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NATURE CONSERVATION OUTPUT

WARREN REGION PLAN

2006-2009



Mount Frankland National Park

ENDORSEMENTS

Signature by the following:

REGIONAL MANANGER

REGIONAL LEADER NATURE CONSERVATION

ENVIRONMENTAL MANAGEMENT BRANCH MANAGER

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PREFACE

The State wide Nature Conservation Output as currently described consumes 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 Warren 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.

It is widely understood that there is increasing (see Page 81 of the Bio Audit Summary) landscape scale trend in decline and loss and that the current State wide linear management model is not effective in mitigating threats. Scale of the problem and the scale of the current response vs the scale and type of the response required. A quantum leap in funding is required – invest now to reduce the increasing trends in resources demand.

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, and monitoring and evaluation of biodiversity status and condition is utilised 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.

In line with modern trends in conservation management the Department wide paradigm shift will require active leadership and improved technical capacity across all three Divisions and will need to build on the successes of the past. 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.

The basis of the process used has been to examine the pervasive processes that threaten and scale of the While there has been an attempt at describing three year outcome-targets for landscape and protected area assets, and ecosystem (inc. wetlands) and species, 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.

The nine regional 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 State-wide 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 by a cross Divisional expert-based workshop involving local input held in Manjimup on 16 to 18 August 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. Whilst the focus of this plan is three years it is recognised that this is a step in a long-term process.

ACKNOWLEDGMENTS

The Nature Conservation Output Warren Region Plan was written by the following Department of Conservation and Land Management (CALM) staff, in alphabetical order: Kaylene Bain, Neil Burrows, Keith Claymore, David Coates, Roger Hearn, Peter Keppel, Rod Simmonds, Kevin Vear, and Ian Wilson. Thanks go to Mark Barley Peter Bidwell, Steve Collings and John Gillard who contributed towards the development of Sections 1.5-1.6 and 2, and the Value/Threat matrix at Appendix 1. Special thanks go to Kevin Vear for facilitation and assisting in drafting at the regional workshop, as well as Gordon Wyre and Alan Walker for providing support and encouragement for the development of all nine regional plans. Keith Claymore and Kevin Vear provided editing, and developed the framework for the plan with assistance from Roger Armstrong, Mark Cowan, Keith Hockey, Norm McKenzie, Kim Williams and Keith Morris and input from Neil Burrows and Ian Abbott. The following people provided comments on the draft plan: ADD CONTRIBUTORS AFTER CIRCULATION OF PLAN.

SYNOPSIS

The Department of Conservation and Land Management's Nature Conservation provides for the development and delivery of a number of programs and activities aimed at conserving biodiversity. These cross research, operational management and administration aspects of the Department. The Nature Conservation Output Plan provides a summary of key biodiversity values and assets within the Warren Region and summarizes major threats to those values. It outlines 14 outcome targets, and 39 associated candidate actions for the Divisions of Science, Nature Conservation and Regional Services at a range of scales over 2005-2008.

For the purposes of the Plan the majority of the Warren IBRA region and South Jarrah 2 subregion and the western part of the South Coast IMCRA (Cape Leeuwin-Point Irwin-Cordinup sub regions) that comprise the Warren Region were used as the basis for analysis of biodiversity related issues. The candidate actions in this 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 target outcomes. The regional target outcomes were identified for those biodiversity assets and values that need to be actively managed if the Nature Conservation Output Aspirational Outcomes are to be achieved. Current management responses being delivered under the Nature Conservation Output directly contribute to meeting the regional targets or the Output's aspirational outcome of reducing the rate of decline in biodiversity and ecosystem condition.

Analysis of major threats against biophysical values and existing management responses is required to ensure management focuses on the most critical values and their threats. There also needs to be a continued focus on maintaining the health of the ecosystems to minimise the increase of threats to the critical values most at risk.

This review has identified that there is gap between present knowledge and the knowledge that is required to make sound, considered and measurable management decisions to ensure Warren Region's focus is on achieving the Output's aspirational outcome. This task requires collaborative work and research by sections of the Department that will provide the knowledge

required to make management decisions that will ensure the most important target outcomes and candidate actions are being focused on. This integrated process is likely to change the priority of some of the actions of this Plan.

The implementation and review of the Plan will direct future management and research:

Landscape and Protected Area System

Development and implement a fire management program that protects and conserves biodiversity.

Develop and implement a *Phytophthora cinnamomi* response plan that includes a risk analysis to ensure threatened flora, ecological communities and areas of conservation significant ecosystems that are uninfected and protectable are the priority for management work.

Develop and implement management plans and control programs for weeds and feral animals that place the greatest risk on the highest conservation values.

Assess the significance of protected areas on the margins of the Region and reduce the threatening processes to maintain these areas in a conservation secure situation. Where possible increase the size of these areas.

Marine Systems

Complete and implement the marine reserve management plan for the Walpole Nornalup Inlets

Wetlands

Complete and implement a management plan for the Muir Unicup Biodiversity Recovery Catchment Area.

Assess the values and threats of the nationally and internationally significant wetlands in the region. Commence management that ensures the conservation of these important values.

Threatened Species and Ecosystems at Risk

Consolidate the management of biological data to ensure the knowledge of values at risk and threats to these values is understood and used by management to achieve the Outputs Aspirational outcomes

Focus science and management expertise to achieve species and ecological communities improved conservation security

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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 maximising resource use and sharing and to integrate delivery where practical and is recognised and embedded in 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 of ecosystems resulting from human activity will be reversed through management intervention by:

- A network of conservation reserves to protect and manage biodiversity in-situ surrounded by sympathetically managed lands/waters where conservation is incorporated into integrated land/resource use and ecological linkages to maximise conservation of biodiversity;
- Identification and biodiversity management of intact, functional landscapes and habitat;
- Better decision-making for biodiversity conservation based on improved knowledge of biodiversity patterns and status, trends and threatening processes; and
- Awareness and understanding of biodiversity and conservation requirements increased in order to gain long-term support and change in behaviour.

