DRAFT

NATURE CONSERVATION OUTPUT

GOLDFIELDS REGION PLAN

2006-2009

Goldfields Woodlands National Park

ENDORSEMENT:

REGIONAL MANANGER

REGIONAL LEADER NATURE CONSERVATION

ENVIRONMENTAL MANAGEMENT BRANCH MANAGER

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PREFACE

The Nature Conservation Output comprises c. 46% ($72m) of the Department of Conservation and Land Management's 2005/06 budget, and is principally aimed at achieving the goal of conserving Western Australia's biodiversity. The Swan Region Plan is one of nine Nature Conservation Output plans that will provide the basis for the delivery of the Output at a regional scale over the next three years for the Divisions of Nature Conservation, Science and Regional Services.

If fully implemented, it would represent a major movement within the Department towards outcome-based management, and recognition of the place of active adaptive management (AAM). AAM is a process in which research is integrated with, and helps inform, operational aspects of conservation management, together with undertaking monitoring and evaluation of biodiversity status and condition to determine the effectiveness of activities in achieving desirable outcomes. Consequently, there will need to be a significant recognition and increase in regional activity aimed at the design and establishment of suitable condition monitoring and evaluation programs, rather than continuing to implement management prescriptions in the absence of an experimental management framework and without knowing whether outcomes are being achieved, or if management intervention is successful.

This paradigm shift will require active leadership and improved technical capacity across all three Divisions. To be successful, the AAM approach entails enhanced co-operation among Divisions and the development of new monitoring systems for many of the proposed regional outcome targets within this plan.

While there has been an attempt at describing three year outcome-targets for landscape, ecosystem (inc. wetlands) and protected area assets, to be effective these will need to be refined and made more specific once sufficient knowledge and information has been gained from appropriate monitoring systems and benchmark biological surveys. For the most part, condition trends are currently unknown and are unlikely to be detected over the next three years. Nevertheless, it is critical that suitable monitoring systems are developed and initiated during this plan so that the Department is better positioned to predict likely changes and threats to biodiversity, rather than to react to situations or problems some years, or even decades, after an observational trend has been detected. Future plan iterations should also be expanded to include performance measures and management targets to provide an indication on progress of candidate actions.

These plans collectively provide the basis for greater integration and coherence of Departmental activities and functions and a better focusing of effort to address major biophysical and social threats to biodiversity, as well as a basis for pursuing opportunities. They will help inform Statewide priorities in the delivery of conservation activities, particularly knowledge-building requirements, Threatened taxa and Threatened Ecological Communities listing priorities, and assist in identifying gaps in administration processes and planning framework to aid effective and consistent delivery of the Output at a high professional standard.

The draft of this Plan was written at an expert-based workshop held in Kensington on 30 August to 1 September; 2005, and informed by data and information from *A biodiversity audit of Western Australia's biogeographical subregions in 2002* (May and McKenzie 2002), then circulated to relevant staff for comment and further input for the final plan.

SYNOPSIS

The Nature Conservation Output Goldfields Region Plan provides a summary of key biodiversity values within the Goldfields Region and major threats to those values. It outlines 20 priority three year outcome targets for the Nature Conservation Output, and 44 associated candidate actions for the Divisions of Science, Nature Conservation and Regional Services at a range of scales for 2005-2008.

For the purposes of the Plan, four management zones were developed from 15 IBRA sub-regions that comprise (in part or full) the Goldfields Region including: Desert; Gascoyne-Murchison Pastoral; Coolgardie Woodlands and Nullarbor. The candidate actions in the Nature Conservation Output Goldfields Region Plan were developed on the basis of including only those actions that would make a direct and measurable improvement in meeting the three year Nature Conservation Output target-outcomes. Regional target outcomes were identified for those biodiversity assets and values that need to be actively managed if the Nature Conservation Output Aspirational Outcome is to be achieved. Current management responses being delivered under the Nature Conservation Output that do not directly contribute to meeting the regional targets or the Output's aspirational outcome of reducing the rate of decline in biodiversity and ecosystem condition, such as 'wild dog' control on unallocated Crown lands, where not included.

Analysis of major threats against biophysical values and existing management responses revealed a general absence of active conservation management in the Desert and Nullarbor management zones (a resourcing and capacity issue); despite the occurrence of significant conservation reserves and threats from altered fire regimes and feral camels and other introduced animals. Further, basic information on conservation reserves is generally lacking, as well as biological inventory (outside some survey work on proposed conservation reserves in the Gascoyne-Murchison Management Zone) and assessment of threats to biodiversity in these areas and at a bioregional/management zone scale.

Benchmark quantitative data on introduced animal populations that would provide the basis for monitoring the success of control programs is absent for all management zones, with perhaps the exception of the western portion of the Gascoyne-Murchison Management Zone. There is also a lack of detailed information and analysis to determine relatively intact landscapes that would form the basis for cost-effective investment and targeting of conservation effort. Priority has been given in the Plan to identify high priority landscapes in the Gascoyne-Murchison on the basis of currently known threats to biodiversity and in order to maximize conservation of biodiversity on leasehold lands and to complement management on newly acquired lands for the conservation reserve system. Similarly, data on Priority taxa and ecological communities to resolve conservation status is deficient, and a risk assessment is required to focus effort.

A gap analysis to determine priority ecosystems for reservation requires up-dating, and refinement of conservation reserve system design to enable regional scale ecological linkages is considered a priority. Land acquisition approaches need to be consolidated and better integrated with regional input for on-ground verifications.

In conclusion, there is a considerable gap in the scale and composition of current management responses aimed at biodiversity conservation, research requirements for management decision making and level of resources needed (both in terms of level of funding and technical capabilities) to be able to meet this Plan's proposed outcome-targets and address candidate actions.

A review of the candidate actions proposed in the Goldfields Region Plan highlights the need for the following priority strategic changes to be made, including some that will require an integrated management and inter-Departmental working group response:

Landscapes and Protected Area System

Altered fire regimes are major threats to biodiversity in all Goldfields Management Zones (Desert, Nullarbor, Gascoyne-Murchison Pastoral and Coolgardie Woodlands), but of particular concern in the Desert and Coolgardie Management Zones.

Determination of appropriate fire regimes is required together with an improved (or detailed) understanding of current fire-related practices and regimes. While this knowledge is being attained, urgent action is needed to restrict large-scale unmanaged fires focusing on the Desert and Coolgardie Management Zones around and within existing and proposed conservation reserves. This will require the development of regional scale notional fire regimes that aim to maintain or enhance biodiversity values, and the refinement of management systems, including establishment of monitoring programs, to ensure appropriate fire regimes are achieved.

Understanding of feral camel (and other large introduced herbivores) distribution and densities, and impacts on biodiversity values, is urgently required for all management zones to develop an effective control program. Similarly, an understanding of feral goat population data/dynamics and impacts is required in the western portion of the Gascoyne-Murchison Management Zone.

Minimising the impacts of mining and exploration activities on biodiversity is required for the Coolgardie Woodlands Management Zone, through continued involvement in the land use planning and Environmental Impact Assessment processes, and subsequent monitoring and auditing processes.

While environmental weeds are considered having low impact on biodiversity values in the Goldfields Region, specific information is required on the impact of weeds on the conservation reserves in the Nullarbor Management Zone, particularly from adjacent pastoral properties.

Off-reserve conservation is required in relatively intact landscapes around existing and proposed conservation reserves in the Gascoyne-Murchison Management Zone, and development of new programs to provide incentives for leaseholders

Biodiversity inventories and monitoring on taxa status and ecosystem condition monitoring are required for the conservation reserves in the Nullarbor and Desert Management Zones.

Wetlands

Biological inventory and condition benchmarking is required for six wetlands listed in the *Directory of Important Wetlands of Australia*, along with appropriate management responses to address threats.

Ecosystems at Risk

A program of investigation and analysis to identify and determine regionally significant ecological communities/ecosystems, and those under threat, is required. As a basis for this investigation, a current candidate list comprising around 50 data deficient ecological communities should be considered.

Recovery work is required for one listed Threatened Ecological Community at Depot Springs, including benchmarking and monitoring of the condition.

A program of investigation is required for the Nullarbor Karst system to determine conservation values.

Species at Risk

Development and implementation of three Critically Endangered, four Endangered, and 16 Vulnerable species recovery plans, including basic benchmarking surveys and monitoring; and resolve the conservation status of 10 taxa and 10 ecological communities.

Resources

Full implement of all 65 candidate actions in this plan will require $8,840,000 in the first year (includes some one off projects) with a slightly lesser amount required each year to fund the ongoing actions in second and third years.

Current allocations (2005-2006) total $1,350,8844 and are derived from six Purchasers, with the Nature Conservation Output providing $602,714 (44.6%)

7% of candidate actions are currently funded or partly funded from within existing allocations (Total $615,749).

The Purchasers provide $735,095 for activities that support the actions that directly conserve the region's biodiversity, including wild dog control, aboriginal/community liaison, wildlife licensing and enforcement and reserve management.

Implementation of all the candidate actions would require a significant increase in capacity (staff) in the Goldfields Region.

CONTENTS

1. INTRODUCTION AND SCOPE

1.1 SCOPE AND PURPOSE OF PLAN

- To describe three year regional scale Nature Conservation Output outcome targets, priorities, and actions integrated across bioregions and Divisions that will contribute towards the Nature Conservation Output Aspirational Outcome (see Section 3 below);

- To provide a framework for Nature Conservation Output investment, with a view to optimising resources, integrating actions, and delivering practical outcomes consistent with the Service Provision Agreements; and

- To clarify roles and responsibilities for Nature Conservation Output actions for Regional Services, Science Division and Nature Conservation Division.

1.2 NATURE CONSERVATION OUTPUT DESCRIPTION

"*The development and implementation of programs for flora and fauna conservation for threatened species and ecological communities and for commercially exploited species according to the principles of ecological sustainability; the acquisition, conservation and protection of representative ecosystems; and encouraging public awareness, understanding and support for nature conservation.*"

1.3 NATURE CONSERVATION OUTPUT ASPIRATIONAL OUTCOME

Within 25 years (2005-2030) the rate of human-induced extinction of local populations of species will be reduced to near zero, and deterioration in the condition[1] of ecosystems resulting from human activity will be reversed through management intervention by:

- The creation of a network of conservation reserves (to protect and manage biodiversity *in-situ* surrounded by compatibly managed lands/waters where conservation is incorporated into integrated land/resource use and ecological linkages to maximise conservation of biodiversity);

- The restitution of intact, functional landscapes and habitat;

- The acquisition of factual knowledge and development of improved understanding of biodiversity patterns, status, and threats to underpin informed decision-making; and

- The education of the public, so as to increase awareness and understanding of biodiversity and conservation requirements in order to gain long-term support and change in behaviour.

1.4 REGIONAL DESCRIPTION AND BIODIVERSITY ASSETS/VALUES

The Goldfields Region makes up 34.3% of Western Australia, or 11.2% of the Australian continent, and is biogeographically extremely diverse comprising either entirely or large proportions of eight Interim Biogeographic Regionalisation for Australia (IBRA) bioregions and 13 IBRA subregions. An additional two IBRA regions have minor occurrences within the region (Yalgoo and Great Sandy Desert) (See Figure 1.)

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[1] Condition relates to species richness, species composition and abundance, and vegetation/habitat structure

The variability in both geology and landform has given rise to a rich diversity in landscape and vegetation assemblages. More than 150 Beard vegetation associations are described for the Region.

The Region is botanically rich, particularly throughout the interzone (Coolgardie Bioregion) where a number of groups such as the Proteaceae, Eucalypts and the Acacias show particularly high levels of diversity and endemism. Over 3020 plant species are recorded from the region but this will increase with survey effort and taxonomic revision.

Other biodiversity values include the following:

- Threatened and Priority flora taxa currently recognised: 10 Declared Rare Flora (DRF). [this is not relevant here – this is an action being undertaken rather than a statement of values – there will always be nominations and changes proposed.] There are 89 Priority One, 42 Priority Two, 60 Priority Three and 20 Priority Four although these numbers continually change in light of new knowledge from botanical survey;

- More than 437 vertebrate taxa are known for the Goldfield Region that represents 40% of known taxa for WA and 22% of Australian taxa. Diverse in highly adapted arid zone fauna, especially reptiles in which richness exceeds all other deserts in the world by several times. Numbers of invertebrate species are beyond estimation;

- Currently there are 10 fauna species that are considered threatened and a further 20 species that are specially protected;

- Nullarbor Karst system is unique and of national and international significance - if nominated it would possibly meet all criteria for World Heritage Listing;

- Episodic and semi-permanent freshwater wetlands across an otherwise arid environment are extremely important refugia for a variety of organisms;

- Banded Ironstone ranges are restricted in extent, show high levels of endemicity in biota and associated assemblage structures;

- Salt lake systems (including ancient paleodrainage systems), particularly through the Coolgardie and Murchison bioregions;

- Central Ranges - Geologically diverse including volcanic and quartzite derived ranges (Within the Western Australian part of the Central Ranges Bioregion very little survey work has been undertaken);

- Subterranean systems and associated troglofauna and stygofauna (Calcrete aquifers through the Murchison, where sampled, have already demonstrated high levels of speciation and endemicity in relation to stygofauna. Similar systems occur through parts of the desert bioregions. The Nullarbor karst system is also likely to support unique cave and aquifer faunas);

- At Depot Springs is the only formally listed Threatened Ecological Community. [again – statement of activity to be included in the tasks – not a statement of value] More than 50 data deficient ecosystems are recorded from the Murchison or Coolgardie bioregions that may be under threat or are in unacceptable rates of decline; and

- The Goldfields Region is currently responsible for the management of 8,249,434.7 ha of conservation reserves in 50 separate tenure blocks and reserves. There are 3,526,249 ha of proposed new conservation reserves and a further 4,500 ha of proposed 2015 pastoral lease excisions.

