



DRAFT

NATURE CONSERVATION SERVICE

SWAN REGION PLAN

2006 - 2009



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Swan Region - DSM

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PREFACE TO THE REGION NATURE CONSERVATION SERVICE PLANS.

The Nature Conservation Service comprises around 46% (\$72m) of the Department of Environment and Conservation (DEC) total 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 Service plans that will provide the basis for the delivery of the Service at a regional scale over the next three years for the Divisions of Nature Conservation, Science and Regional Services.

If fully implemented, the regional Nature Conservation Service plans will represent a major movement within the Department towards outcome-based management, and recognition of the place of active adaptive management, where 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 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 a continuation in implementing 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 an improvement in technical capacity across all three Divisions. To be successful, an active adaptive management approach will also require a high level of co-operation between Divisions and the development of new monitoring systems for many of the proposed regional outcome targets within these plans.

While there has been an attempt at describing three year outcome-targets for landscape, ecosystem (inc. wetlands), protected area and threatened species assets, to be effective these will need to be refined and made more specific in future plan iterations once sufficient knowledge and information has been gained from appropriate monitoring systems and benchmark biological survey work undertaken. 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 implemented 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.

As a set, these plans also provide the basis for greater integration 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 Service at a high professional standard.

The draft of the Swan Region 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

Introduction.

The Nature Conservation Service Swan Region Plan provides a summary of key biodiversity values within the Swan Region and major threats to those values. It outlines 26 three-year outcome targets, and 88 associated candidate actions primarily for the Regional Services Division, but also for the Science Division and Nature Conservation Division, at a range of scales for 2005-2008.

For the purposes of deriving the plan, the four Interim Biogeographic Regionalisation for Australia (IBRA) subregions (Dandaragan Plateau (SWA1), Swan Coastal Plain (SWA2), Northern Jarrah Forest (JF1) and Rejuvenated Drainage (AW2)) and two Interim Marine Coastal Regionalisation for Australia (IMCRA) bioregions (Central West Coast (CWC) and Leeuwin-Naturaliste (LNE)) that comprise (in part) the Swan Region were used as basis for analysis of biodiversity related issues. Each of these IBRA and IMCRA bioregions extend beyond the DEC Swan Region and so any planning based on bioregions requires a consideration of values and response beyond the regional boundary.

In some cases the bioregions have been subdivided into loose management zones/landscapes. For example, in many cases the Northern Jarrah Forest is split into two, a southern section (in which the majority of the area is a single large uncleared area of DEC managed lands) and the northern section (in which the landscape is fragmented and has a large number of land managers). Here a distinction is made between the landscape context and therefore the types of management responses that are possible and appropriate in this landscape and land use context.

The Swan Region needs to provide management at both the fine scale yet high public expectations associated with the fragmented coastal plain and the landscape scale, ecosystem process maintenance required in the forest zone and other areas of extensive vegetation. Two different approaches and skill sets are required to achieve these outcomes.

The candidate actions in the Nature Conservation Service Swan 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 Service target-outcomes. Regional target-outcomes were identified for those biodiversity assets and values that need to be actively managed if the Nature Conservation Service Aspirational Outcome is to be achieved. Current management responses being delivered under the Nature Conservation Service that do not directly contribute to meeting the regional targets or the Service's Aspirational Outcome of reducing the rate of decline in biodiversity and ecosystem condition where not included (for example midge control on reserves, which serves a purpose of nuisance control for neighbours).

Analysis of major threats against biophysical values and existing management responses revealed there is a significant gap in all management zones between the current conservation management, and that required to deliver conservation gains (a resourcing and capacity issue) despite the occurrence of significant conservation values and the acknowledged presence of active threats such as: altered fire regimes, introduced plants and animals, disease, salinity and changing and unsympathetic land uses.

It is clear that over time the works program has become driven by external reactive demands at the expense of strategic on-reserve progress to the extent that only a portion of the regional Nature Conservation budget is directed to on-ground actions on the conservation estate.