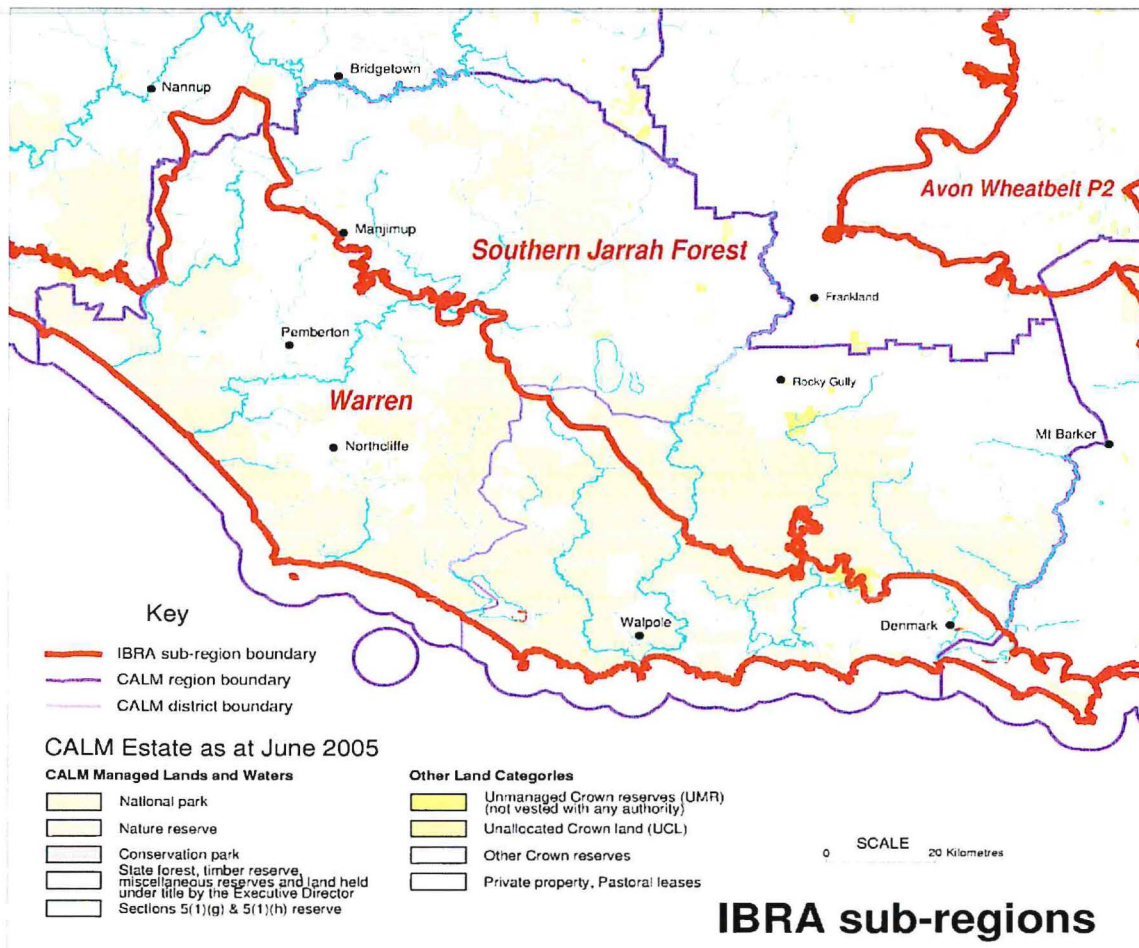
1.4 REGIONAL DESCRIPTION AND BIODIVERSITY ASSETS/VALUES

CALM's Warren Region covers a major proportion of the Warren Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and the Southern Jarrah Forest IBRA subregion (JF2) of the Jarrah Forest IBRA Bioregion (Figure 1).

In summary, the biodiversity assets and values of the Region are:

- A relatively intact, varied and rich complex mosaic of natural landscapes and vegetation such as wetlands, heaths, woodlands, forests (including old growth forests) riparian ecosystems, rivers, rock outcrops, inlets, estuaries, beaches, coastal plain and cliffs, and islands;
- A rich assemblage of aquatic invertebrate fauna, freshwater fishes, and terrestrial invertebrate fauna;
- The highest representation of remnant non-vascular plants in the State;
- The highest occurrence of Gondwanan refugial habitat and associated relictual taxa in the State;
- A high number of Threatened, endemic and relictual fauna including the quokka, sunset frog, Nornalup frog, Walpole burrowing crayfish, tingle trapdoor spider, Muirs corrella, Western ringtail possum, and a translocated population of the Western bristlebird;
- A number of Threatened Ecological Communities, such as the Mt Lindesay Granite community, *Reedia spathacea* peat paluslopes and epiphytic crypogams of the south west forests, and unique geological formations such as the Black Point basalts;
- An extensive, varied, unique and nationally significant wetlands, including the Lake Jasper wetland complex and the internationally recognized and relatively pristine Lake Muir Byenup Lagoon (Muir-Unicup) wetland complex;
- A high number of Threatened, endemic, relictual, edge of range and disjunct (wheatbelt endemics threatened by climate change) native plants including tingle trees, heath, swamp and rock outcrop species associated with moist environs, and rare orchids;
- Extensive areas of relatively undisturbed habitat for flora, fauna and ecological communities where biological, ecological and evolutionary process can occur largely free from interference by humans. These areas include the reservation of almost entire river systems in a relatively natural condition.
- Warren Region manages a total area of CALM managed land of 937938 hectares. This is comprised of 647127ha of national parks and nature reserves, 270811 ha of state forest and timber reserves, 6560ha of various reserves including Executive Director owned lands and 13440ha of unallocated crown lands and unmanaged reserves

Figure 1. Map of Warren Region showing IBRA sub-regions and lands and waters managed by the Department of Conservation and Land Management.



Warren Region CALM tenure areas (ha) June 2005

National park	560,360
Conservation park	37
Nature reserve	86,730
State forest	262,595
Timber reserve	8,216
Sections 5(1)(g) & 5(1)(h)	1,513
Miscellaneous reserve	349
Freehold (exec dir)	4,658
Sections 16 & 16A managed land	40
Total	924,498
- Other	
UCL approx	6,330
UMR approx	7,110

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 IBRA JF2 and Warren IBRA Bioregion.

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

- Spread and impact of *Phytophthora cinnamomi* on the flora, fauna and ecosystems of the Warren Bioregion and Southern Jarrah Forest subregion;
- Inappropriate fire regimes;
- Introduced animals, particularly the feral pig and the fox;
- Changing hydrology, including inundation, changes to the flow regimes of rivers, salinisation, acid groundwater, surface water storage and groundwater extraction;
- Introduction and spread of environmental weeds;
- Climate change;
- Soil damage such as erosion and compaction, particularly in sensitive areas such as coastal dunes and the riparian landscape;
- Unsustainable resource use and impacts by industries such as forestry, craft wood collection, wildflower harvesting, apiculture and public utilities;
- Land use, development and activities that are in conflict with, or not sympathetic to, biodiversity conservation. For example, loss of remnant vegetation (including shade and habitat trees) on farm land, damage caused by threatened cockatoo species on orchard and farming enterprises, resulting in cockatoo control programs, tourism visitation, plantation establishment and hydrological change, use of chemicals on developed land, water extraction from natural waterways.
- Impact of overgrazing by large macropods on small reserves and on the perimeter of large reserves;
- Critical knowledge gaps and inadequate biophysical information management systems;
- Decline in the real value of CALM budget, increased estate to manage, increasing complexity of management;
- Increased community expectations and CALM's ability to deliver within the limitations of resources, priorities and responsibilities; and
- Influence of NRM processes on CALM management priorities for nature conservation.

