A2.1 PPM for Terrestrial Biodiversity
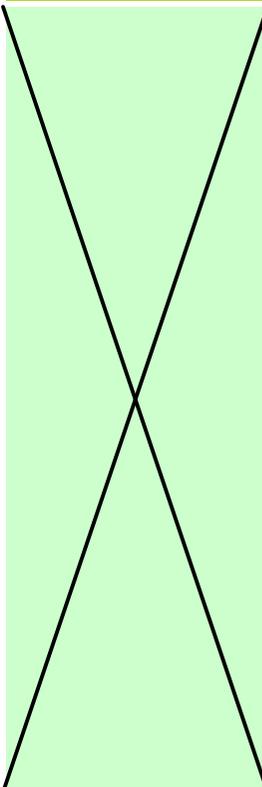
TERRESTRIAL BIODIVERSITY	Objectively Verifiable Indicators	Means of Verification	Assumptions
Overall Outcome To contribute substantially to the understanding, conservation and protection of targeted biodiversity assets in the South West NRM region so as to ensure that ecosystems of the region remain healthy and productive, and are managed holistically in order to maintain their full range of ecosystem services.	**Indicators for the Overall Outcome** **BI-1a** By 2020, no known terrestrial plant or animal species or community becomes extinct in the region if conservation action is being undertaken. **BI-1b** The coverage and condition of native vegetation within the region remains the same or has been expanded or improved in the period to 2020. **BI-1c** A management plan has been drawn up and is being implemented for at least one representative landscape in each of the six IBRA sub-regions represented in the region in the period to 2020. **BI-1d** Terrestrial invasive pest species and diseases identified as being significant at national and/or State levels are managed or controlled in accordance with relevant management/control plans in the period up to 2020. **BI-2** Community awareness about the issues impacting on terrestrial biodiversity continually increases in the period up to 2020. **BI-3** By 2020, the effects of climate variability on terrestrial species are better understood, with adaptation and/or mitigation strategies developed to deal with these effects on priority species and ecosystems. **BI-4** Landscape-scale projects that improve landscape connectivity and ecosystem resilience and are associated with priority assets while securing quality habitat and refugia are being implemented in all sub-regions in the period to 2020.	• State of Environment Report WA • Annual reports (SWCC) • Report cards (SWCC)	

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Management Outcomes **BM-1** Appropriate management programs are being implemented for all targeted terrestrial species and ecological communities in the South West region that are either representative and/or endangered. **BM-2a** Biodiversity conservation work in the South West NRM region is underpinned by comprehensive knowledge systems (inventories of, and management plans for, terrestrial species and ecological communities). **BM-2b** The South West community is aware of the key threats to, and supports action to mitigate their effects on, the region's priority terrestrial biodiversity assets. **BM-3** SWCC, its partners and the broader NRM community have developed and implemented appropriate management policies and strategies into their day-to-day operations to deal with the effects of climate variability on biodiversity assets of the SW region. **BM-4** Appropriate management programs are being implemented for all targeted ecological communities in the South West region that have been identified as providing key landscape-scale ecosystem services.	**Management Outcome Indicators** **BMI-1a** Actions to maintain, enhance and/or restore habitats implemented on 20% of identified priority terrestrial habitats by 2020. **BMI-1b** At least one representative example of each of the SW NRM Region's natural biological and physical diversity at landscape scale is being appropriately managed for conservation by 2015. **BMI-1c** All occurrences of ecological types with less than 10% remaining are identified and management strategies developed and commenced by 2015. **BMI-1d** Increase by 20% the area managed for conservation within those ecological types with less than 30% remaining by 2015. **BMI-1e** Significant invasive environmental weeds and pest animals identified and prioritised by 2015 and control strategies commenced by 2020. **BMI-2a** An inventory of, and monitoring program for, species, communities, habitats and ecosystems is developed by 2013 and used to document and re-evaluate the conservation status of terrestrial species, communities, habitats and ecosystems every 5 years. **BMI-2b** Increase awareness for the conservation of the Region's priority biodiversity assets by 10% on baseline levels by 2015. **BMI-3** Relevant actions that mitigate the effects of climate variability on, and/or help local species and ecological communities adapt to these effects are identified by 2015 and underway by 2020. **BMI-4a** Actions to maintain, enhance and/or restore ecological services implemented on four identified priority landscapes by 2020. **BMI-4b** Increase awareness for landscape-scale NRM of the Region's priority assets by 10% on baseline levels by 2015.	• Annual reports (SWCC) • Report cards or State of Environment reports (SWCC)	• Political and public support for conservation remains strong. • No new invasive species or diseases take hold with the ability to wipe out one or more species. • The rate of change induced by climate variability is not so rapid as to negate adaptation and/or mitigation work.