Further, basic information on conservation reserves is generally low, and despite some significant biological inventory (swan coastal plain survey and works associated with the Regional Forest Agreement and "Forest Check") there are still gaps in knowledge of the values of the region and insufficient knowledge of threats to biodiversity to allow adequate planning and assessment of responses.

Benchmark quantitative data on all threatening processes that would provide the basis for monitoring the success of management programs is absent for all management zones, with perhaps the exception of some western shield monitoring, and monitoring associated with implementation of the Forest Management Plan. There is also a lack of detailed information and analysis to form the basis for cost-effective investment and targeting of conservation effort. Similarly, data on priority taxa and ecological communities to resolve conservation status is deficient, and a risk assessment is required to focus effort.

A survey and analysis to inform the process of identifying priority ecosystems or areas for reservation or management has been carried out for the metropolitan swan coastal plain (Bush Forever) and jarrah forest (RFA), and is currently underway for the remainder of swan coastal plain (Swan Bioplan). However there remains a gap in assessment of areas in the north-east of the region.

In much of the region the high development value of land precludes purchase of significant areas by the Department and acquisition becomes reliant on third parties (eg purchase by the Western Australian Planning Commission), or negotiation through the statutory planning and environmental assessment processes led by other agencies to ceding of parts of significant areas as condition of development.

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 Swan Region Plan highlights the need for the following priority strategic changes to be made, including some that will require integrated management and partnerships with other organizations.

Terrestrial Landscapes and Protected Area System

The southern areas of the Jarrah Forest subregion are largely uncleared and contained within the DEC estate. Similarly several large reserves occur in the north of the region and represent a significant conservation asset at the landscape scale. It is possible to implement management to enable these areas to remain secure from many catastrophic threatening processes for the life of this plan and the foreseeable future (except perhaps for Pc dieback, mining).

Management of landscape scale processes in the largely cleared Swan Coastal Plain and Avon Wheatbelt IBRA regions will be based on a fragmented landscape approach. In both these regions, and in particular the Swan Coastal Plain, the nature of the threatening processes at

play forces actions to the level of preventing the extinction of species and communities and significantly reducing the threatening processes acting.

A proposed approach in this plan to the management of threatening processes on landscapes and on protected areas is to base the response on a joint exercise of landscape scale planning and response to each threatening process, coupled with integrated reserve oriented work plan (including geographical and works prioritisation).

Altered fire regimes and the interactions between fire and other threatening processes (eg weeds, feral animals etc) in smaller remnants are major threats to biodiversity in the SWA2, AW2, and in the fragmented landscapes parts of the JF1 and SWA1 IBRA subregions.

Determination of appropriate fire regimes across all subregions and land use types is required together with an improved (or detailed) understanding of current fire-related practices and regimes. 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.

Plant diseases, particularly that caused by *Phytophthora cinnamomi*, is widely distributed and ubiquitous across the region. Long-standing hygiene management protocols need to be expanded. Disease mapping and modelling needs to be carried out across the region and delivered for small sized remnants in highly fragmented landscapes. Operational (adaptive management) research effort into developing viable operational control techniques for these diseases in regard to fragmented landscapes and for threatened taxa and ecological communities needs to be supported as a priority.

Environmental weeds are having a high impact on biodiversity values in the Region. There is continuing effort being placed into developing and implementing cost efficient and effective control techniques.

Understanding of feral animal distribution and densities, and impacts on biodiversity values, is urgently required for all management zones to develop an effective control program.

An improvement is required in our understanding of hydrological and hydrogeological processes which drive landscape function in the region, in particular for a large part of the swan coastal plain.

Minimising the impacts of urban and infrastructure development (as well as mining and exploration activities) on biodiversity is required for the SWA2 subregion, but also for SWA1 and JF1, through continued involvement in the land use planning and Environmental Impact Assessment processes, and subsequent monitoring and auditing processes. In many cases the most strategic and productive achievements will be made by input to the statutory land use planning processes leading to a reduction in the rate and extent of land clearing being approved in these areas.