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 & SEASCAPE & PROTECTED AREA SYSTEM	T1	The condition of healthy ecosystems including wetlands, riparian zones, diverse eco-tones and old growth forests will be maintained.
	T2	The spatial extent (as indicated by Beard-Hopkins mapping) and condition of areas of remnant vegetation and areas of high endemism and/or species richness (as mapped for the SW Regional Forest Agreement) will be maintained.
	T3	The Walpole-Nornalup marine ecosystems will be maintained at or improved on current condition levels.
WETLANDS/ RIPARIAN	T4	The condition of wetlands of the Lake Muir-Unicup recovery catchment will be improved.
	T5	Eight wetlands (Broke Inlet, Doggerup, Marringup, Mt Soho Swamp, Lake Jasper, Owingup, Lake Muir and Byenup Lagoon) of national significance will be improved or maintained at current condition levels.
ECOSYSTEMS AT RISK	T6	The condition ¹ of three Threatened Ecological Communities (Mt Lindesay complex, Black Point and Reedia complex) will be improved.
	T7	The condition of 17 data deficient ecological communities will be maintained (Appendix 3).
SPECIES AT RISK	T8	The population size of two Critically Endangered flora (<i>Verticordia apecta</i> ; <i>Rhacocarpus webbianus</i>) will be increased.
	T9	The populations of mature plants of four Priority Two flora species (<i>Andersonia annelsii</i> ; <i>Andersonia hammersleyana</i> ; <i>Grevillea acropogon</i> ; <i>Laxmannia grandiflora</i> subsp. <i>Brendae</i>) - proposed as critically endangered - will be maintained at their current size, and the conservation status of 10% of priority flora will be resolved.
	T10	Populations of nine Vulnerable (<i>Meziella trifida</i> ; <i>Caladenia harringtoniae</i> ; <i>Banksia verticillata</i> ; <i>Conostylis misera</i> ; <i>Microtis globula</i> ; <i>Asplenium obtusatum</i> subsp. <i>northlandicum</i> ; <i>Laxmannia jamesii</i> ; <i>Kennedia glabrata</i> ; <i>Diuris drummondii</i>) and seven Endangered flora (<i>Verticordia densiflora</i> var. <i>pedunculata</i> ; <i>Drakaea micrantha</i> ; <i>Sphenotoma drummondii</i> ; <i>Verticordia fimbriolepis</i> subsp. <i>australis</i> ; <i>Caladenia winfieldii</i> ; <i>Caladenia christineae</i> ; <i>Caladenia dorrienii</i>) will be maintained at their current size (defined as the number of mature/reproducing plants).
	T11	No decline in conservation status of nine terrestrial Threatened fauna (Quokka, Chuditch; Numbat; Western Ringtail Possum; Malleefowl; Australasian Bittern; Sunset Frog; Tingle Trapdoor Spider; Walpole Burrowing Crayfish).
	T12	Establish viable populations of the locally extinct Bilby and of the Western Bristle Bird.
	T13	No decline in conservation status of three conservation dependant fauna (Tammar wallaby, Quenda, Woylie), and the conservation status of 12 species (Brush-tailed Phascogale, Black Bittern, Little Bittern, Hooded Plover, Forest Red-tailed Black-Cockatoo, Barking Owl, Masked Owl, Short-nosed Snake (<i>Elapognathus minor</i>), Nornalup Frog, Mud Minnow (<i>Galaxiella munda</i>), Black-stripe Minnow (<i>Galaxiella nigrostriata</i>), Balston's Pygmy Perch (<i>Nannatherina balstoni</i>)) of priority fauna will be resolved.
	T14	The populations of three taxa (Carnaby's Black-Cockatoo, Baudin's Black-Cockatoo and Muir's Corella) of Endangered fauna will be increased (as measured by an index of abundance appropriate to the taxon).

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

3 LIST OF REGIONAL THREE YEAR CANDIDATE ACTIONS

The following section lists priority candidate 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 LANDSCAPE AND SEASCAPE AND PROTECTED AREA SYSTEM

Target Three Year Outcome - T1: The condition of healthy² ecosystems including wetlands, riparian zones, diverse eco-tones and old growth forests will be maintained.

Target Three Year Outcome - T2: No reduction in the spatial extent (Beard-Hopkins mapping) and condition of areas of remnant vegetation and areas of high endemism and/or species richness (mapped for the RFA).

Candidate Actions:

1. Develop and implement a fire management program (which includes condition monitoring) that protects and conserves biodiversity.

Primary Responsibility: Regional Leader Nature Conservation to undertake development of program (including plan development) and coordinate delivery of action.

Support: Science Division to provide advice and input into monitoring design and advise on appropriate fire management regime

Fire Management Services to assist in planning and operational delivery

Sustainable Forest Management Division to provide advice.

Status: Partly achieved (Process needs to be reviewed by May 2006 to ensure the current works program is expanded beyond an annual burn and fire suppression program, and there is full input from Regional Leader Nature Conservation, Regional Ecologist and Science Division in the development of an integrated fire management plan for biodiversity with Fire Management Services providing input).

Indicative Funding: Expenditure previous 2 years an average of \$1600000 per year (excludes wildfire suppression).
2005-06 Budget \$18000000 with expected shortfall of \$300000
An ongoing budget of \$2100000 per financial year is required .

Completion date: Ongoing

2. Develop a *Phytophthora cinnamomi* regional response plan that includes a risk analysis to ensure the protection from Pc of threatened flora, ecological communities and areas of

² In this context healthy refers to intact landscapes/ecosystems as opposed to fragmented systems and Threatened Ecological communities and includes areas of biodiversity richness and high endemism.

conservation significant ecosystems that are uninfected and protectable, by carrying out a regional scale survey of the location and distribution of *P. cinnamomi*, assessment of the current impact on conservation values models future spread and impact, the planned use of phosphite and other control measures and monitoring by June 2008.

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

Support: Environmental Protection Branch to provide overarching framework for risk assessment, and set standards for survey work
Science Division to assist in design of survey and monitoring work and undertake modelling.

Status: New

Funding: 2005-06 Budget is \$100000 in NC & SFM
2006/07 Required Budget from Nature Conservation Output: \$250,000 pa.
An ongoing budget of \$90,000 per financial year is required.

Completion date: Ongoing

SCRIPT NRM Region (Joanna Young Project) is presently funding a project to assess the Walpole Wilderness Area for areas of high conservation significance that is uninfected and protectable. The funding request should enable the completion of this task across the remainder of the Region.

3. Develop and implement an exotic weed control plan that includes a risk analysis to determine priority weeds and locations for action, a regional scale survey of weed locations and distributions, assessment of the current impact on conservation values, prediction of spread (including invasion) and impact of priority weeds, the planned use of control measures and proposed monitoring by June 2007.

Primary Responsibility: Regional Leader Nature Conservation to develop and coordinate delivery of plan

Support: Environmental Protection Branch³ to provide risk analysis framework
Science Division to provide advice and input into design of monitoring program.

Status: Commenced and new

Indicative Funding: To develop plan a one off budget of \$30000 is required.
Ongoing budget of \$25000 per financial year is required to implement the plan.

4. Continue to implement interim weed control measures based on best available knowledge until completion of regional weed plan and review after June 2007 (Action 3 above).

³ Need provision of a risk analysis framework to determine high priority weeds for action, and framework for a weed plan.

Primary Responsibility: Regional Leader Nature Conservation to coordinate delivery of actions and report on progress.

