures are likely to be responsible for the decline in populations. The black-gloved wallaby was chosen as a target as it is known from the area, is possibly in decline, and requires similar habitat features to a range of other critical weight range mammal species.





Native bees



Margaret River burrowing crayfish



Beaufortia sparsa (Augusta-Margaret River's floral emblem)

Critical threats to the conservation area

The conservation targets outlined above are affected by multiple threats. The main threats for each conservation target were identified and ranked based on available information and are shown in the following table.

Twenty six project-specific threats were identified with the following being identified as the highest ranked:

Drying climate: Parts of the region have already experienced a drop in rainfall of 10-15% over recent decades leading to significant impacts in runoff, stream flow, watertable levels and stress on vegetation. This threat is predicted to in crease into the future

Water abstraction: Growing demand for agricultural and domestic water supply is increasing both surface and ground-water abstraction. This is affecting environmental flow in watercourses and the water table levels upon which vegetation systems depend.

Dry season wildfire: The drying and warming climate increases the risk of significantly hotter, more widespread and damaging summer fires.

Water impoundment: A drying climate coupled with an increase in intensive agriculture has resulted in a higher demand for water and a significant increase in the number and extent of farm dams. This impoundment impacts the volume of water available for environmental flows, alters instream habitat and changes the nature and seasonality of stream flow.



Arum lily invading waterways of the Augusta-Margaret River area

Other threats identified during this process include introduced animals (ferals), Phytophthora dieback, marri decline, environmental weeds, clearing for development and fragmentation.

Predation by feral animals affects numerous species, but is focused on many of the smaller native mammals and birds that pollinate local plants.

Over 40% of the region's native plant species are susceptible to Phytophthora cinnamomi (dieback) and this widespread pathogen has the potential to significantly impact whole vegetation communities with subsequent impacts on wildlife.

One of the impacts identified by the plan is fragmentation of the landscape initially caused by clearing for agriculture but which is now exacerbated by a range of degrading forces such as grazing, tree decline/dieback, excessive fires, road and other infrastructure development, and continued invasion by weeds. As bushland becomes more fragmented, native fauna become more vulnerable to predation while other ecosystem processes, such as nutrient cycling, water cycling and population dynamics are disrupted.



Aquatic feral fauna represent a significant threat to the unique aquatic biodiversity of the area. Species of particular concern include the further spread and expansion of gambusia, yabbies, goldfish, carp and smooth marron (Margaret River only) and the potential introduction of redfin perch.

Table 1: Key threats across conservation targets.

Threats Across Targets		Scott Coastal Plain	Leeuwin Naturali ste Ridge	Wetland systems	Water ways	Jarrah- Marri systems	Black Gloved Wallaby	Overall Threat Rank
	Project-specific threats	1	2	3	4	5	6	
1	Drying climate	High	High	Very High	High	High		Very High
2	Water abstraction	High	Low	Very High	High			High
3	Dry season wildfires	Medium	High	High	Low	Medium		High
4	Water impoundment		Low	High	High			High
5	High water use by horticulture, viticulture, plantation forests	Medium		High	Low			Medium
6	Introduced animals (ferals)		Low			High	Medium	Medium
7	Phytophthora cinnamomi	Medium	Low			High		Medium
8	Marri decline					High		Medium
9	Weeds	Low	Medium	Low	Low	Medium		Medium
10	Clearing - development	Low	Medium		Low	Medium		Medium
11	Grazing	Low		Low	Medium	Low	Low	Low
12	Recreational pressure	Low	Medium	Low	Low			Low
13	Clearing - agriculture	Medium		Low				Low
14	Acid plume from Beenup				Medium			Low
15	Agricultural pollutants				Medium			Low
16	Aquatic feral fauna				Medium			Low
17	Barriers to movement						Medium	Low
18	Habitat loss & degradation						Medium	Low
19	Vehicle deaths						Medium	Low
	Threat Status for Targets and Project	High	High	Very High	High	High	Medium	Very High

In addition to the above, the following low ranked threats were also identified as affecting some of the conservation targets: acid sulphate soils, feral pigs, agricultural nutrients, domestic animals, logging, urbanisation (pollution) & viticulture (changed land use and management).

Goals and objectives

The conservation goal in the Augusta-Margaret River landscape is to enhance the viability of each conservation target by improving the condition, size and/or processes that maintain these targets and by eliminating or reducing the threats to them. By doing this for the six conservation targets, the ecological health of the whole system should also be improved as many of the processes and threats are common to many components of the ecosystem.

During the planning process it was acknowledged that more information is needed for some of the targets, and some of these requirements have been included into the strategies below.

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

Target: Augusta-Margaret River landscape (Enabling Strategies)

Objective: Ensure that enabling strategies (e.g. funding, capacity building, and communications) for the Cape to Cape Catchments Group, Lower Blackwood LCDC, and other associated groups are scoped and developed by 2012, to ensure the effective implementation of conservation strategies from 2011 through to 2020 and beyond.