The very high population of much of the region and the levels of human use and interest in the conservation estate impose unique pressures on the conservation reserves and on the manner in which we need to manage them. Therefore the management of conservation reserves needs to change to better include these human/public imposed perceptions. For example access control becomes a much more significant activity, and the aesthetics or visual evidence of management becomes more significant (eg type and maintenance of fencing, signage and other constructed features such as walk trails, or of on-ground conservation works such as revegetation). If this is done well it provides benefits for the department and for biodiversity conservation by

promoting support for conservation (a conservation constituency), if done poorly it can damage public perceptions. The region needs to move towards a more pro-active paradigm of management of urban reserves.

There is a need for increases to the off-reserve programs of the region (principally Urban Nature) and also to integrate this regional effort with the Department's centralised off-reserve and covenanting programs.

This plan proposes continuation of processes for the identification and acquisition of significant areas for the formal conservation estate. However in much of the region the high commercial value of land precludes purchase of significant areas by the Department and acquisition becomes reliant on third parties (eg purchase by the Western Australian Planning Commission), or negotiation through the statutory planning and environmental assessment processes led by other agencies to ceding of parts of significant areas as condition of development.

This plan proposes an increase in the preparation of the number of CALM planning documents (area management plans, interim management guidelines and issue plans). This planning has historically been undertaken by the Estate Planning Officer, however because of the significantly increased Land Use Planning and environmental assessment role this departmental planning function has not been serviced in the region for some time. A dedicated estate planning officer is required within the region to prioritise, program and commence the development of CALM estate planning documents such as area management plans and interim management guidelines.

Finally collation of existing information, and additional biodiversity inventories and monitoring on taxa status and ecosystem condition monitoring are required for all conservation reserves in the region.

Seascape and Marine Protected Area System.

Continued effort needs to be made in the management of the marine conservation reserves within the region to meet the high expectations of the community and of the Marine Parks and Reserves Authority.

Several outstanding actions in the planning for marine reserves, including finalising management plans for the Shoalwater Islands Marine Park, Marmion Marine Park and the establishment of sanctuary zones need to be completed. Adequate resourcing to implement marine management plans and work plans needs to be provided. Because of the high population around the Region's marine reserves they are subject to an extremely high level of human use which necessitates significant human use management and so the Nature Conservation and Parks and Visitor Services programs need to be closely aligned and cooperative in management of the marine reserves.

This plan does not include an approach or targets aimed at a general 'seascape' level (as exists for terrestrial biodiversity sections of the plan), for example relating to seascape values such as: water quality, sediments, and protection (via area statements and condition) of specific marine ecosystems/habitats. The need for such an approach needs to be investigated and if appropriate instigated.

Significant Ecosystems and Species.

Wetlands

Significant Wetlands/Riparian assets are found in all of the Swan Region's terrestrial zones (Appendices 3, 4 and 5) however, relatively few are in good condition or free from major threatening processes. Coastal Plain wetlands are often highly disturbed and in close proximity to urban developments. Most wetlands in the eastern JF1 and AW2 IBRA subregions are being affected by or at risk from rising ground water and/or salinity.

The plan proposes increased management of the three Ramsar listed wetlands in the region including improved biological inventory and condition assessment to allow identification and prioritisation of threatening processes, development of appropriate management responses to address threats, and benchmarking and monitoring to assess success of management.

Similar biological inventory, condition benchmarking and management response is required for 21 wetlands listed in the *Directory of Important Wetlands of Australia*, along with appropriate management responses to address threats.

While specific targets have not been set for wetlands that have been identified in other processes (for example the former DOE listed conservation category wetlands and EPP-listed wetlands), consideration will be given to other recognition in delivery of other projects (for example in considering Land Use Planning decisions, and managing threatening processes across the landscape). A collation of existing information and an initial biological inventory and condition assessment is also required for these other categories of important wetlands in the Region.