Figure 1. Map of Goldfields Region showing IBRA sub-regional and IMCRA boundaries, and lands managed by the Department of Conservation and Land Management.

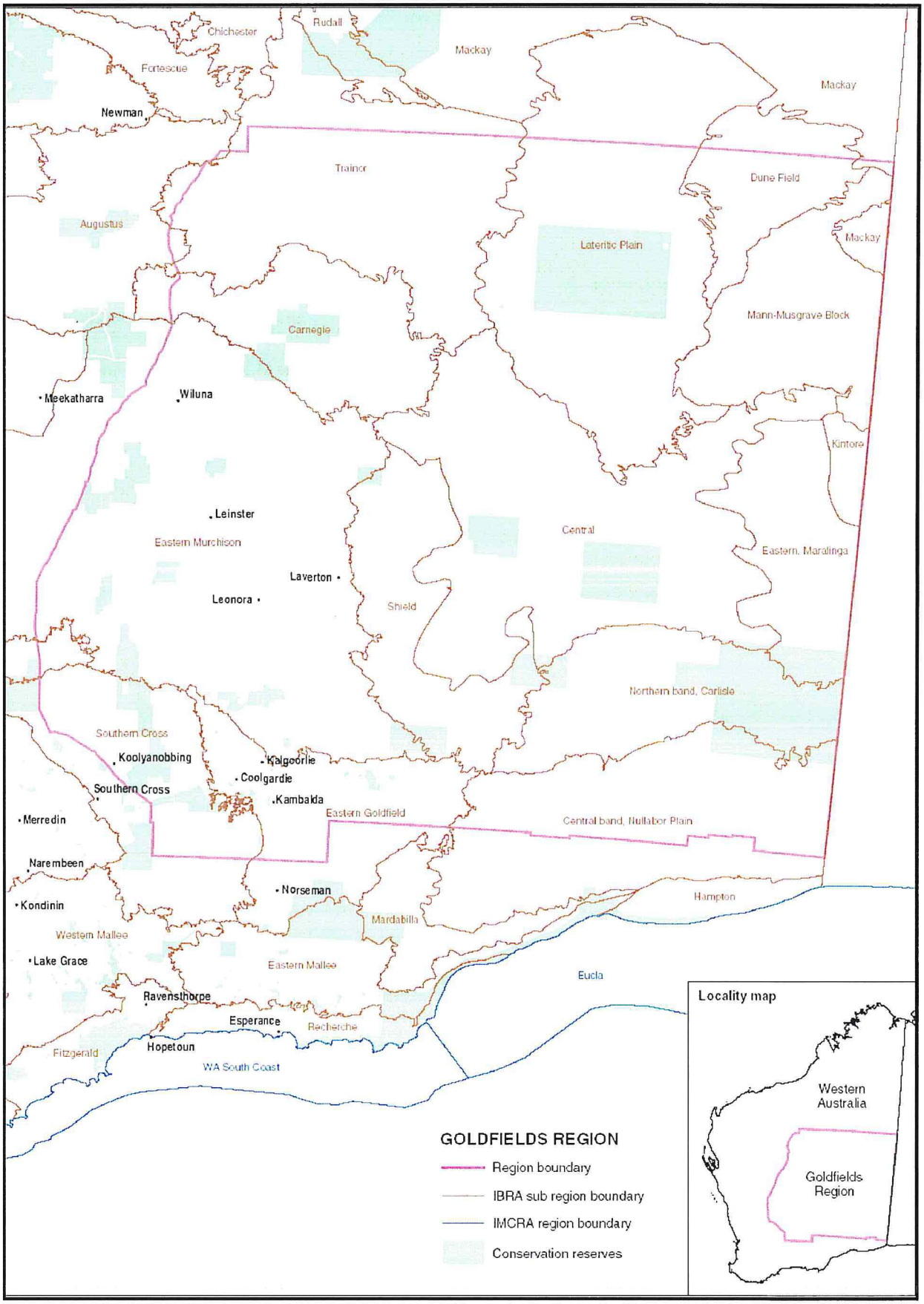
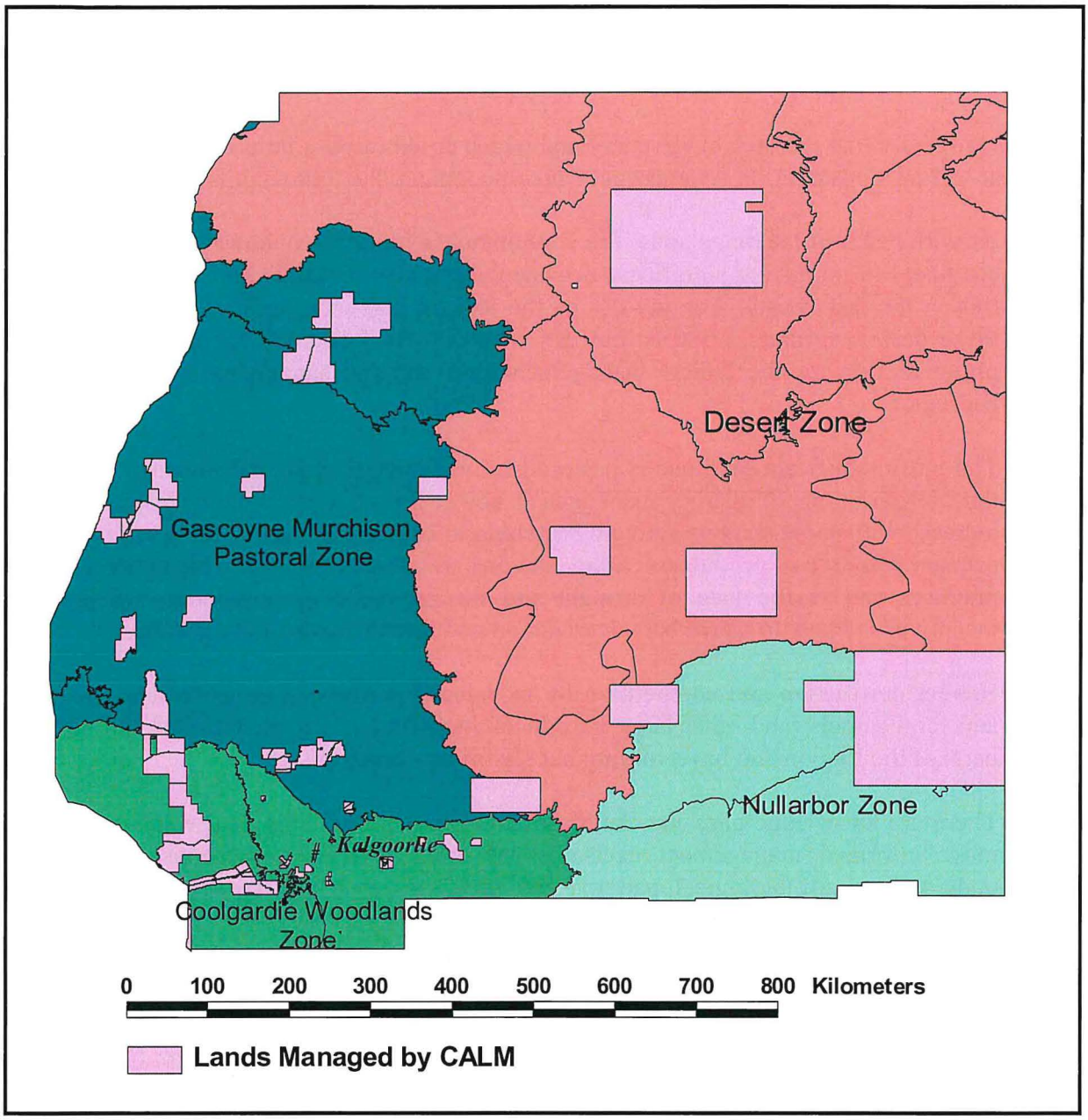


Figure 2. Map of the four Goldfield Region Management Zones



1.5 MAJOR THREATS TO BIODIVERSITY AND BARRIERS TO CONSERVATION

The matrix at Appendix 1 shows the relativity of major biophysical threats against broad biodiversity conservation values of landscape, ecosystem, species and wetlands/riparian across the Goldfields Region's conservation management zones.

Major processes that threaten biodiversity and which could cause a failure in meeting CALM's 25 year Nature Conservation Aspirational Outcome include the following issues.

- As with much of the rangelands, fire is of immense importance, however, current regimes are likely to be having significant detrimental impacts on biodiversity. Estimates show that in the last decade around 40% of the Region has been burnt. The average size of these fires is around 14,500 ha but can exceed several 100,000 ha in size. Areas most prone to fire are the Desert management unit and the sandplains of the Coolgardie Bioregion.

- The most significant land use is pastoralism, in terms of scale and potential impacts, in the Murchison and Nullarbor management units. Environmental degradation is likely to increase with some stations actively switching to cattle, goats and meat sheep breeds as a primary resource of production. Many stations are already unsustainable in their land use practices and in the face of drought and the provision of production subsidies and incentives is likely to exacerbate degradation and further biodiversity decline.

- Habitat destruction and competition by introduced animals, such as feral goats, rabbits and feral camels (and other large introduced herbivores), are uncontrolled through large parts of the Region and have varying but significant impacts.

- There are knowledge gaps in relation to conservation and biological values. Ability to make informed management decisions are often severely compromised by lack of understanding of biological patterns and processes at a variety of scales across the Region.

- The conservation reserve system currently has very little latitudinal connectivity and is surrounded by land use which may not be managed in conservation sensitive ways resulting in biogeographic islands in a 'sea' of often degraded landscapes.

- Introduced predators particularly feral cats and foxes occur across the entire Region and are partially responsible for the decline or disappearance of up to 50% of the pre-European mammal fauna of the Region. These declines may still be continuing, although at a reduced rate due to the disappearance of the more sensitive species.

- Mining of unique or restricted resources, and associated impacts (infrastructure), in areas where there are also high conservation values, such as banded ironstone ranges, greenstone areas or mineral deposits within the central ranges is leading to biodiversity loss. Uncontrolled exploration activities, including gridlines and uncapped drill holes contribute to biodiversity loss.

- Other unsustainable land uses includes uncontrolled firewood collection through parts of the woodlands, and Sandalwood harvesting.

- Noxious plants and other environmental weeds, includes: Wards Weed, Ruby Dock, Onion weed and buffel grass. Areas of high disturbance are prone to weed infestations

and introduced grazing pastures such as buffel grass have the potential to occupy significant parts of the landscape in the future.

- Lack of community understanding of environmental issues and conservation values and in some instances lack of support for conservation initiatives poses a barrier to biodiversity conservation. This includes other Government agencies that control or are involved in land and resource management and frequently support practices and uses that are in direct conflict with conservation values.

2. REGIONAL NATURE CONSERVATION THREE YEAR OUTCOME TARGETS

For the Nature Conservation Output Aspirational Outcome is to be achieved the three year regional target outcomes for those biodiversity assets and values that need to be actively managed are:

LANDSCAPE	T1	Reduce the rate of decline in the condition[2] of the Gascoyne-Murchison Management Zone landscapes[3].
	T2	Reduce the rate of decline in the condition of the Coolgardie Woodland Management Zone landscapes.
	T3	Reduce the rate of decline in the condition of the Desert Management Zone landscapes
	T4	Reduce the rate of decline in the condition of the Nullarbor Management Zone landscapes
PROTECTED AREA	T5	No decline in the condition of the existing and proposed conservation reserve system in the Desert Management Zone.
	T6	No decline in the condition of the existing and proposed conservation reserve system in the Nullarbor Management Zone.
	T7	Improve[4] the condition of the existing and proposed conservation reserve system in the Gascoyne-Murchison Management Zone.
	T8	No decline in the condition of the existing and proposed conservation reserve system in the Coolgardie Woodlands Management Zone.
ECOSYSTEMS AT RISK	T9	Maintain the condition of six *Directory of Important Wetlands of Australia* listed Wetlands (Lake Ballard, Lake Barlee, Lake Marmion, Lake Carnegie, Windich Springs, Rock Pools of the Walter James Range).
	T10	The condition of one Threatened Ecological Community (Depot Springs) will be improved.
	T11	The condition of 10 data deficient ecological communities will be maintained (Appendix 2).
	T12	No decline in the richness of the troglodytic fauna of the Nullarbor Karst[5] system.

Continued ....

[2] Condition relates to species richness, species composition and abundance, and vegetation/habitat structure.
[3] Landscapes include relatively intact and biodiversity rich areas.
[4] Baseline data exists for some reserves.
[5] Integrate with Nature Conservation Output South Coast Plan.