- Develop and implement a long-term funding strategy for conservation interventions in the Augusta-Margaret River landscape.
- Increase the capacity of local natural resource management groups to plan, implement, monitor and review conservation interventions in the Augusta-Margaret River landscape.
- ▶ Develop and implement a biodiversity communications plan for the Augusta-Margaret River landscape.

Target: Augusta-Margaret River landscape (Ecological Strategies)

Objective: Develop key landscape-wide ecological strategies (for fire, connectivity, weeds & feral fauna) by 2013 to ensure long term implementation through to 2020 and beyond.

- ▶ Develop a "Fire and Biodiversity" Plan for the Augusta-Margaret River landscape
- ▶ Develop a strategy for optimising habitat connectivity that links conservation targets, and takes the South West Regional Ecological Linkages work into account.
- Review & update the Augusta-Margaret River Shire weed strategy
- Develop and implement a comprehensive terrestrial feral animal control program for the August-Margaret River landscape.
- Develop and implement a Phytophthora dieback management & prevention program for the Augusta-Margaret River landscape.
- Develop GIS data layers for vegetation type, condition and extent for the Augusta-Margaret River landscape.
- ▶ Investigate and source best layers and tools for mapping vegetation condition across the landscape.

Target: Scott Coastal Plain

Objective: Fill in information gaps on ecological processes affecting biodiversity on the Scott Coastal plain by 2012 to add value to current actions and inform future conservation action by 2015.

- Identify the ecological implications of water abstraction on the biodiversity of the Scott Coastal Plain
- ▶ Review the Scott River Water Quality Improvement Plan (Department of Water) and identify links to the work of the Cape to Cape Catchments Group and the Blackwood Basin Group via the Lower Blackwood Land Conservation District Committee.
- Identify key step(s) in the planning process with potential for improving ecological outcomes.
- ▶ Develop Forest Stewardship Council "type" criteria for water drawdown & nutrient management in relation to plantation plantings.
- Develop a Phytophthora dieback (& other pathogen) study with recommendations for the Scott Coastal
- ▶ Develop and implement a Scott River Action Plan to link a number of actions and strategies for this area including best practice fertiliser management and farm scale nutrient hotspots.
- ▶ Develop and implement a fencing incentive project for the Scott Coastal Plain that incorporates South West Regional Ecological Linkages information into fencing priorities.

Target: Leeuwin-Naturaliste Ridge

Objective: Increase knowledge of the key biodiversity drivers such as water & fire (and related weeds) of the Leeuwin-Naturaliste Ridge by 2013 to inform interventions for increasing the viability of this target by 2015.

- ▶ Incorporate the following into a "Fire and Biodiversity Plan" investigation into the value of Wildfire Threat Assessment approach, debate about value/impacts of prescribed burning, examination of opportunities for other responses to fire risk: town planning, design.
- Develop a water allocation and management strategy for the coastal aquifers.
- Integrate strategies for the Leeuwin-Naturaliste Ridge with the Department of Environment and Conservation's Parks and Reserves Management Plan for the area.
- ▶ Design and implement a communications strategy on the importance of biodiversity (e.g. tufa) on the Leeuwin-Naturaliste Ridge.
- Design and implement a targeted cross-tenure feral animal control plan for the Leeuwin-Naturaliste Ridge.
- ▶ Develop and implement a strategic environmental weed control program targeting arum lily across the landscape.
- Develop and implement a strategic environmental weed control program targeting isolated, small weed patches to prevent further spread.
- ▶ Develop and implement a Phytophthora dieback management & prevention program for the Leeuwin-Naturaliste Ridge.

Target: Wetland systems

Objective: To collate information (research, legislation etc.) on water use, fire, weeds etc. for wetlands by 2012, to enable landscape-wide interventions to reverse the trend of degrading wetlands by 2015.

- ▶ Ensure that future fire strategies take into account fire ecology in wetlands and address the issue of optimum burning regime.
- Critically evaluate existing dam legislation with regards factors including: downstream vegetation effects (not only dam footprint), by-passes to address altered hydrology, re-evaluation of "aesthetics" as a reason for dam construction.
- ▶ Continue to implement and expand fencing incentive projects for wetlands.
- Continue to explore options for "off-line" dams in all catchments.
- ▶ Identify the ecological implications of water abstraction on the biodiversity of wetlands.
- Communicate key messages about the importance of wetlands to decision and policy makers.

Target: Waterways

Objective: To increase the stream foreshore condition of key rivers (>50% of their length in A or B grade condition) by 2020, ensure no new introductions of feral fish or crustaceans, and develop strategies to reduce point source pollutants by 2015.

- Continue with fencing (and alternative watering point) incentive programs along key waterways, and associated tributaries and creeks.
- Critically evaluate existing dam legislation with regards factors including: downstream vegetation effects (not only dam footprint), by-passes to address altered hydrology, re-evaluation of "aesthetics" as a reason for dam construction.
- ▶ Implement strategy for prevention and management of feral fish & crustaceans.
- Develop a strategy for enforcing setbacks along rivers.
- ▶ Continue to explore options for "off-line" dams in different catchments.
- ▶ Identify the ecological implications of water abstraction on the biodiversity of waterways.
- Undertake a River Action Plan for the Scott River.
- Continue involvement in the implementation of hairy marron recovery actions as developed by the recovery team.