Ecological Communities at Risk

Despite the highly developed nature of much of the region, and perhaps because of the high level of development, the region contains a large number (22) of listed threatened ecological communities (TECs) and 8 priority ecological communities (PECs).

Recovery work is required for all 22 listed TECs including condition benchmarking and the development of Departmental standards for monitoring. In this plan recovery effort will be prioritised based on the rank of the TECs (9CR, 6EN, 7VU).

In addition some effort will be made to resolve the conservation status of the 8 PECs, and in the absence of clarified status provide some protection to these PECs.

In this region statutory land use planning and environmental assessment will play a major role in the protection, retention/acquisition and management of TECs.

Many of the TECs in the Swan Region require suitable hydrological conditions to persist, from the vital role and significant threats to the Yanchep Caves aquatic root mat community to the fact that many of the floristic community types that are TECs are wetland based. While for almost all of these TECs changes to hydrological conditions are threatening processes our understanding of the hydrological and hydrogeological processes underpinning these communities is poorly understood.

An improved understanding of hydrological and hydrogeological processes and water quality issues for all threatened communities and ecosystems at risk is required. Focus for the next

three years should be on those types where there is a potential for adverse consequences as a result of changed hydrology brought about by industrial and agricultural water use.

However the plan identifies the level of resources required to recover these TECs is far beyond that provided, and so it is likely that overall condition or status of the TECs will continue to decline in that absence of significantly increased resources.

Species at Risk

Recovery plans have been prepared for most critically endangered flora species and a regional threatened flora plan has been written. Preparation of recovery plans for fauna has resulted in most terrestrial mammals and large cockatoo species having recovery or interim recovery plans. Notwithstanding the need to update existing plans and the need to prepare new plans for other species, the recovery activity in the region will be guided by these existing plans.

Regional activity will be primarily the implementation of species recovery plans, including condition benchmarking and the development of Departmental standards for monitoring. In addition in this region statutory land use planning and environmental assessment will play a major role in the protection, retention/acquisition and management of threatened and priority species.

In this plan recovery effort will be prioritised based on the rank of the species (and for flora species, identification for priority in the Swan Region Threatened Flora Plan) focusing on those species with highest rank, as well as providing for greater focus on those species that are endemic to the region and so the region response is the major or only conservation response for the species. Involvement in the conservation of those threatened species that are found in other regions and/or across the southwest will be in the context of integrated statewide whole of species recovery.

In addition some effort will be made to resolve the conservation status of 58 taxa (25% of the 235) of priority flora (identified in the Swan Region Threatened Flora Plan as those thought to be endemic to the region) and eight (30% of the 38) priority fauna found within (and endemic to) the region, and in the absence of clarified status provide some protection to these priority species.

However the plan identifies the level of resources required to recover these species is far beyond that provided, and so it is likely that overall condition or status of some threatened species will continue to decline in that absence of significantly increased resources.

As for TECs, many species in the Swan Region occur in wetlands (for example in the extensive wetland systems on the swan coastal plain) or otherwise require suitable hydrological conditions to persist. While changes to hydrological conditions are threatening processes for many species, our understanding of the hydrological and hydrogeological processes underpinning these communities is poorly understood. In addition, a climate change risk assessment needs to be applied to species and ecosystems.

Within the life of the plan there will be a need to move to a more intensive recovery and decision-making paradigm for threatened flora and TECs especially. Given the development pressures on many populations (and the extremely high commercial value of land) decisions will need to be made about prioritising and management of individual populations. This will require more complex and scientific approaches than used previously, such as population viability analysis etc. However these complex approaches cannot be done without an increased

understanding of life history (for example recruitment processes and population dynamics). A increased program of research for all Critically Endangered species, and TECs, needs to be initiated.

Management of marine threatened species is focused on a sub-set of fauna species, and primarily looking at managing human-wildlife interactions that threatened these species (for example whales, pinepeds and penguins). There is currently no region based response for the 13 threatened oceanic bird species.