SPECIES AT RISK	T13	Maintain the size of the populations of one Critically Endangered (*Tetratheca paynterae paynterae*), two Vulnerable (*Tetratheca aphylla* and *Tetratheca harperi*) and two proposed Vulnerable *Tetratheca* spp. (*T. paynterae cremnobata* and *T. erubescens*) in the Coolgardie 2 IBRA subregion.
	T14	Maintain the number and size of the populations of Vulnerable flora sp. *Gastrolobium graniticum* in the Coolgardie IBRA subregion).
	T15	Maintain the number and size of the populations of six species (*Conospermum toddii*-Vulnerable, *Leucopogon sp.* Helena & Aurora Range (BJ Lepschi 2077) -Critically Endangered, *Eucalyptus articulata* - Endangered, *Thryptomene wittweri*-Vulnerable, *Myriophyllum lapidicola*- Vulnerable, *Ricinocarpos brevis* ms – Critically Endangered) listed Declared Rare Flora
	T16	No decline in conservation status of nine terrestrial Threatened fauna (*Macrotis lagotis* - Vulnerable, *Dasyurus geoffroii*-Vulnurable, *Dasycercus cristicauda*-Vulnerable, *Sminthopsis psammophila*-Endangered, *Notoryctes caurinus*-Endangered, *Notoryctes typhlops*-Endangered, *Rostratula benghalensis australis*-Vulnerable, *Playtcercus icterotis xanthogenys*- Vulnerable, *Egernia kintorei*-Vulnerable[6])
	T17	Maintain the number and abundance of the populations of the Vulnerable Rock Wallaby (*Petrogale lateralis)* at Calvert Ranges [7](Little Sandy Desert 2 Rudall IBRA subregion) and Townsend Ridges (Central Ranges 1 IBRA subregion) and.
	T18	Maintain the density of the populations of the Vulnerable Mallee Fowl (*Leipoa ocellata*) at the proposed Mount Manning Range Conservation Park (extension to the Mount Manning Range Nature Reserve).
	T19	Improve the conservation status of six locally extinct and Threatened *spp* (Candidate species include Golden Bandicoot *Isoodon auratus* (V), Burrowing Bettong *Bettongia lesueur*(V), Rufous Hare-wallaby *Lagorchestes hirsutus*(V) and Banded Hare- wallaby *Lagostrophus fasciatus*(V), Greater Stick Nest Rat- *Leporillus conditor*(V), Bilby *Macrotis lagotis*(V)) by establishing sustainable populations at the proposed Lorna Glen Conservation Park.
	T20	The conservation status of 10 species (Appendix 3) of Priority fauna will be resolved.

[6] Resolve whether to include the wombat

[7] The actions are implemented by the Pilbara Region

3 LIST OF REGIONAL THREE YEAR CANDIDATE ACTIONS

The following section lists priority actions that need to be undertaken to meet the three year expected outcomes of Section 2. These have been arranged according to major asset categories.

3.1 LANDSCAPES

Target Three Year Outcome - T1: Reduce the rate of decline in the condition of the Gascoyne-Murchison Management Zone landscapes

Target Three Year Outcome - T2: Reduce the rate of decline in the condition of the Coolgardie Woodland Management Zone landscapes

Candidate Actions:

1. Establish protocols for, and complete an assessment of, rangeland vegetation condition at a sub regional scale using remote sensing with ground validation. This will help establish a benchmark of current ecosystem condition and assist in identifying relatively intact ecosystems for urgent conservation management in Gascoyne-Murchison and Coolgardie Woodland Management Zone landscapes to prevent further decline.

   Primary Responsibility: Director Science Division to take responsibility for the design and delivery of project

   Support: Gascoyne-Murchison aspects of project - Regional Ecologist from Goldfields and Midwest Regions, and Science Division to provide input into project design and field validation

   Coolgardie Woodland aspects of project - Regional Ecologist from Goldfields, Wheatbelt, Regional Leader Nature Conservation South Coast Region and Science Division to provide input into project design and field validation

   Status: New

   Indicative Cost: a) $250,000 one off for the Gascoyne-Murchison
   b) $150,000 one off for the Coolgardie Woodlands

   Completion date: June 2008

2. Develop and commence a trial monitoring system (by June 2006) for rangeland biodiversity condition and ecosystem function (with reference to Lorna Glen, Black Range/Lake Mason, and Goongarrie[8] monitoring) to determine trends and enable evaluation of the effectiveness of management actions with respect to achieving T1 and T2. Complete initial trial and review program by June 2008.

   Primary Responsibility: Director Nature Conservation to take responsibility for the design and delivery of project

[8] Represent a latitudinal gradient through the rangeland and includes representatives of reserves for which good data is available.

Support: Gascoyne-Murchison actions - Regional Ecologist from Goldfields and Midwest Regions, and Director Science Division to provide input into project design, methodology and data collection and analysis

Coolgardie Woodland actions - Regional Ecologist from Goldfields and South Coast and Science Division to provide input into project design, methodology and data collection and analysis

Status: Commenced

Indicative Cost: a) $150,000 pa for two years for development
b) $150,000 pa for three years for implementation of the trials

3. Conservation Reserve System Acquisition[9]:

3.1 Update gap analysis of the conservation reserve system in the Gascoyne-Murchison IBRA sub-regions as a basis for setting priorities for acquisition by December 2005, and in the Coolgardie Woodlands IBRA sub-regions by June 2006.

Primary Responsibility: Nature Conservation Director to take responsibility for planning and analysis

Support: Regional Ecologist Goldfields and Regional Leader Nature Conservation South Coast Region to provide input

Status: Ongoing

Indicative Cost: $100,000 pa (excluding land purchase)

Completion date: June 2006

3.2 Review the design of a conservation reserve system and make recommendations for acquisitions and/or other conservation measures to maximise biodiversity outcomes for the Gascoyne-Murchison by March 2006 and for the Coolgardie Woodlands by December 2006.

Primary Responsibility: Nature Conservation Director

Support: Regional Leader Nature Conservation to provide input

Science Division to provide input

Status: New

Indicative Cost: No additional cost - See 3.1

Completion date: December 2006

3.3 Acquisition of land for inclusion in the conservation reserve system.

[9] Rangeland Ecologist to be appointed and undertake or arrange for this work to be done

Primary Responsibility: Director Nature Conservation to lead negotiations and administration/proclamation

Support: Regional Leader Nature Conservation to assist in the on-ground assessment of the suitability of proposed acquisitions

Status: Ongoing

Indicative Cost: $15,000 pa for assisting in on-ground assessments (excluding land purchase)

Completion date: Ongoing

3.4 Prepare Interim Management Guidelines for new acquisitions to the conservation reserve system and implement management actions.

Primary Responsibility: Regional Manager

Support: Director Nature Conservation to endorse, and where Commonwealth funds are used report back to the Commonwealth Department of Environment and Heritage, and provide consistent planning framework and standards

Status: Ongoing

Indicative Cost: $20,000 pa planning (cost of implementation unknown)

Completion date: December 2007

3.5 Enhance the conservation reserve system through off-reserve measures including use of market-based instruments, Conservation Covenants, provision of advice, Section 16a Agreements, integration of biodiversity conservation requirements with property management planning and complementary management of private conservation lands.

Primary Responsibility: Manager Species and Communities Branch to coordinate program and development of suitable market-based instruments

Support: Regional Leader Nature Conservation on ground consultation and assist in negotiations and advice

Status: Ongoing

Indicative Cost: $20,000 pa (cost of instruments unknown)

Completion date: Ongoing

4. Describe the current fire management practices and fire regimes of the Gascoyne-Murchison IBRA sub-regions and quantify the impacts of the current fire regimes on ecosystem condition.

Primary Responsibility: Manager Fire Management Services

Support: Regional Leader Nature Conservation to provide input into on-ground consultation

Science Division for input on the project design and methodology and analysis

Status: Ongoing

Indicative Cost: $120,000 pa

Completion date: June 2008

5. Develop (by June 2006) and implement a fire management plan (that includes reducing the current extent and frequency of wildfires and condition monitoring in the Coolgardie to Southern Cross Wildfire Threat Analysis area) that protects and maintains biodiversity of the Coolgardie Woodlands by June 2006, with review by June 2008 following completion of Action 4 above.

Primary Responsibility: Regional Leader Nature Conservation

Support: Director Science Division to provide guiding principles and advice on ecologically appropriate fire regimes

Manager Fire Management Services to provide operational guidelines

Status: New

Indicative Cost:
a) $100,000 for one year to development;
b) $500,000 pa (estimated for implementation)

Completion date: Development by June 2006 then ongoing

6. Continue to provide input into land use planning processes, including Environmental Impact Assessments, Notice of Intent to Clear and monitor conditions following approval and audit compliance with statutory obligations and managements plans, especially associated the mining and exploration to ensure biodiversity values are protected and maintained.

Primary Responsibility: Regional Leader Nature Conservation

Support: Manager Environmental Management Branch to provide systems, standards and advice

Status: Ongoing

Indicative Cost: $150,000 pa

Completion date: Ongoing

7. In order to achieve control of introduced animals (T1 and T2) the following action are necessary:

- Undertake an aerial survey of the distribution and density of feral/unmanaged and managed goats in the Gascoyne-Murchison and within the Coolgardie Woodlands (in relation to Department of Agriculture's previous feral goat work);

- Determine the correlation between high feral goat numbers and areas of high biodiversity values (see Action 1);

- Describe the impact of goats on ecosystem condition and function; and

- Complete a risk analysis of the threat of feral goats to biodiversity values including individual species.

Primary Responsibility: Manager Environmental Management Branch to design and manage the project

Support: Goldfields and Midwest Regional Ecologists to undertake field verification of broad scale surveys

Director Science Division to provide advice on the project design, methodology and data assessment

Status: New

Indicative Cost: $750,000 one off

Completion date: June 2008

8. Due to the observed decline in condition and habitat loss caused by firewood removal on unallocated Crown land and reserves surrounding Kalgoorlie and other Goldfields' towns, develop a regional response plan[10] to ameliorate impacts, including benchmarking impacts, a situation statement that indicates localities/areas being affected and impacts on biodiversity, monitoring, education and compliance.

Primary Responsibility: Regional Leader Nature Conservation to complete response plan

Support: Director Sustainable Forest Management to provide advice and funds with respect to commercial harvesting

Science Division to provide advice on ecological/biodiversity impacts, design on monitoring

Manager Nature Protection Branch to provide advice on and standards for compliance

Manager Species and Communities Branch to provide framework for response plan so it has Statewide applicability

Status: New and ongoing

Indicative Cost: $60,000 pa

[10] Plan needs to be consistent with a State level framework for amelioration of impacts of biodiversity values from firewood collection to be developed by Species and Communities Branch

Completion date: June 2007

Target Three Year Outcome - T3: Reduce the rate of decline in the condition of the Desert landscapes

Target Three Year Outcome - T4: Reduce the rate of decline in the condition of the Nullarbor landscapes

Candidate Actions:

1. (a) Determine the trend in the frequency and extent of fire over the last 20 years (1985–2005) using satellite imagery as the basis of an assessment of the impact of fire regimes on landscape condition and biodiversity values by December 2007

   (b) Develop and maintain fire frequency and extent maps to assess the effectiveness of management actions in maintaining ecosystem condition and biodiversity values of the Desert and Nullarbor landscapes

   Primary Responsibility: Regional Leader Nature Conservation

   Support: Manager Fire Management Services to provide assistance with digitising and mapping from satellite imagery

   Director Science Division for assist with fire regime interpretation and analysis

   Status: Ongoing

   Indicative Cost: a) $120,000 one off
   b) $20,000 pa monitoring

2. Urgent actions to protect the biodiversity values of the Nullarbor and Desert Management Zone landscapes:

   - Determine areas of high biodiversity value outside the protected area system (areas likely to complement (see Landscape Candidate Action 3.1)) that are likely to decline in the absence of a managed response;

   - Implement the prescribed use of fire to reduce the impact of unmanaged fires on the biodiversity values of the Mangikili Claypan Nature Reserve and the De La Poer Range Nature Reserve, the proposed Carnarvon Range Conservation Park and the Queen Victoria Spring Nature Reserve; and

   - Commence monitoring of frequency and scale of fires in the Nullarbor and Desert landscapes.

   Primary Responsibility: Regional Leader Nature Conservation

   Support: Manager Fire Management Services to provide advice on fire operational planning and techniques

   Director Science Division to provide advice on the location of areas of high biodiversity value

Status: New

Indicative Cost: a) $20,000 one off for the analysis
b) $250,000 pa fire management actions

Completion date: June 2007 analysis then ongoing

3. Undertake survey of feral camels (inc. ungulates) in the Desert, Nullarbor and the Gascoyne-Murchison management (eastern part) zones and of rabbits in the Nullarbor management zone to determine distribution and abundance, and assessment of impacts on biodiversity values as a basis to commencing a control program.

Primary Responsibility: Science Division

Support: Regional Leader Nature Conservation (Goldfields, Pilbara, Kimberley) to provide logistical support and field support, and Indigenous liaison and clearances

Manager Environmental Management Branch to provide advice and input

Status: Commenced in part 2005, needs to be expanded across relevant regions to complete predicted distribution of camels

Indicative Cost: a) $250,000 to cover aerial survey
b) $75,000 to cover assessment

Completion date: June 2008

3.2 PROTECTED AREA SYSTEM

Target Three Year Outcome – T5: No decline in the condition of the existing and proposed conservation reserve system in the Desert management zone

Target Three Year Outcome – T6: No decline in the condition of the existing and proposed conservation reserve system in the Nullarbor management zone

Target Three Year Outcome – T7: Improve the condition of the existing and proposed conservation reserve system in the Gascoyne-Murchison management zone

Target Three Year Outcome – T8: No decline in the condition of the existing and proposed conservation reserve system in the Coolgardie Woodlands management zone

Candidate Actions:

1. Describe the current fire management practices and fire regimes in the protected area system of the Desert, Nullarbor, Gascoyne-Murchison and Coolgardie Woodlands

management zones and determine the impacts of the current fire regimes on ecosystem condition.