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Appropriate Management Actions **BA-1a** **Title** (what): Maintain, enhance and restore terrestrial habitats. **Target** (why): Increase available habitat and contribute to conservation of terrestrial biodiversity. **Appropriate actions** (how): • Implementation of habitat improvement programs in priority areas, focusing on actions that improve connectivity and restore ecological functions of ecosystems at the landscape scale. Appropriate activities include protection, revegetation and restoration works for native vegetation, the objective being to create and restore corridors and improve connectivity, as well as maintain and/or enhance vegetation condition & populations of endangered species and ecological communities. • Provide support for and implementation of seed collecting and banking programs, the objective being to ensure there are sufficient seed/seedlings of the correct type available for appropriate restoration projects. **Contributes significantly to BM-1, BM-2**. In addition, contributes significantly to objectives of WM-1 and LM-1. **BA-1b** **Title** (what): Manage and control pests and diseases. **Target** (why): Maintain and enhance the integrity of existing biodiversity assets within the region. **Appropriate actions** (how): • Support for, and implementation of, control and management programs for pest species in priority areas. Appropriate pest species include invasive environmental weeds (Categories A and B) and introduced animals (cats, European fox, rabbits, pigs, deer). • Support for management programs for dieback (Phytophthora). • Support for research into the causes of tree decline. **Contributes significantly to BM-2a**. In addition, contributes significantly to objectives of the LM-1.	**Potential Management Action Indicators** **BAI-1a** Area planted (ha). **BAI-1b** Increase in planting survival rates. **BAI-1c** Decrease in landscape fragmentation and key patches isolation. **BAI-1d** Increase in fauna and flora diversity in landscapes targeted. **BAI-1e** Seed bank accounting (species diversity held, viability increased, and number/volume of seed increased). **BAI-1f** Number of weeds controlled (abundance and density reduced). **BAI-1g** Area controlled (weeds and animal pests). **BAI-1h** Vegetation condition improved. **BAI-1i** Extent of pest animals decreased.	• SWCC (annual, quarterly and other reports) • SWCC on-ground Database (updated regularly by multiple users). • SWCC Spatial on-ground Database. • SWCC board submissions to policy makers. • Local governments and WALGA. • Schools. • Education Department, universities. • Landcare and other community groups. • Government agencies (DEC, DoW, DoF, BOM). • Museums and the Perth Zoo. • Landholders. • NGOs. • Changes in legislation and policy.	• Correct types and amounts of seed/seedling are available. • Sufficient volunteers to plant. • The right sites are available for the purpose. • Funding matches seasonality. • Seed banks are effective in long term. • Prioritisation of weeds is appropriate - we are focusing on the right thing. • Current weed/animal pest control is effective. • Agency input and support of SWCC's involvement. • Strong partnerships between stakeholders continue to exist and strengthen over time.

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Appropriate Management Actions contd.)
 	
BA-2 Title (what): Identify and address Knowledge Gaps.
   Target (why): Ensure the region has updated information on biodiversity and easy access to it.
   Appropriate actions (how):
• Setting up and maintenance of conservation status database.
• Setting up and maintenance of monitoring database (techniques and results/lessons learned).
• Implementing communication and community awareness programs, especially in relation to Myrtle Rust (Puccinia psidii s.l.), a pathogen that could have widespread effects if released in WA's environment.
   Contributes significantly to BM-3. In addition, contributes significantly to objectives of AM-3, PM-1.
 	
BA-3 Title (what): Managing the effects of climate variability on terrestrial biodiversity.
   Target (why): Contribute to improving the resilience of the region's biodiversity to climate variability.
   Appropriate actions (how):
• Support for research and planning activities into how best to mitigate and/or adapt to the effects of climate variability on local species and ecological communities.
• Develop in-house database of relevant biodiversity information to be used to monitor, report on and evaluate progress (see also BA-2).
• Develop a planned response to the effects of climate variability whilst encouraging a balance between land use and the management of biodiversity and water by assisting with a National approach in developing regional scenarios for climate variability, while looking at how to incorporate this into NRM business to enhance resilient landscapes and adapt to its effects.
• Provide support for inclusion of adaptive responses to the effects of climate variability based on best available knowledge in assisting in the development and implementation of management plans for the conservation reserve system and for protected areas outside the formal conservation reserve system.
• Identify and incorporate risk management strategies for the effects of climate variability into all projects and programs, utilising "best management practice".
   Contributes significantly to BM-3. In addition, contributes significantly to objectives of AM-2.
	BAI-2a Increased awareness – before and after surveys.
	BAI-2b Media monitoring.
	BAI-2c Database with appropriate records and communications.
	BAI-2d Usage records of information.
	BAI-2e Levels of support for community behaviour change.
	