Support: Environmental Protection Branch and Species and Communities Branch to assist Region in developing Regional Weed Action Plan

Status: Partly Achieved and Ongoing.

Indicative Funding: 2004-05 \$130000 expenditure in NC and SFM
2005-06 \$190000 budget
Ongoing budget of \$280000 per financial year is required

Completion date: Ongoing

5. Develop and implement an introduced animal control plan that includes a risk analysis to determine priority species and actions, a regional scale survey of occurrence of priority species, assessment of the current impact on conservation values, prediction of spread and impact of priority species, the planned use of control measures and proposed monitoring by June 2008.

Primary Responsibility: Regional Leader Nature Conservation to develop and coordinate delivery of plan.

Support: Environmental Management Branch to provide risk analysis framework and advice on control techniques and ensure standards and consistency of approach,

Science Division to provide advice on design of monitoring program and assist in predictive modelling.

Status: Partly achieved.

Indicative Funding: Existing funding needs to be increased by \$40000 per financial year to carry out this action

Completion date:

6. Due to observable, significant impact, develop and implement a feral pig control plan that includes a risk analysis, priorities for action, a regional scale survey of occurrence, assessment of the current impact on conservation values, prediction of spread and impact, the planned use of control measures and monitoring by June 2006.

Primary Responsibility: Regional Leader Nature Conservation to develop plan.

Support: Environmental Management Branch to provide framework for plan so consistent across relevant Regions.

Science Division to provide advice and input into design of modelling and monitoring.

Status: Partly achieved.

Indicative Funding: NEW: to develop a control plan and implement increased feral pig control an additional \$120000 per financial year is required.

Completion date:

7. Until the completion of the regional introduced animal control plan as per action 5 above, continue to implement interim introduced animal control measures based on best available knowledge and review after June 2008.

Primary Responsibility: Regional Leader Nature Conservation to coordinate delivery of program and report on progress.

Support: Environmental Protection Branch

Status: Ongoing.

Indicative Funding: * Includes Action Item 8 predator control work; 2004-05; \$159000 expenditure in NC and SFM 2005-06; \$176000 budget in NC and SFM is adequate for existing program. Action Item 6, 7 and 8. Any increase in control program planning and implementation will require a budget increase of \$160000 as indicated in Action Items 6,7 and 8.

Completion date: Ongoing

8. Continue to implement Western Shield over 741000 ha, including monitoring assets and threatening processes, fox control, and relevant fauna reconstruction activities.

Primary Responsibility: Regional Leader Nature Conservation to coordinate delivery of on-ground control and translocation activities.

Support: Science Division to provide advice and undertake research

Species and Communities Branch to set monitoring standards, Science Division, and provide training and administration for translocation/baiting, and State level coordination.

Status: Ongoing (and to include the Western Shield Review recommendations).

Funding: See Action Item 7 for predator control work that is carried out as part of Western shield

Completion date: Ongoing

9. Undertake rapid survey to identify the conservation values of and threatening processes on remnant vegetation (both within the protected area system and in off reserve areas) in the eastern sections of the Region north of Muir Highway

Primary Responsibility: Regional Leader Nature Conservation to arrange survey.

Support: Director Science Division to provide advice on design.

Status: New

Indicative Funding First year one off budget of \$30000 required to develop program.
Ongoing budget of \$40000 per financial year required to implement management program

10. Develop and implement a monitoring and management program by June 2007 (program to include acquisition, conservation covenants and Land for Wildlife and focus these programs in high priority areas in north eastern parts of Region and south coastal areas east of Walpole.

Primary Responsibility: Regional Leader Nature Conservation to arrange survey.

Support: Species and Communities Branch to provide advice, and focus relevant programs into high priority areas.

Status: New

Indicative Funding: First year one off budget of \$45000 required to develop program.
Ongoing budget of \$60000 per financial year to implement management of these values. *If land purchase needs are identified a significant one off funding will be required.*

11. Complete an assessment of the impact of altered hydrology on conservation values, firstly in the transitional zone between the forests and eastern woodlands and then the south coastal plain and the Scott coastal plain by June 2008.

Primary Responsibility: Regional Leader Nature Conservation to arrange survey and assessment.

Support: Science Division to advise on study design along with Natural Resources Branch (Hydrologist).

Status: New

Indicative Funding: One off funding of \$80000 is required
Completion date:

12. Finalise the Lake Muir-Unicup Natural Diversity Catchment Recovery Plan by December 2005, and in the meantime continue to implement the interim plan until completion of recovery plan.

Primary Responsibility: Regional Leader Nature Conservation to coordinate program, and finalise plan.

Support: Natural Resources Branch to provide advice on planning framework and input into plan

Director Science Division to provide advice on planning framework and input into plan.

Status: Ongoing

Indicative Funding: Existing and previous budgets have been between \$293000 and \$400000 per financial year.
If engineering solutions are required a significant budget allocation will be required for several financial years.
If not an ongoing budget of \$302000 should be adequate.

Completion date: Ongoing

13. Due to the observed decline in condition and habitat loss and damage of the protected area system caused by firewood removal, develop a response plan⁴ including benchmarking impacts, including a situation statement that indicates localities/areas being affected and impacts on biodiversity, monitoring, education and compliance by June 2007.

Primary Responsibility: Regional Leader Nature Conservation to complete response plan in conjunction with Regional Leader Sustainable Forest Management.

Support: Director 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: Ongoing and expanding

Indicative Funding: 2004-05 expenditure \$53000 (NC and SFM)
2005-06 budget of \$50000 in SFM, no budget in NC
Ongoing budget of \$65000 per financial year required in NC

Completion date: Ongoing

14. Due to the observed decline in condition and habitat loss and damage of the protected area system caused by inappropriate resource use such as craftwood collection, wildflower picking, apiculture and public utilities, develop a response plan including benchmarking impacts, monitoring, education and compliance by June 2007.

Primary Responsibility: Regional Leader Nature Conservation to develop plan.

Support: Manager Nature Protection Branch to provide advice on wildlife industries' standards and compliance and education.

Status: Ongoing.

Indicative Funding: 2004-05 expenditure \$152000
2005-06 budget \$140000
New imitative component of this Action Item will require an additional \$210000 per financial year.

⁴ Plan needs to be consistent with a State level framework for amelioration of impacts of biodiversity values of firewood collection to be developed by Species and Communities Branch.

Completion date: Ongoing

15. Provide input into land use planning processes to ensure biodiversity values are protected and maintained.

Primary Responsibility: Regional Manager
Support: Regional Leader Nature Conservation and Manager Environmental Management Branch to provide advice on

Status: Ongoing

Indicative Funding: 2004-05 expenditure \$90000
2005-06 budget \$90000.
Ongoing budget of \$90000 per financial year is required.

16. Continue to provide input into Environmental Impact Assessments, Notice of Intent to Clear, manage disturbance associated with land use, monitor outcomes and ensure compliance with statutory obligations and management plans to prevent extinctions and decline in ecosystem condition.