Primary Responsibility: Manager Fire Management Services

Support: Regional Leader Nature Conservation to provide input into on ground consultation

Director Science Division for input on the project design and methodology and analysis

Status: Ongoing

Indicative Cost: $120,000

Completion date: June 2007

2. Develop (by June 2007) and implement a fire management program (that includes reducing the current extent and frequency of wildfires and condition monitoring) in Gibson Desert Nature Reserve, Earaheedy, Lorna Glen, Black Range, Lake Mason, Kaluwiri proposed Conservation Parks, Great Victoria Desert Nature Reserve, Queen Victoria Spring Nature Reserve, Goldfields Woodlands National Park[11] that protects and maintains biodiversity of the protected area system in all management units in the Goldfield Region by June 2008.

Primary Responsibility: Regional Leader Nature Conservation, in conjunction with Regional Fire Coordinator

Support: Director Science Division to provide guiding principles and advice on ecologically appropriate fire regimes

Manager Fire Management Services to provide operational guidelines

Status: New

Indicative Cost: a) $100,000 for one year to develop
b) $500,000 pa to implement

Completion date: June 2007 to develop then ongoing

3. Undertake survey of feral camels, and ungulates, to determine distribution and abundance, and assessment of impacts on biodiversity values, and as a basis to commence a control program for the Desert, Nullarbor and Gascoyne-Murchison management (eastern part) units.

Primary Responsibility: Science Division

Support: Regional Leader Nature Conservation (Goldfields, Pilbara, Kimberley) to provide logistical support and field support, and Indigenous liaison and clearances

[11] These areas have been selected on the basis of their known biodiversity value

Manager Environmental Management Branch to provide advice and input

Status: Commenced in part 2005, needs to be expanded across relevant regions to complete predicted distribution of camels

Indicative Cost: (Included in Landscape action)

Completion date: June 2008

4. Expansion of Western Shield into the Goldfields Region (proposed Lorna Glen Conservation Park, and Ministerial condition in association with Portman Mining in the proposed Mt Manning Range Conservation Park):

   - Continue control of introduced predators (fox and feral cat) at Lorna Glen
   - Implement fire management plan for Lorna Glen;
   - Assess suitable candidate species of mammals for reintroduction into Lorna Glen and prepare and implement a translocation proposal (see T19); and
   - Undertake recovery actions for Mallee Fowl at Mt Manning.

   Primary Responsibility: Regional Leader Nature Conservation

   Support: Science Division to provide advice and research

   Species and Communities Branch to provide advice and administration for translocations

   Environmental Management Branch to provide overall coordination and standards for Western Shield

   Status: Commenced

   Indicative Cost: a) $320,000 pa for Lorna Glen including reintroductions (see T19) from May 2006
   b) $70,000 pa for Mt Manning

   Completion date: Ongoing

5. Undertake rapid survey and assessment of environmental weeds with particular emphasis in the southern area of the Goldfields Region and on those pastoral leases/unallocated Crown land adjacent to the Nullarbor conservation reserves (including proposed reserves) to determine species, distribution and abundance, and assessment of impacts on biodiversity values, and as a basis to commence a control program.

   Primary Responsibility: Regional Leader Nature Conservation

   Support: Director Science Division to provide advice

Manager Environmental Management Branch to advice and standards

Status: New

Indicative Cost: $120,000 (ongoing control program costs unknown until completion of assessment and development of program)

Completion date: June 2007

6. Continue input into the land use planning and assessment of exploration and mining operations with particular emphasis on the conservation reserve system in all Management Zones (there is currently a high focus in the Coolgardie Woodlands Management Zone).

Primary Responsibility: Regional Leader Nature Conservation

Support: Manager Environmental Management Branch to provide advice and standards

Status: Ongoing

Indicative Cost: $120,000 pa (inc. field assessment and audits/monitoring)

Completion date: Ongoing

7. Survey and assess the biodiversity values and ecosystem condition of Gibson Desert Nature Reserve, Earaheedy, Lorna Glen, Black Range, Lake Mason, Kaluwiri proposed Conservation Parks, Great Victoria Desert Nature Reserve, Queen Victoria Spring Nature Reserve, Goldfields Woodlands National Park as the basis for maintaining species abundance and ecosystem condition in the Goldfield Region.

Primary Responsibility: Regional Leader Nature Conservation

Support: Director Science Division to provide advice on design and methodology of project

Status: New

Indicative Cost: a) $200,000 (inc. field assessment)
b) $200,000 pa for on-going monitoring

June 2007

8. Develop an integrated Nature Conservation information management system[12] for the Goldfields Region.

Primary Responsibility: Regional Manager

[12] Needs to be consistent with State information management framework

Support: Nature Conservation Leader to provide advice along with Science Division on requirements

Status: New

Indicative funding: a) $150,000 for development
b) $50,000 for maintenance

Completion date: June 2006 for development then ongoing

3.3 ECOSYSTEMS

Target Three Year Outcome – T9: The condition of seven[13] *Directory of Important Wetlands of Australia* listed Wetlands (Lake Ballard, Lake Barlee, Lake Marmion, Lake Carnegie, Windich Springs, Rock Pools of the Walter James Range, Lake Throssell) will be maintained.

Candidate Actions:

1. Urgent actions include:

   - Benchmark the current condition of vegetation associated with the seven wetlands and assess potential threatening processes, including soil condition/erosion;
   - Survey waterbird activity (species and abundance) following significant rainfall events, including aerial surveys where ground access is restricted (opportunistic);
   - Work with landholders to maintain or improve the condition of wetlands, including quantification and amelioration of detrimental adjacent land use (ongoing); and
   - Establish wetlands monitoring system.

   Primary responsibility: Regional Leader Nature Conservation

   Supported by: Director Science Division to provide advice on condition benchmarking, monitoring and waterbird survey methods

   Status: New

   Indicative budget: a) $ 100,000
   b) $20,000 for ongoing monitoring

   Completion date: June 2007 to benchmark the ongoing

Target Three Year Outcome – T10: The condition of one Threatened Ecological Community (Depot Springs) will be improved

Candidate Actions:

[13] Considered only those DIWA wetlands not in the protected area system

1. Urgent actions for the Threatened ecological community include:

   - On-site assessment of the condition of the Threatened Ecological Community and of potential threatening processes;
   - Establish a recovery team by June 2006, prepare and implement Interim Recovery Plan by December 2006; and
   - Establish monitoring system and undertake benchmark survey.

   Primary Responsibility: Regional Ecologist

   Supported by: Manager Species and Communities Branch to provide planning framework

   Status: New

   Indicative budget: a) $10,000 on-site assessment and establishment on monitoring program
   b) $10,000 for the development of the plan (cost of recovery actions unknown)

   Completion date: Benchmark and plan development by June 2006 then ongoing

Target Three Year Outcome - T11: The condition of 10 data deficient ecological communities will be maintained

Candidate Actions:

1. Urgent actions for data deficient ecological communities include:

   - Undertake a regional assessment to identify suitable ecological communities, and determine conservation status and threats; and
   - Prepare proposals for listing of appropriate ecological communities.

   Primary Responsibility: Regional Leader Nature Conservation to coordinate and arrange assessments, surveys and prepare listing nominations

   Supported by: Manager Species and Communities Branch to provide advice on listing process and undertake listing administration

   Status: New

   Indicative budget: $120,000

   Completion date: June 2008

Target Three Year Outcome - T 12: No decline in the condition of the Nullarbor Karst system

Candidate Actions:

1. Urgent actions include:

   - Prepare a paper on the values of, and status of the Nullarbor Karst system by June 2006 (with input from an expert working group, with inter and intra State representation);

     Paper to include: a literature review and documentation of existing conservation values of the Nullarbor Karst system as a prerequisite to determining the need for further sampling/survey by December 2006;

   - Carry out a broad scale assessment of threatening processes, including a desk top analysis and a targeted field assessment (especially visitor impacts) on biodiversity values by June 2007;

   - Develop an understanding of hydrological processes affecting the Nullarbor Karst system to enable a better assessment of threatening processes by June 2006;

   - If required, carry out a further sampling/survey of stygofauna and troglofauna, including sub-fossils and other biota, to fill knowledge gaps of levels of endemism and species composition by June 2007; and

   - Prepare a nomination of the Nullarbor Karst system for World Heritage listing in recognition of its national and international significance by June 2008.

   Primary responsibility: Goldfields Regional Manager

   Supported by: Director Science Division to provide advice on methodology, representation on reference group, review of paper, and undertake sampling and analysis

   Director Nature Conservation to provide advice on nominations, and input into review of paper

   Status: New

   Indicative Budget: $300,000 pa

   Completion date: Progressively implement by June 2008

3.4 SPECIES AT RISK

Target Three Year Outcome – T13: Maintain the size of the populations of one Critically Endangered (*Tetratheca paynterae* subsp. *paynterae* ms), two Vulnerable (*Tetratheca aphylla* and *Tetratheca harperi*) and two proposed Vulnerable *Tetratheca* species (*T. paynterae* subsp. *cremnobata* ms and *T. erubescens* ms) in the Coolgardie 2 IBRA subregion

Candidate Actions:

1. Implement the ongoing actions specified in the approved recovery plan for *Tetratheca paynterae* subsp. *paynterae.*

   Primary Responsibility: Regional Leader Nature Conservation

   Support: Manager Species and Communities Branch to provide technical advice

   Goldfield Threatened Flora Recovery Team to provide technical advice and monitors implementation

   Portman Mining Pty Ltd as part of their ministerial conditions is to prepare, fund implementation and research

   Status: Ongoing

   Indicative Funding: $100,000 pa

   Completion date: Ongoing

2. Complete nominations for Declared Rare Flora listing of two proposed Vulnerable *Tetratheca* species (*T. paynterae* subsp. *cremnobata* ms and *T. erubescens* ms).

   Primary Responsibility: Regional Leader Nature Conservation

   Support: Manager Species and Communities Branch to provide technical advice

   Goldfield Threatened Flora Recovery Team to provide technical advice and monitors implementation

   Status: Ongoing

   Indicative Funding: $10,000

   Completion date: December 2006

3. Survey distribution and abundance of one Critically Endangered (*Tetratheca paynterae* subsp. *paynterae* ms), two Vulnerable (*Tetratheca aphylla* and *Tetratheca harperi*) and two proposed Vulnerable *Tetratheca* species (*T. paynterae* subsp. *cremnobata* ms and *T. erubescens* ms).

   Primary Responsibility: Regional Leader Nature Conservation

   Support: Manager Species and Communities Branch to provide technical advice

   Goldfield Threatened Flora Recovery Team to provide technical advice and monitors implementation

Portman Mining Pty Ltd as part of their ministerial conditions to survey all except *T. aphylla*

Status: Ongoing

Indicative Funding: $Nil pa (Requirement for Portman under Ministerial Conditions)

Completion date: June 2008

4. Prepare and implement actions identified under the Goldfields Region Threatened Flora Management Plan that are directed towards managing threats and maintaining the current (2005) population size for Vulnerable *Tetratheca aphylla* and *Tetratheca harperi.*

Primary Responsibility: Regional Leader Nature Conservation

Support: Goldfields Threatened Flora Recovery Team to assist in priority setting and provide advice

Species and Communities Branch to provide advice

Status: Ongoing

Indicative Funding: $100,000 pa

Completion date: Ongoing

Target Three Year Outcome – T14: Maintain the number and size of the populations of Vulnerable flora species *Gastrolobium graniticum* in the Coolgardie IBRA subregion)

Candidate Actions:

1. Survey distribution and abundance of Vulnerable flora species *Gastrolobium graniticum* and prepare a recovery plan.

Primary Responsibility: Regional Leader Nature Conservation

Support: Manager Species and Communities Branch to provide technical advice.

Goldfield Threatened Flora Recovery Team to provide technical advice and monitors implementation

Status: Ongoing

Indicative Funding: $10,000 pa

Completion date: June 2008

2. Undertake induced recruitment trials of Vulnerable flora sp. *Gastrolobium graniticum.*

Primary Responsibility: Regional Leader Nature Conservation

Support: Manager Species and Communities Branch to provide technical advice

Goldfield Threatened Flora Recovery Team to provide technical advice and monitors implementation

Status: Ongoing

Indicative Funding: $10,000 pa

Completion date: June 2008

Target Three Year Outcome – T15: Maintain the number and size of the populations of six species (*Conospermum toddii* -Vulnerable, *Leucopogon sp.* Helena & Aurora Range (BJ Lepschi 2077) -Critically Endangered, *Eucalyptus articulata* - Endangered, *Thryptomene wittweri*-Vulnerable, *Myriophyllum lapidicola*- Vulnerable, *Ricinocarpos brevis* ms – Critically Endangered) listed Declared Rare Flora and resolve the conservation status of 105 taxa (50%) of Priority flora

Candidate Actions:

1. Prepare and implement Interim Recovery Plans for Critically Endangered sp (*Ricinocarpos brevis* ms).

   Primary Responsibility: Regional Leader Nature Conservation

   Support: Manager Species and Communities Branch to provide technical advice

   Goldfield Threatened Flora Recovery Team to provide technical advice and monitors implementation

   Portman Mining Pty Ltd has agreed to prepare and fund implementation

   Status: New

   Indicative Funding: $100,000 pa

   Completion date: June 2007 then ongoing

2. Prepare and implement Interim Recovery Plans for Critically Endangered sp *Leucopogon* sp. Helena & Aurora Range (BJ Lepschi 2077).