	BAI-3a Strategies to deal with the effects of climate variability on species, communities and ecosystems completed.
	BAI-3b Database set up and maintained.
			• There is a willing, capable and cooperative delivery mechanism.
			• Environmental issues remain prominent in community.
			• Diversity in planting is appropriate.
			• Impact and/or consequences of climate variability is not underestimated.

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BA-4 Title (what): Implement landscape-scale NRM in priority areas.
   Target (why): Ensure that landscape-scale NRM becomes a key focus of NRM in the SW region.
   Appropriate actions (how):
• Develop a coordinated approach to introducing landscape-scale NRM that encourages a balance between land use and the management of biodiversity by:
   o Pursuing options on how to incorporate this into NRM business to enhance diverse and resilient landscapes and ensure that landscape-scale NRM becomes a cornerstone of NRM operations and that new and alternative funding streams are tapped into.
   o Implementing strategies to bring together science, government and community for the purpose of promoting landscape-scale NRM approaches in the South West NRM region.
• Provide support for inclusion of landscape-scale NRM based on best available knowledge in the development and implementation of landscape-scale plans and projects for the conservation of ecosystems and species under threat in the South West NRM region, targeting activities that incorporate complementary techniques such as terrestrial plantings, riparian restoration and sustainable farming practices, creating refugia and corridors at a variety of scales, using buffers for 'hotspots' and large scale restoration.
• Identify, develop and implement four landscape-scale NRM projects that will be the focus of SWCC's activities in this area and address cross-sectoral NRM issues across multiple priority assets with the aim of ensuring that overall ecosystem function is preserved and where connectivity is maintained or preferably increased.
• Promote, provide support for and facilitate initiatives that incorporate landscape-scale management techniques. Specific activities include:
   o Implementing landscape-scale projects that focus on cross-sectoral, complementary activities that stimulate broad participation by community and Aboriginal groups, agencies, universities and local governments;
   o Promoting an understanding and awareness of landscape-scale conservation; and
   o Provision of information and support to farmers and the community on how to implement initiatives that provide benefits at the landscape scale.
Contributes significantly to BM-3. In addition, contributes significantly to objectives of AM-3, PM-1.
	BAI-4a Number of priority landscapes selected.
	BAI-4b Media monitoring.
	BAI-4c Increased awareness – before and after surveys.
	BAI-4d Levels of involvement by agencies, institutions and community in landscape-scale initiatives.		

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Priority Assets for Management Action
 	
• **Regional Ecological Linkages**
 	
BioLandscapes identified by Ecosystem Solutions (2009):
 	
• **Primary priority:**
  o BioLandscape 1 – Ruabon – Tuttunup
  o BioLandscape 2 – Scott River
  o BioLandscape 3 – Whicher
  o BioLandscape 4 – Benger
  o BioLandscape 8 – Toolibin
 	
• **Secondary Priority:**
  o BioLandscape 9 – Whicher 2
  o BioLandscape 10 – Karridale
  o BioLandscape 14 – Collie North
  o BioLandscape 15 – Collie South
  o BioLandscape 16 – Bridgetown
  o BioLandscape 17 – Perup
  o BioLandscape 18 – Windy Harbour
  o BioLandscape 19 – Walpole
 	
• **Specific Assets**
  o All flora and fauna species and ecological communities that are classified as threatened, rare, priority or significant.
  o Vegetation complexes with less than 30% areal extent remaining on pre-1750 levels (<10% a higher priority).
	Priority threats:
	• Climate change.
	• Dieback (*Phytophthora* spp.),
	• Decreasing rainfall (drought);
	• Fire (including inappropriate fire management regimes);
	• Environmental weeds (Category A) and introduced animals (cats, European fox, rabbits);
	• Problem species (introduced and native – European Honey Bee, Kookaburra, Minahs, Galahs, Corellas);
	• Habitat fragmentation and/or isolation;
	• Salinity
	• Land clearing;
	• Removing buffer and/or riparian vegetation;
	• Grazing by stock; and
	• Population increase / urban development.
	
	Secondary threats include other diseases (*Armillaria* spp.); other problem species (pigs, kangaroos); contamination through chemicals/pesticides; water extraction and/or capture; and physical removal of plants and/or animals.		