Primary Responsibility: Regional Manager in conjunction with District Managers,

Support: Manager Environmental Management Branch to provide advice on

Status: Ongoing

Indicative Funding: 2004-05 expenditure \$152000
2005-06 budget is \$85000 in NC, SFM & PVS
Additional ongoing budget of \$75000 is required per financial year

Completion date: Ongoing

17. Fill gaps in the conservation reserve system identified by the WA Biodiversity Audit in the Warren and JF2 IBRA Provinces through land acquisition, land use planning, tenure changes and other instruments such as Section 16 Agreements and conservation covenants.

Primary Responsibility: Regional Leader Nature Conservation to identify areas of interest (priority areas) for land acquisition and agreements.

Support: Regional Manager in conjunction with District Manager to provide advice on land use planning and ensure negotiations and agreements

Manager Species and Communities Branch to target conservation covenant program into priority areas and undertake relevant administration for covenants.

Status: Ongoing

Indicative Funding: 2005-06 budget is \$21000
Additional budget of \$20000 required per year to carry out this assessment and develop implementation plan.

18. Continue to develop and refine an integrated Nature Conservation information management system⁵ for the Warren Region.

Primary Responsibility: Regional Manager. Nature Conservation Leader to provide advice along with Science Division on requirements.

Status: New initiative commenced in 2005-06 which requires an ongoing commitment

Indicative Funding No specific budget in 2005-06, task is being costed to threatened flora mngt, anticipate an expenditure of \$20000
Ongoing budget of \$20000 per financial year is required

Completion date: Ongoing

Target Three Year Outcome – T3: The Walpole-Nornalup marine ecosystems will be maintained at or improved on current condition levels.

1. Finalise the development of the Walpole-Nornalup Inlets Marine Park indicative management plan, and implement final plan.

Primary Responsibility: Marine Conservation Branch to undertake public consultation and administration associated with plan to create and finalise plan, and provide advice to Region on monitoring and management standards.

Support: Regional Manager to coordinate implementation of plan once finalised, with input from Regional Leader Nature Conservation

Status: Ongoing

Indicative Funding: No funding provided from Marine Branch to date for input to preparation of the draft management plan. Anticipate an expenditure of \$15000 in 2005-06 for mngt input to marine reserve mngt planning process
Prior to marine reserve being vested a budget will be provided via the management plan approval process. Estimate \$230000 budget per financial year is required for NC and PVS (jetties and boating facilities) management, monitoring and maintenance

Completion date: Ongoing

3.2 WETLANDS/RIPARIAN

Target Three Year Outcome – T4: The condition of wetlands of the Lake Muir-Unicup recovery catchment will be improved.

1. Finalise and implement the Lake Muir-Unicup Natural Diversity Recovery Catchment Plan, including urgent actions:

⁵ Needs to be consistent with State information management framework.

- Acquisition of Water and Rivers Commission managed land and other lands in the Unicup-Lake Muir catchment;
- Understand the hydro-geology of Unicup-Lake Muir catchment to facilitate the implementation of the engineered recovery actions; and
- Continue with the catchment revegetation program, including owner liaison to ensure landscape connectivity and buffering of wetlands

Primary Responsibility: Regional Ecologist to finalise plan and coordinate activities in conjunction with Regional Leader Nature Conservation.

Support: Manager Natural Resources Branch to provide advice on plan framework, and provide input to plan.

Director Science Division to provide advice and input to plan, and condition monitoring advice.

Status: Ongoing

Indicative Funding: Current and expanded works program covered by Muir Unicup Recovery Catchment works program and budget. *See Candidate Action 12*

Completion date: Ongoing

Target Three Year Outcome – T5: The condition of the seven wetlands (Owingup, Lake Jasper, Broke Inlet, Doggerup, Marringup, Mt Soho Swamp, and Byenup) of national significance will be improved or maintained.

Urgent actions to be undertaken:

1. Progress work on Owingup wetland complex such as working with neighbours to prevent eutrophication, quantification of adjacent land use impacts and hydrological processes on the wetland condition;
2. Assess the condition of the biota and abiotic factors such as water quality and quantity, and evaluate threats to, Lake Jasper; and
3. Establish and consolidate benchmark information for Broke Inlet, Doggerup, Marringup, Mt Soho Swamp, and Byenup to determine condition, identify threats and to determine interim management actions.

Primary Responsibility: Regional Leader Nature Conservation to coordinate and arrange activities in conjunction with District Nature Conservation Coordinator.

Support: Director Science Division to provide advice on condition monitoring.

Status: New

Indicative Funding: No existing budget.
Additional budget of \$60000 per financial year required to implement assessment, monitoring and management.

Completion date: Ongoing

3.3 ECOSYSTEMS AT RISK

Target Three Year Outcome - T6: The condition⁶ of three Threatened Ecological Communities (Mt Lindesay complex, Black Point and Reedia community) will be improved.

Candidate Actions:

1. Urgent actions required to recover the three Threatened Ecological Communities:
 - Establish a recovery team and finalise Interim Recovery Plans for the Mt Lindesay complex, Black Point, and Reedia community Threatened Ecological Communities by June 2006;
 - Implement feral pig control at Mt Lindesay and Reedia community Threatened Ecological Communities, and monitor condition;
 - Develop and implement appropriate fire management plan for Threatened Ecological Communities;
 - Finalise *Phytophthora cinnamomi* mapping for Mt Lindesay Threatened Ecological Community;
 - Continue phosphite treatment of Mt Lindesay Threatened Ecological Community;
 - Undertake ground water monitoring of Reedia community Threatened Ecological Community;
 - Monitor and control introduced animals and exotic weeds in the Reedia community Threatened Ecological Community; and
 - Establish condition monitoring program for TECs.

Primary Responsibility: Regional Leader Nature Conservation to coordinate program activities, establish recovery team and finalise recovery plans, and undertake actions and monitoring.

Support: Manager Species and Communities Branch to provide advice on plans and ensure standards.

Director Science Division to provide advice on plans and advice on monitoring programs.

Status: Ongoing and new actions

Indicative Funding: Ongoing management is funded by activities that have potential to disturb and threatening processes eg; fire weeds, feral animals and dieback management. 2005-06 budget of \$10000 is being used to evaluate condition of 2 critically

⁶ Condition refers to species richness, composition and abundance and vegetation structure)

endangered species and development immediate recovery action

To prepare recovery plans and engage recovery teams will require an ongoing budget of \$65000 per financial year

Completion date: Ongoing

2. Manage neighbouring disturbances to prevent extinctions and decline in the condition of three Threatened Ecological Communities and ensure compliance with statutory obligations from EIA and land use planning processes.

Primary Responsibility: Regional Manager to ensure input into EIA and land use planning processes.

Support: Regional Leader Nature Conservation to coordinate on-ground activities to minimise impacts.

Manager Environmental Management Branch to provide advice on EIA and land use planning processes.

Status: Ongoing

Indicative Funding: As per Action Item 1

Completion date: Ongoing

Target Three Year Outcome - T7: The condition of 17 data deficient (Priority) ecological communities (Appendix 3) will be maintained.