Target: Jarrah-marri systems

Objective: Identify key interventions (e.g. fire, weed, feral animal, disease & connectivity plans) by 2012 for improving the conservation status of jarrah-marri systems by 2015

- ▶ Incorporate the following into a "Fire and Biodiversity Plan" investigation into the value of Wildfire Threat Assessment approach, debate about value/impacts of prescribed burning, examination of opportunities for other responses to fire risk: town planning, design.
- Maintain strong involvement with the five year project investigating marri and jarrah health being managed by the Western Australian Centre of Excellence for Climate Change, Woodland and Forest Health (ensure that management needs are being addressed by the research).
- ▶ Develop and implement a strategic fencing incentive project for jarrah-marri linkages and poorly represented/ reserved vegetation complexes.
- Develop comprehensive Phytophthora dieback map and strategy for the Shire.
- Implement a Phytophthora dieback management & prevention program for Shire and landholders.
- ▶ Develop and implement a control program for containment of feral bird species (e.g. corellas, sulphur crested cockatoos)
- Design and implement a targeted cross-tenure feral animal control plan for jarrah-marri systems (in particular training & communication).
- Investigate and promote best practice/ hygiene protocols for native tree maintenance to reduce the impact of tree decline.

Target: Black-gloved wallaby

Objective: Obtain baseline information (numbers/distribution as indicator of healthy bush & connectivity) about black-gloved wallabies (and fauna with similar habitat requirements/threats) in the Augusta-Margaret River landscape by 2013, to inform key interventions for improving viability of the species in the area by 2015.

- Design and implement a targeted community survey for black-gloved wallabies that includes collection of data from kills/other opportunistic sightings and basic habitat data of sighting locations to allow predictive modelling.
- Work out optimum fire regime for black-gloved wallabies as part of development of "Fire and Biodiversity Plan".
- Raise community awareness about black-gloved wallabies.
- Develop a funding application for a regional black-gloved wallaby baseline study that could include universities undertaking the following activities (amongst others) with post-graduate students: numbers & distribution, habitat needs & thresholds, feeding patterns from gut contents studies.
- Develop an integrated strategy and action plan for improving habitat size, quality and connectivity for blackgloved wallabies and fauna with similar habitat requirements.
- Further investigate predation sources and optimum strategies for specific interventions with black-gloved wallabies in mind (e.g. fox baiting).
- Quantify kangaroo grazing impacts, effectiveness of control methodologies and recommendations.

Future strategies

This plan will be reviewed regularly as more information/data becomes available about the responses of the landscape and ecosystems to management actions, and in particular as the process becomes better informed by some of the further surveys and investigations. Future reviews of this plan will likely yield additional strategies.



Measuring our success

The key question that groups involved in conservation need to answer is: "Are the conservation strategies being used having the intended effect?" To answer this question, data will be collected on a number of indicators that gauge how well critical threats are being reduced and, in turn, whether the viability of the conservation targets is improving. To date, a monitoring framework has been developed (see below) and the most critical and practical methods to develop and implement a monitoring program are being investigated.





Augusta-Margaret River Monitoring Framework

Conservation Target	Indicator				
Scott Coastal Plain	 Ecological linkages/proximity analysis Changes in hydrological regime Community and species diversity Honey possum populations Vegetation coverage - Based on a percentage of original remaining, using the broad community targets (Mattiske mapping) 				
Leeuwin-Naturaliste Ridge	 Changes in hydrological regime Ecological linkages/proximity analysis Community and species diversity Based on % of original remaining, rating required for each specific communities within the broad target (Mattiske mapping) 				
Wetland Systems	 Timing of fires Changes in hydrological regime Geocrinia alba, G. vitellina and Engaewa populations (species sensitive to disturbance, trampling etc.) Characteristic fauna assemblages 				
Waterways	 Environmental flow Fauna assemblages Vegetation condition class Standard physical and chemical parameters 				
Jarrah-Marri Systems	 Plant species composition Structure (age class distribution) Guild of pollinators Canopy condition Presence of chuditch Vegetation condition Total extent (as a percentage of the original) 				
Black-Gloved Wallaby	 Ecological linkages/proximity analysis Importance of movement and the effect of fences Number of animals / potential of suitable habitat occupied 				

How can you get involved?

Please contact one of the following to find out how you can get involved:

- The Cape to Cape Catchments Group: The CCG is a community group that supports the management of our natural resources for a healthy productive and sustainable future.
 - http://www.capetocape.org.au/
- Phone 9757 2202
 Gondwana Link
- www.gondwanalink.org,
- The Lower Blackwood LCDC http://www.blackwoodbasingroup.com.au Phone 9758 4021

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For more information, please see: http://conpro.tnc.org/1796/

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