   Primary Responsibility: Regional Leader Nature Conservation

   Support: Species and Communities Branch to provide technical advice

Goldfield Threatened Flora Recovery Team to provide technical advice and monitors implementation

Status: New

Indicative Funding: $100,000 pa

Completion date: June 2008

3. Survey distribution and abundance of Vulnerable flora sp. *Conospermum toddii*.

Primary Responsibility: Regional Leader Nature Conservation

Support: Species and Communities Branch to provide technical advice

Goldfield Threatened Flora Recovery Team to provide technical advice and monitors implementation

Status: New

Indicative Funding: $100,000 pa

Completion date: Ongoing

4. Prepare and implement actions identified under the Goldfields Region Threatened Flora Management Plan that are directed towards managing threats and maintaining the current (2005) population size for *Eucalyptus articulata* - Endangered, *Thryptomene wittweri*- Vulnerable, *Myriophyllum lapidicola*- Vulnerable.

Primary Responsibility: Regional Leader Nature Conservation

Support: Goldfields Threatened Flora Recovery Team to assist in priority setting and provide advice

Manager Species and Communities Branch to provide advice

Status: Ongoing

Indicative Funding: $100,000 pa

Completion date: Ongoing

5. Complete desk top survey and follow up field survey of 105 Priority Flora by July 2008 directed towards resolving current knowledge of distribution, abundance and threatening processes to confirm conservation status of each species.

Primary Responsibility: Regional Leader Nature Conservation

Support: Goldfields Threatened Flora Recovery Team to assist in priority setting and provide advice

Manager Species and Communities Branch to provide advice

Status: Ongoing

Indicative Funding: $100,000 pa

Completion date: Ongoing

Target Three Year Outcome – T16: No decline in conservation status of nine terrestrial Threatened fauna (*Macrotis lagotis* - Vulnerable, *Dasyurus geoffroii*-Vulnerable, *Dasycercus cristicauda*-Vulnerable, *Sminthopsis psammophila*-Endangered, *Notoryctes caurinus*-Endangered, *Notoryctes typhlops*-Endangered, *Rostratula benghalensis australis*-Vulnerable, *Playtcercus icterotis xanthogenys*- Vulnerable, *Egernia kintorei*-Vulnerable)

Candidate Actions:

1. Implement actions specified in the approved (interim) recovery plans for *Macrotis lagotis* - Vulnerable, *Dasycercus cristicauda*-Vulnerable, *Sminthopsis psammophila*-Endangered, *Notoryctes caurinus*-Endangered, *Notoryctes typhlops*-Endangered and *Egernia kintorei*-Vulnerable

   Primary Responsibility: Regional Leader Nature Conservation to coordinate and arrange actions

   Support: Director Science Division to provide advice and participate on relevant recovery teams

   Regional Ecologist to provide advice and undertake select actions, and participate on recovery teams

   Manager Species and Communities Branch to provide advice and participate on relevant recovery teams

   Status: Ongoing

   Indicative Funding: $500,000 pa (focus on recovery in conservation reserves)

   Completion date: Ongoing

2. Urgent actions to maintain the conservation status of three Threatened Species (*Macrotis lagotis* - Vulnerable, *Dasycercus cristicauda*-Vulnerable, *Egernia kintorei*-Vulnerable) in the Gibson Desert Nature Reserve through the management of landscape scale threatening processes specifically (this action will also cover other significant fauna[14]).

   - Establish recovery team;

[14] This is the only reserve in which it is likely all three of these species co-occur (including the Endangered species *Notoryctes caurinus* and/or *Notoryctes typhlops)*. Other species requiring protection that are also likely to occur in the Gibson Desert include the Woma *Aspidites ramsyi*. There are anecdotal reports by traditional owners of Brush-tailed Possums in the eastern parts of the reserve

- Implement broad scale aerial introduced predator (fox, feral cat) control;
- Developing and implementing appropriate fire regimes (A priority management action is to reduce the scale and severity of wildfires (see Target at 3.2)) and expand fire ecology research;
- Developing a rapid assessment technique to search for new populations of threatened taxa; and
- Develop and undertake taxa monitoring and monitoring for fire management.

Primary Responsibility: Regional Leader Nature Conservation to develop and coordinate program

Support: Regional Fire Coordinator to prepare management programs

Regional Ecologist to provide advice and input into recovery program/team, and develop monitoring program

Science Division to provide advice and input into recovery team

Manager Species and Communities Branch and Director Science Division to provide advice and input into recovery team

Status: New

Indicative Funding: a) $300,000 pa (Introduced Predator)
b) $500,000 pa (Fire management)

Completion date: Ongoing

3. Implement targeted survey for both Endangered *Notoryctes caurinus* and Endangered *Notoryctes typhlops* using survey methodology as outlined in relevant recovery plans to establish presence[15] and delineation between the two species.

Primary Responsibility: Regional Ecologist

Support: Director Science Division to provide advice on survey methodology

Manager Species and Communities Branch to provide advice on survey

Status: New

Indicative Funding: $200,000

4. Implement targeted survey for Endangered *Sminthopsis psammophila* to locate additional populations in the Great Victoria Desert by June 2008.

[15] Given so little is known about the actual occurrence of these species within their distributional ranges, defining presence is critical to any subsequent management.

Primary Responsibility: Regional Ecologist

Support: Director Science Division to provide advice on survey methodology

Manager Species and Communities Branch to provide advice on survey

Status: New

Indicative Funding: $70,000

Completion date: June 2008

5. Urgent actions to maintain and monitor the conservation status of extant threatened and specially protected taxa in the Queen Victoria Springs Nature Reserve through the management of landscape scale threatening processes specifically:

   - Establish recovery team;
   - Implement broad scale aerial introduced predator (fox, feral cat) control;
   - Develop and implement appropriate fire regimes (A priority management action is to reduce the scale and severity of wildfires (see Target under 3.2) and expand fire ecology research; and
   - Develop taxa monitoring program, and fire management monitoring program.

   Primary Responsibility: Regional Leader Nature Conservation to develop and coordinate program

   Support: Regional Fire Coordinator to prepare fire management programs

   Regional Ecologist to provide advice and input into recovery program/team, and develop monitoring program

   Director Science Division to provide advice and input into recovery team

   Manager Species and Communities Branch to provide advice and input into recovery team

   Status: New

   Indicative Funding: a) $50,000 pa (Introduced Predator)
   b) $50,000 pa (Fire management)
   c) $20,000 pa (monitoring)

Completion date: June 2008 then ongoing

Target Three Year Outcome – T17: Maintain the number and abundance of the populations of the Vulnerable Rock Wallaby (*Petrogale lateralis)* at Calvert Ranges (Little Sandy

Desert 2 Rudall IBRA subregion) and Townsend Ridges (Central Ranges 1 IBRA subregion)

Candidate Actions:

1. Maintain introduced predator (fox and feral cat) control programs in Calvert Ranges and Townsend Ridges to maintain and enhance current abundance and local distribution of Vulnerable Rock Wallaby *Petrogale lateralis*.

   Primary Responsibility: Regional Leader Nature Conservation to develop and coordinate program

   Support: Pilbara Regional Leader to coordinate Calvert Range program

   Species and Communities Branch to provide advice

   Status: Ongoing

   Indicative Funding: $30,000 pa

   Completion date: Ongoing

2. To review existing monitoring of Vulnerable Rock Wallaby (*Petrogale lateralis)* at both Townsend Ridges and Calvert Ranges, and make necessary changes to implement monitoring and evaluation program.

   Primary Responsibility: Regional Leader Nature Conservation to develop and coordinate program

   Support: Pilbara Regional Leader to coordinate Calvert Range program

   Manager Species and Communities Branch to provide advice

   Indicative Funding: a) $15,000 pa (Townsend Ridges)
   b) $20, 000 pa (Calvert Ridges)

   Completion date: June 2007

Target Three Year Outcome – T18: Maintain the density of the populations of the Vulnerable Mallee Fowl *Leipoa ocellata* at the proposed Mount Manning Range Conservation Park (extension to the Mount Manning Range Nature Reserve)

Candidate Actions:

1. Implement introduced predator control program to protect current known populations of Vulnerable Mallee Fowl *Leipoa ocellate* as per Portman Mining ministerial conditions.

   Primary Responsibility: Regional Leader Nature Conservation to develop and coordinate program

   Support: Portman Mining Ltd though ministerial conditions are required to meet this action

   Regional Ecologist to provide advice

   Director Science Division to provide advice

   Status: New

   Indicative Funding: a) $50,000 pa (Portman mining contribution)
   b) $10,000 pa (CALM)

   Completion date: Ongoing

2. Collection of data on the abundance of introduced predators (feral cats, ??wild dogs and foxes) in the Coolgardie Woodlands by June 2007.

   Primary Responsibility: Regional Leader Nature Conservation

   Support: Portman Mining to provide logistical support

   Regional Ecologist to provide advice

   Director Science Division to provide advice

   Status: Commenced

   Indicative Funding: $40,000

   Completion date: Ongoing

Target Three Year Outcome – T19: Improve the conservation status of six locally extinct and Threatened *spp* (Candidate spp include Golden Bandicoot *Isoodon auratus* (V), Burrowing Bettong *Bettongia lesueur*(V), Rufous Hare-wallaby *Lagorchestes hirsutus*(V) and Banded Hare- wallaby *Lagostrophus fasciatus*(V), Greater Stick Nest Rat-*Leporillus conditor*(V), Bilby *Macrotis lagotis*(V)) by establishing sustainable populations at the proposed Lorna Glen Conservation Park

Candidate Actions:

1. Develop a draft translocation proposal by December 2005 and implement reintroductions of two species to be approved by Directors Nature Conservation and Science to the proposed Lorna Glen Conservation Park (see Protected Area System T4-T8 Candidate Action 4 from the above list).

Primary Responsibility:	Science Division to develop proposal
Support:	Director Nature Conservation to endorse
	Manager Species and Community Branch to review
	Goldfields Regional Manager to assist with translocations
Status:	New
Indicative Funding:	$400,000
Completion date:	June 2007

Target Three Year Outcome – T20: The conservation status of 10 taxa (Appendix 3) of Priority fauna will be resolved

Candidate Actions:

1. Undertake desktop revision of current information to determine necessity and priorities for field survey and complete field assessment.

Primary Responsibility:	Regional Ecologist
Support:	Manager Species and Communities to provide advice and any available information
Status:	New
Indicative Cost:	$100,000 pa
Completion date:	June 2008

4. RESOURCE ANALYSIS

In order to make strategic change and implement the new and ongoing supporting actions a resource gap analysis has been completed as the basis of a feasibility study.

1. Key question investigated were (Appendix 4 Resource Analysis):

   - What is the actual or estimated cost (includes salaries, wages, plant, materials, contract and overheads) pa and over 3 years of each candidate action?

   - What is the current financial years (2005/06) expenditure (includes salaries, wages, plant, materials, contract and overheads) from each of those candidate actions or part of a candidate action that are currently being implemented?

- What are the actions and their estimated cost for those actions that are currently undertaken in the Region that do not contribute to the completion of a candidate action(s) or part thereof?

- Comparing items 2 and 3 what actions (if any) and what total savings (includes salaries, wages, plant, materials, contract and overheads) arise from any actions that could be dropped out of the current Nature Conservation SPA?

- What are the sources of funds (specify e.g. GMS, Western Shield, SAP, NRM, CALM Recurrent, Other Outputs etc) and the amounts used to implement the candidate actions?

2. Full implement of all the candidate actions in this plan will require $8,840,000 in the first year with a substantial but lesser ongoing amount once the one off projects are completed.

3. Current allocations (2005-2006) total $1,350,8844 and are derived from seven sources:

   - $602,714 from Nature Conservation Output

   - $220,000 from Unallocated Crown land funds

   - $188,730 from Gascoyne-Murchison Scheme

   - $1,200 from Common Fire Conditions

   - $300,000 from new Fire Resources

   - $150,000 from Portman Mining

   - $30,000 from Sustainable forest management Output (Firewood, Sandalwood and Forest Products Commission management)

4. 7% of the candidate actions are currently funded or partly funded (total $615,749) from within the existing allocations.

5. The Purchasers provide $735,095 [less once Bus mgt subtracted] for activities that support the nature con servation actions in the region:

   - Wild dog control under the Department's good neighbour policy $179,367

   - Reserve Management $183,470

   - Aboriginal and community liaison $64,269

   - Wildlife licensing and enforcement $41,625

   - NRM liaison $20,000

   - Fire emergency availability ($7,000)

6. Staffing resources contributing to the Nature Conservation Output in the Goldfields Region as of September 2005 are:

- Regional Manager – 60%
- Regional Leader Nature Conservation – 100%
- Regional Ecologist – 100%
- Regional Fire Coordinator – 100%
- Wildlife Officer – 100%
- Conservation Officer – 100% (funded externally by Portman)
- Reserves Officer – 70%
- Assistant Reserves Officer – 100%
- Finance Manager – 70%
- Administration Assistant – 60%
- Operations Officer – 40%
- Conservation Employee – 100%

Implementation of all the candidate actions would require a significant increase in capacity (staff) in the Goldfields Region.

5. MEASURING EFFECTIVENESS AND PROGRESS OF PLAN

Progress against each of the three year outcome targets listed in the table, Section 3, above will be used to indicate whether or not the management actions implemented have been effective.