Candidate Actions:

1. Urgent actions for data deficient ecological communities include:

- Undertake an assessment of conservation status and threats by June 2006;
- Prepare proposals for listing of appropriate ecological communities by June 2007;
- Prepare an Interim Management Guideline for cryptogam data deficient ecological community by June 2007; and
- Establish a condition monitoring and evaluation program for priority ecological communities following assessment by June 2007.

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

Support: Director Science Division to provide advice on design of assessment and advice on design of monitoring program.

Manager Species and Communities Branch to provide advice on listing process and undertake listing administration.

Status: New

Indicative Funding: No existing budget, new budget of \$65000 per financial year required.

Completion date: Three years from commencement date

2. Continue to provide input into Environmental Impact Assessments, Notice of Intent to Clear, manage disturbance associated with land use, monitor outcomes and ensure compliance with statutory obligations and management plans to prevent extinctions and decline in 17 Priority Ecological Communities.

Primary Responsibility: Regional Manager to ensure input into processes.

Support: Nature Conservation Regional Leader to provide advice.

Manager Environmental Management Branch to provide advice.

Status: Ongoing

Indicative Funding: See Outcome Target T12 and 13, and Candidate Action Item 16

Completion date: Ongoing

3.3 SPECIES AT RISK

Target Three Year Outcome - T8: The population size of two Critically Endangered flora species (*Verticordia apecta*; *Rhacocarpus webbianus*) will be increased.

Candidate Actions:

1. Urgent recovery action to be undertaken by June 2007:
 - Develop a propagation and translocation program for *Verticordia apecta*;
 - Monitor and manage visitor impacts on *Rhacocarpus webbianus*;
 - Relocate type locality of *Rhacocarpus webbianus*; and
 - Prepare and implement interim recovery plans for the two Critically Endangered flora species.

Primary Responsibility: Regional Leader Nature Conservation to coordinate activities, arrange preparation of recovery and translocation plans and monitoring.

Support: Director Science Division to provide advice.

Manager Species and Communities Branch to provide framework for recovery plans, and ensure standards.

Status: New

Indicative Funding: No existing specific budget, funded as part of managing Threatened Flora Budget of \$53000 in 2005-06
New initiative of improving the condition and population size of threatened flora budget of \$75000 requires over two to three years.
Ongoing budget of \$10000 per financial year after condition of populations are improved.

Completion date: Ongoing

2. Continue to provide input into Environmental Impact Assessments, Notice of Intent to Clear, manage disturbance associated with land use, monitor outcomes and ensure compliance with statutory obligations and management plans to prevent extinctions of populations/taxa.

Primary Responsibility: Regional Manager to ensure appropriate input.

Support: Regional Leader Nature Conservation and Regional Ecologist to provide advice.

Manager Environmental Management Branch to provide advice.

Status: Ongoing

Indicative Funding: See Outcome Target T12 and T13 Action Item 16

Target Three Year Outcome - T9: The populations of mature plants of four Priority Two flora (*Andersonia annelsii*; *Andersonia hammersleyana*; *Grevillea acropogon*; *Laxmannia grandiflora subsp. Brendae*) - proposed as Critically Endangered - will be maintained at their current size, and the conservation status of 10% of Priority flora will be resolved.

Candidate Actions:

1. Urgent actions to be undertaken:
 - Complete nominations for Declared Rare Flora listing by December 2005;
 - Survey for new populations and update conservation status of *Andersonia hammersleyana*; *Grevillea acropogon*; *Laxmannia grandiflora subsp. Brendae* by December 2005;
 - Continue to annually monitor the population of mature plants of the four P2 taxa;
 - Collect seed for *ex situ* storage and future translocations for *Andersonia annelsii*, *Andersonia hammersleyana*, *Grevillea acropogon*; *Laxmannia grandiflora subsp. Brendae*;
 - Treat *Andersonia annelsii* and *Andersonia hammersleyana* with phosphite biennially; and
 - Implement recovery actions in anticipation of listing as Declared Rare Flora.

Primary Responsibility: Regional Leader Nature Conservation in conjunction with Regional Ecologist to coordinate and implement urgent actions..

Support: Director Science Division to provide advice
Manager Species and Communities Branch to provide framework and approve listings and recovery actions.

Status: Ongoing and new work

Indicative Funding: 2005-06 Budget \$40000.
Existing budget needs to be increased by \$40,000 per financial year to enable this work to be increased.

Completion date:

2. Survey for new populations and update the conservation status of 16 Priority flora to be identified by the Warren Region Flora Recovery Team with reference to the Warren Region Flora Recovery Plan.

Primary Responsibility: Regional Leader Nature Conservation to convene and chair recovery team, and coordinate survey work.

Support: Director Science Division to advise on survey.
Manager Species and Communities Branch to approve updating of conservation status.

Status: New work

Indicative Funding: No current funding available.
Budget of \$90000 per year is required to carry out this Action.

3. Continue to provide input into Environmental Impact Assessments, Notice of Intent to Clear, manage disturbance associated with land use, monitor outcomes and ensure compliance with statutory obligations and management plans to prevent extinctions of Priority flora.

Primary Responsibility: Regional Manager

Support: Nature Conservation Regional Leader and Regional Ecologist to provide advice

Status: Ongoing

Indicative Funding: See Outcome Target T12 and 13 Action Item 16

Completion date:

Target Three Year Outcome – T10: Populations of nine Vulnerable (*Meziella trifida*; *Caladenia harringtoniae*; *Banksia verticillata*;

Conostylis misera; *Microtis globula*; *Asplenium obtusatum* subsp. *northlandicum*; *Laxmannia jamesii*; *Kennedia glabrata*; *Diuris drummondii*) and seven Endangered flora (*Verticordia densiflora* var. *pedunculata*; *Drakaea micrantha*; *Sphenotoma drummondii*; *Verticordia fimbriolepis* subsp. *australis*; *Caladenia winfieldii*; *Caladenia christineae*; *Caladenia dorrienii*) will be maintained at their current size (defined as the number of mature/reproducing plants).

Candidate Actions:

1. Implement actions identified under the regional flora management plan and those to be developed by the Warren Region Flora Recovery Team that are directed towards managing threats and maintaining the current (2005) population size for all taxa.

Primary Responsibility: Regional Leader NC to provide list of suitable actions in conjunction with District NC Leader and the Warren Region Flora Recovery Team

Support: Science Division, and Species and Communities Branch

Status: New

Indicative Funding: Additional budget of \$30,000 per financial year required to implement actions identified in regional flora management plan

Completion date:

2. Continue to provide input into Environmental Impact Assessments, Notice of Intent to Clear, manage disturbance associated with land use, monitor outcomes and ensure compliance with statutory obligations and management plans to prevent extinctions the nine Vulnerable and seven Endangered flora.

Primary Responsibility: Regional Manager in conjunction with District Managers

Support:

Status: Ongoing

Indicative Funding: See Outcome Target T12 and T13 Action Item 16

Completion date:

Target Three Year Outcome – T11: No decline in conservation status of nine terrestrial Threatened fauna (Quokka, Chuditch; Numbat; Western Ringtail Possum; Malleefowl; Australasian Bittern; Sunset Frog; Tingle Trapdoor Spider; Walpole Burrowing Crayfish).