Resources.

Full implementation of all 88 candidate actions in this plan will require over \$22M in the first year with a slightly lesser amount required each year to fund the ongoing actions.

Current allocations (2005-2006) are approximately \$4.8M and is significantly less than the identified total in this document. It appears unlikely that budget allocations will be increased to the level required to fully implement the plan, and it is likely that other resource issues would limit implementation (for example a lack of qualified and experienced personal in the state through to operational constraints such as lack of office and corporate infrastructure to support implementation).

Without a significant increase in resources and capacity in the region to implement this plan there will continue to be a decline in the condition of the biodiversity values of the region. In order to reduce the rate of this decline the funding and resource priorities are to:

- gain any increases in funding and resources towards delivery of the basic nature conservation service (protected area management, threatened species and ecological communities recovery);
- develop and support a rigorous process to prioritise actions and strategic approaches to delivery of the nature conservation service.

In addition the following structural issues need to be considered:

- Increases and changes have occurred to the workload and responsibilities of the Nature Conservation program resulting from the merge to form DEC. Increased responsibility is now placed in environmental impact assessment, and vegetation clearing, land use planning, wetlands etc.
- The Land Use Planning and environmental assessment roles of the region are already stretched and creation of additional Land Use Planning Officer positions in each district is required to systematically and adequately respond to the large workload created by development applications.
- Specialist Regional Ecologist positions. There is a need for additional issue-based ecologists (for example threatened species and communities, wetlands/hydrology) in the region. In addition an estate planning officer is required within the region to prioritise, program and commence the development of CALM estate planning documents such as area management plans and interim management guidelines issue plans.

CONTENTS

ENDORSEMENTS	II
ACKNOWLEDGMENTS	III
PREFACE TO THE REGIONAL NATURE CONSERVATION SERVICE PLANS.....	IV
SYNOPSIS	V
1. INTRODUCTION AND SCOPE.....	1
1.1 SCOPE AND PURPOSE OF PLAN.....	1
1.2 NATURE CONSERVATION SERVICE DESCRIPTION.....	1
1.3 NATURE CONSERVATION SERVICE ASPIRATIONAL OUTCOME	1
1.5 MAJOR THREATS AND BARRIERS TO BIODIVERSITY CONSERVATION	4
2. REGIONAL NATURE CONSERVATION THREE YEAR OUTCOME TARGETS.....	7
3 LIST OF REGIONAL THREE YEAR CANDIDATE ACTIONS	11
3.1 LANDSCAPES (INCLUDING TERRESTRIAL PROTECTED AREA SYSTEM)	11
3.2 SEASCAPES AND MARINE PROTECTED AREA SYSTEM.....	11
3.3 WETLANDS/RIPARIAN	27
3.4 ECOSYSTEMS AT RISK.....	30
3.4 SPECIES AT RISK	36
4. RESOURCE ANALYSIS.....	53
5. MEASURING EFFECTIVENESS AND PROGRESS OF PLAN.....	53
FIGURE 1 MAP OF SWAN REGION SHOWING IBRA AND IMCRA SUBREGIONAL BOUNDARIES.....	7
FIGURE 2 REMNANT VEGETATION AND THREATENED ECOLOGICAL COMMUNITIES WITHIN SWAN REGION.....	
FIGURE 3 THREATENED FLORA, RAMSAR WETLANDS AND LISTED IMPORTANT WETLANDS WITHIN THE SWAN REGION	
APPENDIX 1 MATRIX OF VALUES/ASSETS AND THREATS AND RELATIVE IMPORTANCE FOR REGIONAL SCALE ACTIONS FOR DEC SWAN REGION	54
APPENDIX 3 RAMSAR LISTED WETLANDS.....	55
APPENDIX 4 ESTUARIES.....	56
APPENDIX 5 LIST OF IMPORTANT WETLANDS.....	56
APPENDIX 6 LIST OF THREATENED ECOLOGICAL COMMUNITIES IN THE SWAN REGION	
APPENDIX 7 LIST OF PRIORITY TECS RECORDED FROM THE SWAN REGION.	
APPENDIX 8 LISTED DRF FOR SWAN REGION.	
APPENDIX 9 PRIORITY FLORA FROM SWAN REGION.	
APPENDIX 10 FLORA SPECIES WITH THE HIGHEST REQUIREMENT FOR ACTION BASED ON AVERAGE SCORE FOR RECOVERY ACTIONS	
APPENDIX 11 LISTED FAUNA RECORDED (RECENTLY) FROM SWAN REGION.	
APPENDIX 12 PRIORITY FAUNA RECORDED (RECENTLY) FROM SWAN REGION.	