Efficiency will be evaluated through the Service Provider Agreement process and will examine the levels of resources used to achieve each target outcome and outline performance measures.

Progress with implementation of the candidate actions will be reported biannually in conjunction with the Service Provider Agreement.

The plan will be reviewed annual to validate new and ongoing candidate actions, provide for emerging issues and inform the development of each annual Service Provider Agreement.

Appendix 1 Matrix of values/assets and threats and relative importance for regional Scale Actions for CALM Goldfields Region

'H' (high) equals major threats at the sub-regional scale that affect the decline in number & spatial extent of species & ecosystems & ecosystem condition
Threats may be ranked, if desired, either within or between sub-regions *Significant wetlands* includes Ramsar sites, National Register and regionally important wetlands.

		THREATS											
	IBRA REGIONS	Broad scale vegetation clearing	Fragmentation, loss of remnants, lack of recruitment	Firewood collection	Grazing pressure - stock	Introduced animals	*Exotic weeds*	Altered fire regimes	Pathogens	Changed hydrology - Salinity	Changed hydrology - other	Pollution	Other - Mining/Sandalwood use
BIODIVERSITY VALUES	**Desert**												
	Landscape					H		H					
	Wetlands/riparian												
	Ecosystems at risk							H					
	Species at risk					H							
	Protected area system					H		H					
	Nullarbor												
	Landscape				H	H	H	H					
	Wetlands/riparian												
	Ecosystems at risk										H		H
	Species at risk										H		
	Protected area system					H	H	H					H
	Pastoral Zone												
	Landscape				H	H		H			H		H
	Wetlands/riparian				H	H					H		
	Ecosystems at risk				H								H
	Species at risk				H	H		H			H		H
	Protected area system					H		H					H
	Woodlands												
	Landscape			H	H	H		H					H
	Wetlands/riparian				H	H					H		H
	Ecosystems at risk												H
	Species at risk					H		H					H
	Protected area system					H		H					H

Appendix 2 Data deficient ecological communities of the Goldfields Region

	Community	Assessed-category	On dbase complete	On dbase in-complete	Field survey commenced	Field survey complete
1	**Woodline Hills vegetation complexes (*Baeckea recurva* shrubland)** (Newby *et al.*, 1984: Henry-Hall 1990) (N. Gibson, G. Keighery pers comm). Speak to N.Gibson, G.Keighery, N.Hall. Ridge communities unique but unless a mine is proposed are currently not threatened (G.Keighery pers. comm.).	Priority 4 (a)	+	+		+
2	**Subterranean fauna of the Paroo Sub-Basin of the Lake Way Basin**. Calcrete formations near Wiluna (B. Humphreys pers. comm.).	Priority 4 (b)				+
3	**Flora and fauna assemblages of granite rock pools** (J.Davis and S.Halse pers. comm.) (Pinder et al. in press).	Priority 1				
4	**Goldfields granite outcrop assemblages** (rocks south of Balladonia, rocks east of Lake Johnson, Eranynia Hill - Cowarna Downs Station - proposal to mine) (Henry-Hall, 1990; J. Angas pers. comm.) (Mt Bevan telecom tower – A.Brown pers. comm.).	Priority 1			+	
5	**Granite moss sheet communities** (S. Halse pers. comm. 2000).	Priority 1				
6	**Permanent to semi-permanent brackish to freshwater wetlands with belts of Samphire and *Melaleuca*** around the perimeter, Goldfields region. Swan Lake - Cowarna Downs Station; Cane Grass Lagoon - east of Rowles Lagoon (Henry-Hall 1990; J. Angas, A. Chapman pers. comm.; speak to J. Lane).				+	
7	**Banded Ironstone Hills with *Dryandra arborea***. On VCL in excellent condition NW Menzies area (A.Brown pers. comm.). See land system reports for idea of extent.	Priority 3 (iii)				
8	**Duladgin Ridge vegetation complex** (G.Keighery and N.Gibson pers comm; Beard map)	Priority 3 (iii)				
9	**Mount Jumbo Range vegetation complex**, Laverton area, northeast goldfields (G.Keighery and N.Gibson pers comm; Hall, *et al.* 1994-not definitive; Beard 1974-not definitive)	Priority 3 (iii)				
10	**Mount Linden Range banded ironstone ridge vegetation complex** (G.Keighery and N.Gibson pers comm)	Priority 3 (iii)				
11	**Helena and Aurora Range vegetation complexes** (Beard 1972b; Dell *et al.* 1985; Henry-Hall 1990; Gibson *et al.* 1997a and b). Subject to imminent exploration programs for iron ore mining (Portman mining Co.) (R.Thomas pers. comm 2000).	Priority 3 (iii)				
12	**Koolyanobbing vegetation complexes** (G.Keighery and N.Gibson pers comm; Beard 1972b) Subject to imminent exploration programs for iron ore mining (Portman mining Co.) (R.Thomas pers. comm 2000).	Priority 3 (iii)				
13	**Highclere Hills vegetation complex** (Beard, 1972b; Newbey and Hnatiuk 1985; Dell *et al.*, 1985; Henry-Hall 1990; Gibson and Lyons, 1997b)	Priority 3 (iii)				
14	**Hunt Range vegetation complex** (Gibson and Lyons 1997c; Beard 1972b, 1978; Dell *et al.* 1985; Newbey & Hnatiuk 1985). See regional plan.	Priority 3 (iii)				
15	**Mount Dimer vegetation complex** (Beard 1972b; N.Gibson and G.Keighery pers. comm.)	Priority 3 (iii)				

	Community	Assessed-category	On dbase complete	On dbase in-complete	Field survey commenced	Field survey complete
16	**Diehardy Range vegetation complex** (G.Keighery and N.Gibson pers comm; Henry-Hall 1990: Beard 1972b). Subject to imminent exploration programs for iron ore mining (Portman mining Co.) (R.Thomas pers. comm 2000).	Priority 3 (iii)				
17	**Mount Manning Range vegetation complex** (Beard 1972b; Beard 1990; Henry-Hall 1990; Keighery *et al.* 1995; Gibson and Lyons 1997a). Subject to imminent exploration programs for iron ore mining (Portman mining Co.) (R. Thomas pers. comm 2000). CALM bidded for.	Priority 3 (iii)				
18	**Mount Jackson Range vegetation complex** (Henry-Hall 1990; G.Keighery and N.Gibson pers comm; Beard map). Subject to imminent exploration programs for iron ore mining (Portman mining Co.) (R.Thomas pers. comm 2000).	Priority 3 (iii)				
19	**Yilgarn Hills vegetation complex** (G. Keighery and N. Gibson pers comm; Newbey *et al.* 1995; Beard 1972b). [Of interest, awaiting survey, NG, GK]	Priority 3 (iii)				
20	**Mt Gibson vegetation complex** (G. Keighery and N. Gibson pers. comm.; Beard map). Beard says its dif, mapped area is a complex of ECs.	Priority 3 (iii)				
21	**Mt Belches *Acacia quadrimarginea* / *Ptilotus obovatus* banded ironstone community**. On Randall River Timber Reserve. Has grazing coexistence with the reserve. (R.Thomas pers. comm.).	Priority 3 (iii)				
#	**Ironcap Hills complexes** (Mt Holland, Mid, North and South Ironcap Hills and Hatters Hill) (sufficient data may be available from Hopkins *et al.* (1996) to allow assessment against criteria for TECs) (Newby, *et al*, 1984; G. Keighery and N. Gibson pers. comm.; Beard (1972).	Priority 3 (iii)				
22	**Microbialite community of Harpers Lagoon**. NNE of Kalgoorlie (R.Sarti pers. comm.) R.Thomas has investigated three lakes in this area but has not located any microbial communities.					
23	**Halophytic communities of salt lake systems of the goldfields** Lake Lefroy; VCL on Madoonia Downs Station (Handley 1991; J.Angas pers. comm)					
24	**Yellow sandplain communities of the Great Victoria Desert** Very diverse mammalian and reptile fauna, distinctive plant communities (D.Pearson pers. comm.) Threats from mining.					
25	**Assemblages of Queen Victoria Spring** Great Victoria Desert (Burbidge *et al.* 1976) (Speak to A.George, D.Pearson)					
26	***Melaleuca* sp. nov. Low Closed to Open Forest Strand Community** Near Wiluna (Blackwell and Trudgen 1980) Ask Malcolm whether regional distribution is known					

	Community	Assessed-category	On dbase complete	On dbase in-complete	Field survey commenced	Field survey complete
27	**Assemblages of the lignum Swamps of the Goldfields Region** eg. Sheehan Swamp - Cowarna Downs; Brown Lagoon - east of Rowles Lagoon; Lignum Swamp - Mt Vetters Station) (I. Kealley, A. Chapman pers. comm.). Threatened by mine dewatering and pastoralism. Need to check the regional distribution of this type of wetlands - Qld, SA, WA deserts or WA wheatbelt and whether same dominants – ie Muehlenbeckia cunninghamii?.				+	
28	**Permanent to semi-permanent wetlands with *Ruppia* across** the lake floor of the Goldfields region (Lake Wannaway, Madoonia Downs; unnamed lake at 30 km peg north of Norseman) (J.Angas, A. Chapman pers. comm.				+	
29	***Calcyphytic casuarina acacia woodlands/shrublands*** *of the north-east Goldfields (Pringle et al. 1994 - site type 7) Speak to H.Pringle - ask if site type maps are available, or if only land type maps produced. The former more closely approximate vegetation maps.*					
30	***Calcrete platform woodlands/shrublands*** *of the north-east Goldfields (Pringle et al. 1994 - site type 8) Speak to H.Pringle - ask if site type maps are available, or if only land type maps produced. The former more closely approximate vegetation maps.*					
31	***Plain mixed halophyte low shrublands*** *of the north-east Goldfields (Pringle et al. 1994 - site type 9)*					
32	***Silver saltbush (Atriplex bunburyana) low shrublands*** *of the north-east Goldfields (Pringle et al. 1994 - site type 16) Speak to H. Pringle - ask if site type maps are available, or if only land type maps produced. The former more closely approximate vegetation maps.*					
33	***Mixed chenopod shrublands with mulga (Acacia aneura) overstorey*** *of the north-east Goldfields (Pringle et al. 1994 - site type 18) Speak to H.Pringle - ask if site type maps are available, or if only land type maps produced. The former more closer approximate vegetation maps.*					
34	***Mulga (Acacia aneura) shrublands with scattered chenopod low shrubs*** *of the north-east Goldfields (Pringle et al. 1994 - site type 19) Speak to H.Pringle - ask if site type maps are available, or if only land type maps produced. The former more closer approximate vegetation maps.*					
35	***Mulga (Acacia aneura) drainage line shrublands/woodlands with chenopod understoreys*** *of the north-east Goldfields (Pringle et al. 1994 - site type 20) Speak to H.Pringle - ask if site type maps are available, or if only land type maps produced. The former more closely approximate vegetation maps.*					

	Community	Assessed-category	On dbase complete	On dbase In-complete	Field survey commenced	Field survey complete
36	***Calcyphytic pearl bluebush (Maireana sedifolia) shrublands of the north-east Goldfields*** *(Pringle et al. 1994 - site type 21) Speak to H.Pringle - ask if site type maps are available, or if only land type maps produced. The former more closely approximate vegetation maps.*					
37	***Stony bluebush (Maireana spp.) mixed shrublands*** *of the north-east Goldfields (Pringle et al. 1994 - site type 22) Speak to H.Pringle - ask if site type maps are available, or if only land type maps produced. The former more closely approximate vegetation maps.*					
38	***Upland small bluebush (Maireana spp.) species shrublands*** *of the north-east Goldfields (Pringle et al. 1994 - site type 23) Speak to H.Pringle - ask if site type maps are available, or if only land type maps produced. The former more closely approximate vegetation maps.*					
39	***Granite hill mixed shrublands*** *of the north-east Goldfields Survey by Pringle et al. 1994 - site type 25 .*					
40	***Stony ironstone mulga (Acacia aneura) shrublands*** *of the north-east Goldfields Survey by Pringle et al. 1994 - site type 28) Speak to H.Pringle - ask if site type maps are available, or if only land type maps produced. The former more closer approximate vegetation maps*					
41	***Rich ephemeral communities of outcrops and bottomlands*** *in the Kurnalpi-Kalgoorlie area (McKenzie and Hall 1992)*					
42	***Mixed low woodlands of Eucalyptus oleosa, Casuarina cristata and Acacia aneura*** *in the Kurnalpi-Kalgoorlie area (McKenzie and Hall 1992)*					
43	***Vegetation complexes of the Greenstone / banded ironstone ranges of the goldfields*** *(J.Angas pers. comm.).*	Priority 3 (iii)				
44	***Melaleuca spp. Scrub****. 70% alienated (Beard and Sprenger, 1984) Southern Goldfields, Darling, Eastern South Coast (Hopkins, Beeston data?)*					
45	***Acacia - Casuarina - Melaleuca Thicket****. 80% alienated (Beard and Sprenger, 1984) Wheatbelt, Southern Goldfields, Darling, Northern Sandplain, Eastern South Coast, Southwest Interzone (Hopkins, Beeston data?).*					
46	***Eucalyptus, Acacia, Atriplex, Halosarcia Wooded Succulent Steppe*** *87% alienated (Beard and Sprenger 1984) Wheatbelt, Southern Goldfields, Southwest Interzone (Hopkins, Beeston data?).*					
47	***Eucalyptus loxophleba, E. wandoo, E. salmonophloia Woodland*** *97% alienated (Beard and Sprenger, 1984)) Darling, Wheatbelt, Southern Goldfields, Eastern South Coast, Northern Sandplain, South West Interzone (Hopkins/Beeston data?).*					
48	***Wetlands of the Nullarbor region*** *(J.Lane pers. comm.)*					

DESERTS

	Community	Assessed-category	On dbase complete	On dbase in-complete	Field survey commenced	Field survey complete
1	***Gorge communities - desert ranges*** *(D.Pearson pers. comm.)*					
2	**Wooded coolibah freshwater wetland of Lake Gruzka**. Most wetlands in that area are saline *(D. Pearson pers. comm.)*. See Directory of Important wetlands.					