Candidate Actions:

1. Implement actions specified in the approved recovery plans for Chuditch, Numbat and Sunset Frog.

Primary Responsibility: Regional Leader Nature Conservation in conjunction with District Nature Conservation Coordinator

Support: Science Division and Species and Communities Branch

Status: Ongoing and new

Indicative Funding: Control of threatening processes is covered by fire, feral animal, weed and dieback management budgets

Additional budget of \$30000 per financial year required to implement recovery plans other than control of threats

Completion date: Ongoing

2. Prepare recovery plans for Western Ringtail Possum, Malleefowl, Australasian Bittern, Tingle Trapdoor Spider and Walpole Burrowing Crayfish.

Primary Responsibility: Regional Leader Nature Conservation to coordinate preparation/prepare in conjunction with District Nature Conservation Coordinator and Regional Ecologist.

Support: Director Science Division to provide advice and input

Manager Species and Communities Branch to provide framework for recovery plans and input.

Status: New

Indicative Funding: No existing budget
Additional budget of \$55,000 per financial year required.

Completion date: Two years from commencement of plan.

3. Urgent actions to maintain the conservation status of Threatened fauna:

- Maintain Western Ringtail Possum conservation status by implementing fox control, develop and implement an appropriate fire regime;
- Complete regional surveys of Nuyts and Quarram and 2005/08 wildfire areas to determine whether populations of Western Ringtail Possum are present and if not, consider for translocation;
- A targeted public education program to raise awareness about the threat to, and how to “live” with, Western Ringtail Possums;
- Identify and protect Australasian Bittern principle breeding areas and establish taxonomic status of WA population through DNA analysis;
- Search for new populations, monitor population size and research fire and habitat management for Tingle Trapdoor Spider and Walpole Burrowing Crayfish;

- Assist in the development of non-destructive sampling technique for Walpole Burrowing Crayfish;
- Complete the rapid survey of Quokka occurrence and determine conservation status, and habitat condition;
- Continue to implement the interim Fire Management Guidelines for Quokka conservation; and
- Finalise and commence implementation of the Fauna Distribution Information System following endorsement of the system by A/Director Nature Conservation.

Primary Responsibility: Regional Leader Nature Conservation to coordinate activities and arrange surveys.

Support: Director Science Division to provide advice for design of surveys, and arrange DNA analysis, provide advice on survey techniques and fire management regimes.

Manager Species and Communities Branch to provide advice.

Status: New

Indicative Funding: No existing Budget
Additional budget of \$35,000 per financial year required

Completion date: Ongoing

Target Three Year Outcome – T12: Establish viable populations of the locally extinct Bilby and of the Western Bristle Bird.

Candidate Actions:

1. Continue to implement the Western Bristle Bird component of the draft South Coast Threatened Bird Recovery Plan relevant to Warren Region.

Primary Responsibility: Regional Leader Nature Conservation to coordinate actions in conjunction with District Nature Conservation Coordinator.

Support: Advice to be provided from Director Science Division and Manager Species and Communities Branch.

Status: Ongoing

Indicative Funding: 2005-06 budget covers our present work in Frankland District to the value of \$15000 per financial year.
Budget of \$15000 per year required maximise potential of having a stable population situation

Completion date: Ongoing until populations are established

2. Prepare and implement a translocation proposal for the Bilby by December 2006.

Primary Responsibility: Regional Leader Nature Conservation to prepare translocation proposal in conjunction with District Nature Conservation Coordinator, and coordinate translocation once approved.

Support: Director Science Division to provide advice on proposal and appropriate monitoring (both population and threats)

Manager Species and Communities Branch to provide advice on proposal.

Status: New

Indicative Funding: Current budget should cover this work to the value of \$15,000 per financial year.
Predator control covered by this Activity Budget

Completion date: Ongoing through to success of translocation being decided

Target Three Year Outcome – T13: No decline in conservation status of three conservation dependant fauna (Tamar wallaby, Quenda, Woylie), and the conservation status of 11 Priority fauna (Brush-tailed Phascogale, Black Bittern, Little Bittern, Hooded Plover, Forest Red-tailed Black-Cockatoo, Barking Owl, Masked Owl, Short-nosed Snake (*Elapognathus minor*), Nornalup Frog, Mud Minnow (*Galaxiella munda*), Black-stripe Minnow (*Galaxiella nigrostriata*), Balston's Pygmy Perch (*Nannatherina balstoni*)) will be resolved.

Candidate Actions:

Urgent actions to be undertake:

1. Continue to implement Western Shield fox control program;
2. Develop by December 2005 and implement appropriate fire regimes for Tamar wallaby, Quenda, Woylie;
3. Continue monitoring Tamar wallaby, Quenda, Woylie population trends and introduced predator density and abundance and analyse and evaluate data and incorporate into adaptive management; and
4. Determine the population genetic structure of the Tamar wallaby to enable evaluation suitability of animals for translocation by June 2006.

Primary Responsibility: Regional Leader Nature Conservation to coordinate activities in conjunction with District Nature Conservation Coordinator.

Support: Director Science Division to provide advice and input into monitoring and translocation.

Manager Species and Communities Branch to provide advice and maintain standards.

Status: On going and new

Indicative Funding: Fox control cost covered by existing predator control budget. Fire regime management is part of present fire management budget.
Additional budget of \$20,000 per financial year required for monitoring work to be carried out.

Completion date: Ongoing

Target Three Year Outcome – T14: The populations of three Endangered fauna (Carnaby's Black-Cockatoo, Baudin's Black-Cockatoo and Muir's Corella) will be increased (as measured by an index of abundance appropriate to the taxon).

Candidate Actions:

Urgent actions to be undertaken:

1. Continue to implement draft recovery plan actions for Carnaby's Black-Cockatoo, Baudin's Black-Cockatoo and Muir's Corella;
2. Locate breeding sites for Baudin's Black-Cockatoo and Muir's Corella for protection and management from threatening processes by June 2007; and
3. Manage threats to Carnaby's Black-Cockatoo, Baudin's Black-Cockatoo and Muir's Corella related to horticulture and agriculture such as compliance, industry liaison and education, land use planning, and land owner liaison education and incentives.

Primary Responsibility: Regional Leader Nature Conservation to coordinate activities in conjunction with District Nature Conservation Coordinators.