1. INTRODUCTION AND SCOPE

1.1 SCOPE AND PURPOSE OF PLAN

- To describe three year regional scale Nature Conservation Service outcome targets, priorities, and actions integrated across bioregions and Divisions that will contribute towards the Nature Conservation Service Aspirational Outcome (see Section 3 below);
- To provide a framework for Nature Conservation Service 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 Service actions for Regional Services, Science Division and Nature Conservation Division.

1.2 NATURE CONSERVATION SERVICE DESCRIPTION

Comment [k1]: Page: 1
Budget papers

“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.”

This quote is from budget papers – should we use the Corporate Plan one?? At least cite the reference to budget papers.

1.3 NATURE CONSERVATION SERVICE 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 condition¹ 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 identification and management of intact, functional landscapes and habitats;
- The acquisition of scientific knowledge and development of improved understanding of biodiversity patterns, status, and threats to underpin informed decision-making; and
- The education of the public and decision makers, so as to increase awareness and understanding of biodiversity and conservation requirements in order to gain long-term support and change in behaviour.

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

DSM says: Requires here a Swan Region statement of aspirational or long term aims to place the remainder of the document in a regional long term context. One approach is that the above section gets titled and modified to be specific to the Swan Region. Or alternatively a Departmental set of three year priorities could be included here.

1.4 REGIONAL DESCRIPTION AND BIODIVERSITY ASSETS/VALUES

DEC's Swan Region covers a major proportion of the Swan Coastal Plain IBRA Bioregion (subregions SWA1 and SWA2), and the Northern Jarrah Forest IBRA subregion (JF1) of the Jarrah Forest IBRA Bioregion, and covers part of the west of the Rejuvenated Drainage Wheatbelt IBRA subregion (AW2).

The State waters of the Swan Region include the northern portion of the Leeuwin-Naturaliste (LNE) and the southern portion of the Central West Coast (CWC) IMCRA Marine Bioregion. The northern portion of the LNE includes the Shoalwater Islands Marine Park and the southern portion of the CWC includes the Marmion Marine Park.

Figure 1 shows Regional and District boundaries, the IBRA subregional boundaries and the IMCRA marine bioregion boundaries.

Figures 2 and 3 show some of the major biodiversity values of the Region.

The biodiversity assets and values of the Swan Region are:

- The total area of the region is 2.15 million hectares, of which 1.10 million hectares (51%) remains as remnant vegetation.
- In the eastern half of the region, a relatively intact mosaic of natural landscapes and vegetation such as forests, woodlands, heaths, riparian ecosystems, rivers and rock outcrops (monadnocks);
- In the western half of the region, the landscape is highly fragmented but includes high conservation value woodlands, heaths, wetlands, estuaries, beaches, coastal plain, marine ecosystems and islands;
- The far eastern part of the region is also highly fragmented as the landscape becomes more agricultural. A greater level of land clearing has occurred for agricultural use;
- Both north-south and west-east ecotones of high conservation value;
- 733,597 ha of conservation reserves, State forest and other lands managed by DEC (comprising 23 national parks (117, 375 ha); 13 conservation parks (28,647 ha); 139 nature reserves (52,341 ha); 11 State forests (460,485 ha); and 3 marine parks (16,392 ha) This constitutes 34% of the land area of the region and 65% of the remaining vegetated area of the region.
- 22 Threatened Ecological Communities (TECs), of which 9 are Critically Endangered and eight Priority TECs;
- Approximately 2,200 native plant species are recorded from the region;
- 54 species of State listed threatened flora and 235 Priority flora species, that is 12% of the native plant species known from the region are either known or suspected to be threatened;
- 27 species of State listed threatened fauna and 31 Priority fauna species;