Appendix 3 Priority and Other Specially Protected Flora and Fauna of the Goldfields Region

Specially Protected Fauna

Aves
Falco peregrinus, Peregrine Falcon
Cacatua leadbeateri, Major Mitchell's Cockatoo
Northiella haematogaster narethae, Naretha Blue Bonnet

Reptilia
Aspidites ramsayi, Woma or Ramsay's Python
Morelia spilota imbricata, Carpet Python

Priority Fauna

Mammalia
Sminthopsis longicaudata, Long-tailed Dunnart

Aves
Falco hypoleucos, Grey Falcon
Ardeotis australis, Australian Bustard
Numenius madagascariensis, Eastern Curlew
Charadrius rubricollis rubricollis, Hooded Plover (western subspecies)
Burhinus grallarius, Bush Stonecurlew
Polytelis alexandrae, Princess Parrot
Tyto novaehollandiae novaehollandiae, Masked Owl (southern subspecies)
Cinclosoma alisteri, Nullarbor Quail-thrush
Amytornis striatus striatus, Striated Grasswren (sandplain)
Amytornis textilis textilis, Thick-billed Grasswren (western subspecies)
Hylacola cauta whitlocki, Shy Heathwren (western)
Falcunculus frontatus leucogaster, Crested Shrike-tit (south-western subsp.)

Reptilia
Aspidites ramsayi, Woma (southwest population)
Morelia spilota imbricata, Carpet Python (south-west)
Diplodactylus kenneallyi
Lerista puncticauda
Ramphotyphlops margaretae

Butterflies
Ogyris subterrestris petrina
Jalmenus aridus

Arachnida (Spiders, ticks, mites, etc.)
Kwonkan moriartii

Crustacea
Branchinella apophysata
Branchinella denticulata
Branchinella simplex

Priority 1 Flora

Abutilon sp. Warburton (AS George 8164)
Acacia adinophylla
Acacia epedunculata
Acacia websteri
Apatophyllum macgillivrayi
Astartea sp. Mt Dimer (C McChesney TRL4/72)
Astartea sp. Red Hill (KR Newbey 8462)
Baeckea sp. Bulla Bulling (DJE Whibley 4648)
Baeckea sp. Bungalbin Hill (BJ Lepschi, LA Craven 4586)
Baeckea sp. Die Hardy Range (E Mattiske J91)
Baeckea sp. Pigeon Rocks (D Grace DJP 281)
Baeckea sp. Sandstone (CA Gardner s.n.)
Baeckea sp. Wialki (GM Storr 4/10/1958)
Caesia rigidifolia
Calothamnus superbus
Calytrix creswellii
Calytrix verruculosa
Chamelaucium paynterae ms
Dampiera eriantha
Dampiera plumose
Dillwynia acerosa
Diocirea microphylla ms
Echinopogon ovatus var. pubiglumis
Eremophila annosocaule ms
Eremophila attenuata ms
Eremophila aureivisca ms
Eremophila congesta ms
Eremophila eversa ms
Eremophila flaccida subsp. attenuata ms
Eremophila gracillima ms
Eremophila perglandulosa ms
Eremophila praecox ms
Eremophila sp. Mt Jackson (GJ Keighery 4372)
Eremophila viscimarginata ms
Euryomyrtus inflate
Fuirena nudiflora
Gnephosis intonsa
Gnephosis sp. Norseman (KR Newbey 8096)
Goodenia anfracta
Goodenia gibbosa
Goodenia grandiflora
Goodenia lyrata
Grevillea aspera
Grevillea phillipsiana
Halosarcia flabelliformis
Halosarcia sp. Angel Fish Island (B Davey 4)
Halosarcia sp.Yanneri Lake (S.van Leeuwen 3002)
Hibbertia lepidocalyx subsp. tuberculata
Homalocalyx grandiflorus
Isotropis winneckei
Jacksonia jackson ms
Jacksonia lanicarpa ms

Korthalsella leucothrix
Labichea deserticola
Lechenaultia aphylla
Lepidium fasciculatum
Leptospermum macgillivrayi
Menkea lutea
Micromyrtus helmsii
Millotia falcate
Neurachne lanigera
Persoonia leucopogon
Phebalium appressum
Philotheca deserti subsp. brevifolia
Philotheca eremicola
Philotheca linearis
Philotheca tubiflora
Phyllanthus baeckeoides
Prostanthera splendens
Pseudactinia sp. Bungalbin Hill (FH & MP Mollemans 3069) [aff. Melichrus]
Ptilotus astrolasius var. luteolus
Ptilotus chortophytum
Ptilotus procumbens
Ptilotus tetrandrus
Schoenus centralis
Stackhousia clementii
Stenanthemum mediale
Stenanthemum patens
Tetratheca chapmanii
Tetratheca erubescens ms
Tetratheca sp. Die Hardy (R Ryan BR1)
Thryptomene sp. Leinster (BJ Lepschi & LA Craven 4362)
Thysanotus baueri
Verticordia mirabilis
Vittadinia cervicularis var. oldfieldii

Appendix 4 Resource Analysis

Nature Conservation Output Goldfields Region Plan 2006-2009

Asset	Targets and Actions	One off or Ongoing	Priority	Action Status			Budget 2005-06	Total Required Year 1	Gap in Funds	Fund Source	Remarks
				Nil Action	Part Actioned	Fully Actioned					
Landscape	**Outcome 1 & 2: Reduce the rate of decline in the condition of the Gascoyne-Murchison & Coolgardie Woodland Management Zone landscapes**										
	Action 1 (a) Assess rangeland condition Gascoyne- Murchison	One off	2	X				$250,000	$250,000		
	Action 1 (b) Assess rangelend condition Coolgardie Woodlands	One off	2	X				$150,000	$150,000		
	Action 2 (a) Develop monitoring Lorna Glen, Black Range/Lake Mason & Goongarrie	pa, 2 years	1		X		$66,760	$150,000	$83,240	GMS & NC	Action 2a and 2b combined in existing costs.
	Action 2 (b) Ongoing monitoring Lorna Glen, Black Range/Lake Mason & Goongarrie	pa, 3 years	1		X			$150,000	$150,000		
	Action 3.1 Gap analysis of the conservation reserve system in Gascoyne-Murchison & Coolgardie Woodlands IBRA sub-regions	ongoing	1		X		$11,452	$100,000	$88,548	NC	
	Action 3.2 Review the design of a conservation reserve system & recommend acquisitions &/or other conservation measures	no cost	1	X				$0			No additional costs, costs covered in action 3.1
	Action 3.3 Acquisition of land for inclusion in the conservation reserve system	ongoing	1		X		$0	$15,000	$15,000	NC	Not inc purchase costs

Action 3.4 Prepare Interim Management Guidelines	ongoing	3		X		$9,906	$20,000	$10,094	GMS	
Action 3.5 Enhance the conservation reserve system through off-reserve measures	ongoing	3		X		$4,560	$20,000	$15,440	NC	included in 3.3 costs
Action 4 Describe the current fire management practices & regimes of the Gascoyne-Murchison IBRA sub-regions & quantify the impacts of the current fire regimes on ecosystem condition	ongoing	2		X			$120,000	$120,000		Fire Planning
Action 5 (a) Develop a fire management plan (that includes reducing the current extent and frequency of wildfires and condition monitoring in the Coolgardie to Southern Cross Wildfire Threat Analysis area	ongoing	1	X			$135,857	$100,000	-$35,857	NC, GMS, Fire, UCL	Fire Planning - to develop fire plans, costs represent fire planning across all tenures and zones in GFR
Action 5 (b) Implement 5 (a)	ongoing	1	X			$229,396	$500,000	$270,604	NC, GMS, Fire, UCL	per annum for implementation of fire plans, includes prescribe burning, access work and hazard reduction across all tenures and zones
Action 6 Input into land use planning processes	ongoing	1		X		$26,955	$150,000	$123,045	NC	EIA across entire region
Action 7 Survey & control of goats in areas of high biodiversity values	one off	3	X				$750,000	$750,000		

Action 8 Develop a regional response plan to ameliorate impact of firewood gathering on reserves close to towns	ongoing	3		X		$30,000	$60,000	$30,000	NC & SFM	budget from SFM
					Sub Total	**$514,886**	**$2,535,000**	**$2,020,114**		
Target 3 & 4: Reduce the rate of decline in the condition of the Desert & Nullarbor landscapes										
Action 1(a) Determine the trend in the frequency and extent of fire over the last 20 years	one off	2	X				$120,000	$120,000		
Action 1 (b) Develop & maintain fire frequency & extent maps to assess the effectiveness of management actions in maintaining ecosystem condition	ongoing	2	X				$20,000	$20,000		
Action 2 (a) 2. Urgent actions to protect the biodiversity values inc. prescribed use of fire to reduce the impact of unmanaged fires on the biodiversity values of the Mangikili Claypan Nature Reserve and the De La Poer Range Nature Reserve, the proposed Carnarvon Range Conservation Park and the Queen Victoria Spring Nature Reservc.	one off	2	X				$20,000	$20,000		
Action 2 (b) Implement 2 (a)	ongoing	2	X				$250,000	$250,000		As for action 5 (b) above

	Action 3 (a) Survey of feral camels in the Desert, Nullarbor & Gascoyne-Murchison management (eastern part) zones &of rabbits in the Nullarbor management zone to determine distribution &abundance	one off	2		X		$5,000	$250,000	$245,000	NC	Science major contributor
	Action 3 (b) Assessment for 3 (a) survey	one off	2		X			$150,000	$150,000		Commenced 2005 - Science Divisison
						Sub Total	**$5,000**	**$810,000**	**$805,000**		
						Landscape Sub Total	**$519,886**	**$3,345,000**	**$2,825,114**		
Protected Area System	**Target 5,6,7 & 8 No decline in the condition of the existing & proposed conservation reserve system in the Desert, Nullarbor & Coolgardie Woodlands management zones & improve the condition of the existing & proposed conservation reserve system in the Gascoyne-Murchison management zone**										
	Action 1 Describe the current fire management practices & fire regimes in the protected area system of the Desert, Nullarbor, Gascoyne-Murchison & Coolgardie Woodlands management zones & determine the impacts of the current fire regimes on ecosystem condition	ongoing	2		X			See T1, T2 Candidate Action 5.	$0	NC & GMS	As per Action 5a above

	Action 2 (a) Develop a fire management program (that includes reducing the current extent & frequency of wildfires &condition monitoring) in Gibson Desert Nature Reserve, Earaheedy, Lorna Glen, Black Range, Lake Mason, Kaluwiri proposed Conservation Parks, Great Victoria Desert Nature Reserve, Queen Victoria Spring Nature Reserve, Goldfields Woodlands National Park	one off	1		X			$100,000	$100,000	UCL	Lorna Glen and Earaheedy commenced, budget of $50,000 last financial year.
	Action 2 (b) Implement 2 (a)	ongoing	1		X			$500,000	$500,000	NC	Across Reserve system in GFR, as per 5(b) above
	Action 3 Survey of feral camels, &ungulates, to determine distribution and abundance, & assessment of impacts on biodiversity values, as a basis to commence a control program for the Desert, Nullarbor & Gascoyne-Murchison management (eastern part) units		2					$0	$0		as per Action 3a above
	Action 4 (a) 4. Expand Western Shield into proposed Lorna Glen Conservation Park	ongoing	1		X		$38,807	$320,000	$281,193	GMS	Lorna Glen, Western Shield has funded aerial baiting for past 2 years

	Action 4 (b) Expand Western Shield under Ministerial conditions in association with Portman Mining in the proposed Mt Manning Range Conservation Park	ongoing	1		X		$16,525	$70,000	$53,475	NC	Mt Manning
	Action 5 Rapid survey & assessment of environmental weeds with particular emphasis in the southern area of the Goldfields Region & on those pastoral leases/unallocated Crown land adjacent to the Nullarbor conservation reserves	one off over three years	3	X			$4,000	$120,000	$116,000		control program costs unknown until assessment complete
	Action 6 Input into the land use planning & assessment of exploration & mining operations with particular emphasis on the conservation reserve system in all Management Zones	ongoing	1		X			$120,000	$120,000		Current expenditure as per Action 6 under T1