Support:

Status: Ongoing and new

Indicative Funding: Management of threats is covered by existing Regional Wildlife Officer works program and budget. Monitoring budget to be covered by Outcome Targets T6 and T7 Action Items

Completion date: Ongoing

4. RESOURCES

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 questions investigated were (Appendix 4 Resource Analysis):
 - The estimated cost for the candidate actions that includes current budget where it can be identified (salaries, wages, plant, materials, contract and overheads) per year is \$ \$5063000

- In all situations 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 cannot be accurately estimated as there is not always a direct alignment between current budget allocation and the proposed candidate action items. The 2005-06 NC recurrent budget is \$3728295. Additional to this recurrent budget funds are available from NRM Groups across the Region. The Region also presently used the principle of costing the impact of protecting conservation values to the disturbing influence, eg; threatened flora management work required due to prescribed burning, and harvesting and regeneration works is costed to prescribed burning and the FPC.
2. Full implementation of the candidate actions in this plan and our existing NC works program will require \$5063000 in the first year. In comparison to our NC recurrent budget this plan indicates that a gap of \$2149000 exists for the one off and ongoing action items identified in this 3 Year Plan.
 3. Current budget allocations (2005-2006) total \$4267293 and are derived from seven revenue sources:
 - \$3728293 recurrent budget from Nature Conservation Output
 - \$23000 from Unallocated Crown land funds
 - *\$39500 from Common Fire Conditions, (included in recurrent budget)
 - *\$400000 from new Fire Resources, (included in recurrent budget and 25% work in remote regions)
 - \$263000 for Muir Unicup Biodiversity recovery catchment
 - \$44000 Fed Govt funding for weed control
 - Portion of the \$ 2,389782 Sustainable Forest Management Output budget that is used to carry out conservation works on state forest, timber reserves, executive director owned lands, and on some occasions conservation reserves immediately adjoining state forest.
 4. NC contributes \$519412 to general overheads for business administration and \$85000 to fire emergency availability. PVS Output provides \$130000 for activities (such as preparation of area management plans) that support the actions that directly conserve the region's biodiversity:
 5. The fed government funded Bushfire Mitigation Project for fire access on protected area reserves across the Region will contribute \$123000 in 2005-06 on a \$ for \$ basis.
 6. NRM projects (via the SWCC and SCRIPT) in the Region contribute to weed and feral animal control, dieback management, and biodiversity monitoring on CALM managed

lands and the private property interface. Actual \$ amount is not consolidated, and much of the effort is works in kind carried out on CALM managed lands.

7. Staff resources who primarily contribute to the Nature Conservation Output in the Warren Region as of September 2005 are 23 salaried staff and 28 conservation employees. These staff levels range from managers, operations staff (some of which have ecological and biological science expertise) and admin support. This does not include staff input to wildfire suppression.

Implementation of all the candidate actions would require a significant increase in capacity (staff) in the Warren Region. This increased staff resource will need to have ecological or biological science expertise to carry out the assessment, planning and implementation work of the candidate actions. Tasks such as feral animal and weed control works programs will require the availability of trained field operatives.

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.

6. GLOSSARY

8. “Strategic consistency” - each action in the regional plans is to link logically with the goals of the draft State Biodiversity Strategy;
9. Feasibility - each action statement is to be practicable and achievable in the nominated timeframe;
10. “Pro-activity” - proactive action statements are to predominate over reactive action statements;
11. Scientifically-informed - actions are underpinned by relevant ecological facts and modern ecological thinking;
12. Synergy with adjoining regions - similar actions are performed so as to provide trans-regional conservation benefits;
13. Use of adaptive management approach - all actions are regarded as informal experiments and are performed in a culture based on learning from successes and failures; and

14. "Initiative" – actions that should yield multiple conservation benefits in terms of cost and effort are preferred.
-

APPENDIX 1 Matrix of values/assets and threats and relative importance for regional Scale Actions for CALM Warren 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.

IBRA REGIONS		THREATS												
		Changing land use	Broad scale vegetation clearing	Fragmentation, loss of remnants, lack of recruitment	Firewood collection	Grazing pressure	Introduced animals	Exotic weeds	Changed inappropriate fire regimes	Pathogens	Changed hydrology – salinity	Changed hydrology – other	Pollution	Other, people pressure, resource use
BIODIVERSITY VALUES ⁷	WARREN													
	Landscape ⁸			H			H	H		H		H		H ⁹
	Protected area system	H			H		H		H	H				H ¹⁰
	Ecosystems at risk						H	H	H	H		H		
	Species at risk						H	H	H	H				
	Wetlands/riparian	H				H ¹¹	H	H	H	H		H	H	H ¹²
	JF2													
	Landscape			H	H		H	H	H	H	H	H		
	Protected area system	H			H		H	H	H	H	H	H	H	H ¹³
	Ecosystems at risk						H		H	H	H	H		
Species at risk	H					H		H	H	H	H			
Wetlands/riparian	H					H	H	H	H	H	H	H ¹⁴		

⁷ Definitions align with WA Biodiversity Audit 2002

⁸ Landscape may include areas of high species richness &/or endemism & landscape scale ecological linkages

⁹ Increased visitation – increased disturbance beyond acceptable limits

¹⁰ Increased visitation – increased disturbance beyond acceptable limits

¹¹ Native pest species

¹² Increased visitation – increased disturbance beyond acceptable limits

¹³ Increased visitation – increased disturbance beyond acceptable limits

¹⁴ Eutrophication, pesticides

APPENDIX 2 List of 17 data deficient ecological communities in Warren and JS2 IBRA Provinces

Community	Status
Relictual peat community (eg Lake Surprise) (South Coast Region pers. comm.)	P1
Spagnum communities of the “Tingle Forest” (only 3 known occurrences - Walpole area) (G. Wardell-Johnston data; R. Hearn pers comm.)	P2
Basalt association (Black Point - near Augusta) (R. Hearn pers. comm.)	P2
Saprolite association/Palusmont wetlands (Walpole Inlet) (R. Hearn pers comm.; V. and C. Semeniuk data)	P2
Grasslands of the South Coast (R. Hearn and T. Macfarlane, pers. comm.)	P2
Southern Granite community (eg Muirillup Rock, Northcliffe; subset of wheatbelt granites; insufficient information to distinguish discrete community type/s at this point) (N. Marchant pers. comm; I. Bayly data)	P2
Cryptogams associated with <i>Trymalium floribundum</i> and <i>Chorilaena quercifolia</i> in the karri forests of s-w WA (R. Hearn and T. Macfarlane, pers. comm.)	P3
Karri community at edge of geographic range (Plantagenet District). (Ken Tinley pers. comm.)	P2
Flat wetlands Rocky Gully to Denmark (M. Graeme pers. comm.)	P2
Naturally brackish/saline coastal lakes in the south west region (S. Halse pers comm.)	NE
Aquatic invertebrates associated with permanent freshwater/brackish pools (S. Halse pers. comm.)	NE
Diatom assemblages of south-west rivers (John 1998)	NE
Plant assemblages of primary saline wetlands (J. Buegge pers. comm.)	NE
Perched wooded wetlands of the southern Wheatbelt (R. Brazell pers. comm.)	NE
<i>Eucalyptus occidentalis</i> association (Robinson 1997) Lake Muir area	NE
<i>Eucalyptus decipiens</i> low woodland (Hopkins <i>et al.</i> 1996)	NE
Valley communities of <i>Eucalyptus wandoo</i> woodland (Beard 1980a,b,c)	NE

APPENDIX 3 RESOURCE ANALYSIS

See general comments in Section 4 regarding the need to increase the Region`s capacity to assess, plan and implement tasks of a ecological and biological science nature. The rollout of this Plan will influence the decisions as to how these resources should be procured. When the rollout is confirmed a resource analysis will be carried out to identify the Region`s needs.

Version dated 30-12-05