- A number of these threatened fauna species are endemic to the region, including western swamp tortoise, cave fauna, tumulus springs fauna, thrombolite communities and relictual invertebrates. In addition there are a number of significant fauna species under active recovery activity, such as quokka, western ringtail possum, forest black-cockatoos, translocated populations of the Vulnerable noisy scrub-bird and black-flanked rock wallaby;
- 34 species of migratory birds, of which a large number are of international significance;
- Several threatened marine species including the Australian Sealion, Little Penguin, Humpback Whale, and the Southern Right Whale;
- Four Ramsar wetlands and 23 Wetlands of National Importance, most of which occur on the SCP; and
- The last remaining, intact vegetated freshwater claypans in the agricultural zone;

1.5 MAJOR THREATS AND BARRIERS TO BIODIVERSITY CONSERVATION

Major processes that threaten biodiversity or act as a barrier to its conservation and which could cause a failure in meeting DEC's 25 year Nature Conservation Aspirational Outcome relate to several issues.

The matrix at Appendix 1 shows the major biophysical threats against broad biodiversity conservation values of landscape, ecosystem, species and wetlands/riparian across IBRA JF1, SWA1, SWA2 and AW2 subregions within the Swan Region.

Possibly the most significant impact on biodiversity within the region is the rate and level of change of land use, primarily relating to urban and infrastructure development. Many thousands of hectares of bushland and wetland are identified for development and removal of this vegetation has implications for overall targets of vegetation retention, but also for threatened species and ecological communities (as areas zoned for urban development contain occurrences). In addition it is likely that due to clearing in the region, that species may be pushed into higher threat categories (eg moving priority 1 and 2 flora species to DRF).

The Swan Region contains around 79% of Western Australia's human population, 44 local government authorities and about 70% of Legislative Assembly constituencies. Consequently, there is very high visitation and impacts on reserves, as well as a very high level of community-based and environmental groups interest, overview and involvement in biodiversity conservation and land use issues. This places significant pressures on the Region in terms of reacting to enquiries and consultative processes.

This "people pressure" exacerbates a number of threats to the reserve system and biodiversity in general such as increased vectoring of pests and disease, high levels of extraction of resources from bushland and generally increased levels of disturbance (eg physical damage to vegetation or soils, and arson). These pressures are more significant on the many smaller isolated urban reserves.

Major processes that threaten biodiversity, include:

- Land use (such as sand mining), development and infrastructure activities that are in conflict with, or not sympathetic to, biodiversity conservation;

- Introduction and spread of a large number of environmental weeds, including *Watsonia*, bridle creeper, cotton bush, eastern state's Acacias, and perennial grasses such as Love grass and Veldt grass;
- Introduced animals, including the fox, cat, pig, goat, rabbit, black rat, Argentine ant, feral bee, Rainbow Lorikeet, Eastern Long-billed Corellas, Little Corellas; and fish species such as gambusia, carp, and redfin perch.
- Introduction and spread of marine fauna and flora.
- Spread and impact of *Phytophthora cinnamomi* on the flora, fauna and ecosystems of all IBRA subregions within the Region;
- Inappropriate fire regimes and repeated arson causing wildfire;
- Groundwater extraction, such as occurring in the Gnangara Mound area;
- Changing hydrology, including inundation, changes to the flow regimes of rivers, salinisation, acid groundwater, surface water storage and groundwater extraction;
- Climate change, involving warming and drying trends, and increasing frequency of extreme weather events;
- Soil damage such as erosion and compaction, particularly in sensitive areas such as coastal dunes and the riparian landscape;
- Unsustainable terrestrial resource use and impacts by industries such as forestry, wildflower harvesting, apiculture and public utilities;
- Unsustainable marine reserve use and impacts by industry such as commercial fisheries, petroleum exploration and production and aquaculture;
- Impact of overgrazing by large macropods on small reserves;
- Misuse of publicly-owned lands by motorbikes, mountain bikes, firewood collectors, 4WD vehicles.
- Unstainable marine resource use and impacts by recreational users; and
- High density of human usage of DEC managed lands and waters, particularly the metropolitan terrestrial and marine reserves. Results in overuse of some publicly-owned lands because of the large population of humans in metropolitan Perth. But also provides opportunities for improves support and involvement in conservation management.