	Action 7 (a) Survey& assess the biodiversity values & ecosystem condition of Gibson Desert Nature Reserve, Earaheedy, Lorna Glen, Black Range, Lake Mason, Kaluwiri proposed Conservation Parks, Great Victoria Desert Nature Reserve, Queen Victoria Spring Nature Reserve, Goldfields Woodlands National Park as the basis for maintaining species abundance and ecosystem condition in the Goldfield Region	one off	2		X			$200,000	$200,000		initial assessment, expenditure as per 2a under T1
	Action 7 (b) Ongoing monitoring of 7 (a)	ongoing	2		X			$200,000	$200,000		ongoing monitoring, expenditure as per 2a under T1
	Action 8 (a) Develop an integrated Nature Conservation information management system	one off	3	X				$150,000	$150,000		
	Action 8 (b) Maintain 8 (a)	ongoing	3	X				$50,000	$50,000		ongoing maintenance
						Protected Area Sub Total	**$59,332**	**$1,830,000**	**$1,770,668**		
Ecosystems at Risk	**Target 9 The condition of seven Directory of Important Wetlands of Australia listed Wetlands (Lake Ballard, Lake Barlee, Lake Marmion, Lake Carnegie, Windich Springs, Rock Pools of the Walter James Range, Lake Throssell) will be maintained**										
	Action 1 (a) Benchmarking & surveys	New	3	X				$100,000	$100,000		

	Action 1 (b) Monitoring of 1 (a)	ongoing	3		X		$2,347	$20,000	$17,653	NC	ongoing monitoring Lake Boonderoo, Science running this project
						Sub Total	**$2,347**	**$120,000**	**$117,653**		
	Target 10 The condition of one Threatened Ecological Community (Depot Springs) will be improved										
	Action 1 (a) on-site assessment and establishment on monitoring program	one off	2	X				$10,000	$10,000		Site assessment
	Action 1 (b) development of the plan	one off	2	X				$10,000	$10,000		Plan development
						Sub Total	**$0**	**$20,000**	**$20,000**		
	Target 11 The condition of 10 data deficient ecological communities will be maintained										
	Action 1 Risk assessment	ongoing	3	X				$120,000	$120,000		
						Sub Total	**$0**	**$120,000**	**$120,000**		
						Ecosystems at Risk Sub Total	**$2,347**	**$260,000**	**$257,653**		
Species at Risk	**Target 12 No decline in the condition of the Nullarbor Karst system**										
	Action 1 Review and broad scale assessmengt of threats	ongoing	2	X				$300,000	$300,000		
						Sub Total	**$0**	**$300,000**	**$300,000**		
	Target 13 Maintain the size of the populations of one Critically Endangered (Tetratheca paynterae subsp. paynterae ms), two Vulnerable (Tetratheca aphylla & *Tetratheca harperi*) & two proposed Vulnerable Tetratheca species (T. paynterae subsp. cremnobata ms & T. erubescens ms) in the Coolgardie 2 IBRA subregion										
	Action 1 Implment Recovery Plan actions	ongoing	1		X			$100,000	$100,000	Portman	

Action 2 2. Complete nominations for Declared Rare Flora listing of two proposed Vulnerable Tetratheca species (T. paynterae subsp. cremnobata ms and T. erubescens ms)	one off	1		X			$10,000	$10,000	Portman	
Action 3 Survey distribution and abundance of one Critically Endangered (Tetratheca paynterae subsp. paynterae ms), two Vulnerable (Tetratheca aphylla and Tetratheca harperi) and two proposed Vulnerable Tetratheca species (T. paynterae subsp. cremnobata ms and T. erubescens ms).	one off	1		X					Portman	Not costed - Portman Mining fund as part of Ministerial conditions
Action 4 Prepare and implement actions identified under the Goldfields Region Threatened Flora Management Plan that are directed towards managing threats & maintaining the current (2005) population size for Vulnerable Tetratheca aphylla &Tetratheca harperi	ongoing	2		X			$100,000	$100,000	Portman	
					Sub Total	**$0**	**$210,000**	**$210,000**		
Target 14 Maintain the number and size of the populations of Vulnerable flora species Gastrolobium graniticum in the Coolgardie IBRA subregion)										

Action 1 Survey distribution and abundance of Vulnerable flora species Gastrolobium graniticum and prepare a recovery plan	ongoing	2		X			$10,000	$10,000		
Action 2 Undertake induced recruitment trials of Vulnerable flora sp. Gastrolobium graniticum.	ongoing	2	X				$10,000	$10,000		
					Sub Total	**$0**	**$20,000**	**$20,000**		
Target 15 Maintain the number & size of the populations of six species (Conospermum toddii -Vulnerable, Leucopogon sp. Helena & Aurora Range (BJ Lepschi 2077) -Critically Endangered, Eucalyptus articulata - Endangered, Thryptomene wittweri-Vulnerable, Myriophyllum lapidicola- Vulnerable, Ricinocarpos brevis ms – Critically Endangered) listed Declared Rare Flora & resolve the conservation status of 105 taxa (50%) of Priority flora										
Action 1 Prepare and implement Interim Recovery Plans for Critically Endangered sp (Ricinocarpos brevis ms)	ongoing	1	X			$5,295	$100,000	$94,705	NC and Portman	Recovery team and planning for all Threatened species
Action 2 Prepare and implement Interim Recovery Plans for Critically Endangered sp Leucopogon sp. Helena & Aurora Range (BJ Lepschi 2077)	ongoing	1	X				$100,000	$100,000		
Action 3 Survey distribution and abundance of Vulnerable flora sp. Conospermum toddii	ongoing	2		X			$100,000	$100,000		

Action 4 Implement actions identified under the Goldfields Region Threatened Flora Management Plan that are directed towards managing threats & maintaining the current (2005) population size for Eucalyptus articulata - Endangered, Thryptomene wittweri- Vulnerable, Myriophyllum lapidicola- Vulnerable	ongoing	2		X		$12,364	$100,000	$87,636	NC and Portman	Writing of DRF Management Plan and DRF and Priority survey work across whole region and all species.
Action 5 Complete desk top survey and follow up field survey of 105 Priority Flora by July 2008 directed towards resolving current knowledge of distribution, abundance and threatening processes to confirm conservation status of each species.	ongoing	2		X			$100,000	$100,000		
					Sub Total	**$17,659**	**$500,000**	**$482,341**		
Target 16 No decline in conservation status of nine terrestrial Threatened fauna (Macrotis lagotis - Vulnerable, Dasyurus geoffroii-Vulnerable, Dasycercus cristicauda-Vulnerable, Sminthopsis psammophila-Endangered, Notoryctes caurinus-Endangered, Notoryctes typhlops-Endangered, Rostratula benghalensis australis-Vulnerable, Playtcercus icterotis xanthogenys- Vulnerable, Egernia kintorei-Vulnerable)										
Action 1 Implement actions specified in the approved (interim) recovery plans	ongoing	3		X			$500,000	$500,000	NC	

Action 2 (a) Urgent actions to maintain the conservation status of three Threatened Species (Macrotis lagotis - Vulnerable, Dasycercus cristicauda-Vulnerable, Egernia kintorei-Vulnerable) in the Gibson Desert Nature Reserve against introduced predators	ongoing	3	X				$300,000	$300,000		Predator control
Action 2 (b) Urgent actions to maintain the conservation status of three Threatened Species (Macrotis lagotis - Vulnerable, Dasycercus cristicauda-Vulnerable, Egernia kintorei-Vulnerable) in the Gibson Desert Nature Reserve using appropriate fire regimes	ongoing	3	X				$500,000	$500,000		Fire Control
Action 3 Implement targeted survey for both Endangered Notoryctes caurinus and Endangered Notoryctes typhlops using survey methodology as outlined in relevant recovery plans to establish presence and delineation between the two species	ongoing	2	X				$200,000	$200,000		

Action 4 Implement targeted survey for Endangered Sminthopsis psammophila to locate additional populations in the Great Victoria Desert by June 2008	ongoing	2	X				$70,000	$70,000		
Action 5 (a) Urgent actions to maintain & monitor the conservation status of extant threatened & specially protected taxa in the Queen Victoria Springs Nature Reserve through the management of landscape scale threatening processes caused by introduced predators	ongoing	2	X				$50,000	$50,000		Predator Control
Action 5 (b) Urgent actions to maintain and monitor the conservation status of extant threatened and specially protected taxa in the Queen Victoria Springs Nature Reserve through the management of landscape scale threatening processes caused by inappropriate fire regimes	ongoing	2	X				$50,000	$50,000		Fire Control
Action 5 (c) Monitoring 5 (a) & (b)	ongoing	2	X				$20,000	$20,000		Monitoring
					Sub Total	**$0**	**$1,690,000**	**$1,690,000**		
Target 17 Maintain the number & abundance of the populations of the Vulnerable Rock Wallaby (Petrogale lateralis) at Calvert Ranges (Little Sandy Desert 2 Rudall IBRA subregion) & Townsend Ridges (Central Ranges 1 IBRA subregion)										

Action 1 Maintain introduced predator (fox and feral cat) control programs in Calvert Ranges and Townsend Ridges to maintain and enhance current abundance and local distribution of Vulnerable Rock Wallaby Petrogale lateralis	ongoing	1		X		$5,230	$30,000	$24,770	NC	Townsend Ridges
Action 2 (a) Review existing monitoring of Vulnerable Rock Wallaby (Petrogale lateralis) at Townsend Ridges & make necessary changes to implement monitoring & evaluation program	ongoing	1		X			$15,000	$15,000		
Action 2 (b) review existing monitoring of Vulnerable Rock Wallaby (Petrogale lateralis) at Calvert Ranges,& make necessary changes to implement monitoring &evaluation program	ongoing	1		X			$20,000	$20,000		Calvert Range (Pilbara Region to manage)
					Sub Total	**$0**	**$65,000**	**$65,000**		
Target 18 Maintain the density of the populations of the Vulnerable Mallee Fowl Leipoa ocellata at the proposed Mount Manning Range Conservation Park (extension to the Mount Manning Range Nature Reserve)										

Action 1 (a) Implement introduced predator control program to protect current known populations of Vulnerable Mallee Fowl Leipoa ocellate as per Portman Mining ministerial conditions	ongoing	1		X			$50,000	$50,000	Portman	Portman Contibution
Action 1 (b) as for 1 (a) but funded by Portman Mining Ltd	ongoing	1		X		$16,525	$10,000	-$6,525	NC	CALM contribution
Action 2 Collection of data on the abundance of introduced predators (feral cats, ??wild dogs and foxes) in the Coolgardie Woodlands.	one off	1		X			$40,000	$40,000	NC	Science Division advising
					Sub Total	**$16,525**	**$100,000**	**$83,475**		
Target 19 Improve the conservation status of six locally extinct and Threatened spp (Candidate spp include Golden Bandicoot Isoodon auratus (V), Burrowing Bettong Bettongia lesueur(V), Rufous Hare-wallaby Lagorchestes hirsutus(V) & Banded Hare- wallaby Lagostrophus fasciatus(V), Greater Stick Nest Rat- Leporillus conditor(V), Bilby Macrotis lagotis(V)) by establishing sustainable populations at the proposed Lorna Glen Conservation Park										
Action 1 Develop a draft translocation proposal by December 2005 & implement reintroductions of two species to be approved by Directors Nature Conservation & Science to the proposed Lorna Glen Conservation Park	ongoing	1	X				$400,000	$400,000		monitoring components are ongoing
					Sub Total	**$0**	**$400,000**	**$400,000**		
Target 20 The conservation status of 10 taxa (Appendix 3) of Priority fauna will be resolved.										

	Action 1 Undertake desktop revision of current information to determine necessity and priorities for field survey and complete field assessment	ongoing	2	X				$100,000	$100,000		per annum for 3 years
						Sub Total	**$0**	**$100,000**	**$100,000**		
						Species at Risk Sub Total	**$16,525**	**$665,000**	**$648,475**		
						Nature Conservation Three Year Target OutcomeTotal	**$615,749**	**$8,820,000**	**$8,204,251**		

Current Regional Nature Conservation Actions not included in the above	Wild Dog Control	ongoing		**N/A**	X		$179,367			UCL, NC and GMS	UCL and CALM Lands
	Wildlife licencing and enforcement	ongoing			X		$41,625			NC and SFM	Wildlife Officer
	Aboriginal / Community Liaison	ongoing			X		$64,269			NC	Aboriginal communities, shires, neighbors, committees
	Business support	ongoing			X		$239,364			NC and GMS	Office rental, freight, phones, radios etc
	Reserve management	ongoing			X		$183,470			GMS and NC	includes fencing, track work, site clean-up, neighbor negotiations, field visits, inspections, signs, buildings GMS
	Fire Emergency Availability	ongoing			X		$7,000			NC	
	NRM	ongoing			X		$20,000			NC and NRM	
						Sub Total	**$735,095**				

Total	**$1,350,844**

NC - Nature Conservation funds
GMS - Gascoyne Murchison Strategy funds
NRM - Natural Resource Management funds

Portman - funds through Portman Mining ministerial conditions
UCL - Unallocated Crown Land funds

Appendix 5 Criteria for setting priority amongst regional Nature Conservation Candidate Actions

To ensure that CALM maximises the return for its investment, in terms of the achievement of three Nature Conservation target outcomes, rank all the candidate actions as either 1, 2 or 3 based on the combined answer to the following questions:

1. Urgency - Can we afford to delay taking management action beyond three years? – Is there demonstrated species loss or unacceptable decline in condition over there years?

2. Capacity - Do we have the necessary technical skills to complete the action within three years? If not can it reasonably be acquired and deployed in three years. Do we have the knowledge necessary to effectively act?

3. Effectiveness - Will the investment maximise the number of three year Nature Conservation target outcomes achieved?

4. Effectiveness - Within a three year target outcome which action will give the greatest return in meeting the outcome?

NOTE: There should only be a maximum of 10 candidate actions that are rated as 1.