FIGURE 1 Map of Swan Region showing IBRA and IMCRA sub-regional boundaries

FIGURE 2 Remnant vegetation and Threatened Ecological Communities within Swan Region

FIGURE 3 Threatened flora, Ramsar wetlands and listed important wetlands within the Swan 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 the scale of the assets.

3.1 LANDSCAPES (INCLUDING TERRESTRIAL PROTECTED AREA SYSTEM).

Target Three Year Outcome - T1: The formal protection (IUCN I-VI) of regionally significant vegetation¹¹ and wetlands on those portions of the Swan Coastal Plain (SWA1 and SWA2) within the DEC Swan Region will be increased by 2,000 ha in the northern Swan Coastal Plain and by 200 ha in the southern Swan Coastal Plain in order to maintain condition of landscapes with an emphasis on connectivity

Target Three Year Outcome – T2: The formal protection (IUCN I-VI) of the area of remnant vegetation and wetlands on the northern end of those portions of the Northern Jarrah Forest (JF1) within the DEC Swan Region will be increased by 5,000 ha in order to maintain condition of landscapes

Target Three Year Outcome – T3: The current extent of remnant vegetation and wetlands of those portions of the Rejuvenated Drainage (AW2) within the DEC Swan Region will be maintained

Include a strategic approach statement after each Target 3 yr outcome statement. Giving broad guidelines for attack. For example....

Targets 1 – 3 relate to formal protection, including the full range of mechanisms meeting IUCN I-VI). They are essentially area statements. The General target is for increases in the area under formal protection. The broad guidelines or approach distinguishes between approaches to different IBRA (based on amount remaining, level of existing degradation, major land uses)

Candidate Actions:

1. First action is to confirm the area targets above in T1 and T2 (Develop a GIS-based decision-making tool for determining biodiversity conservation priorities, including identifying areas for inclusion into the protected area system and applying off reserve conservation measures).

Primary Responsibility: Director Nature Conservation to provide a framework and corporate targets and priorities

Support: GIS Section to provide the technicians, systems and data

Regional Ecologist to undertake the Swan Region analysis and apply results

¹¹ As defined in *Bush Forever*.

Status: New
Indicative Cost: \$75,000 one off
Completion date: December 2005

2. Develop a GIS-based decision-making tool for determining biodiversity conservation priorities, including identifying areas for inclusion into the protected area system and applying off reserve conservation measures.

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Primary Responsibility: Director Nature Conservation to provide a framework and corporate targets and priorities

Support: GIS Section to provide the technicians, systems and data
Regional Ecologist to undertake the Swan Region analysis and apply results

Status: New
Indicative Cost: \$75,000 one off
Completion date: December 2005

3. Update gap analysis of the protected area system (refine areas examined under the RFA) in the northern end of those portions of the Northern Jarrah Forest (JF1) within the DEC Swan Region to determine priorities for land use planning to ensure that biodiversity conservation, including additions to the protected area system occurs at a landscape scale.

Primary Responsibility: Regional Ecologist to take responsibility for the design and delivery of the project

Support: Regional Leader Nature Conservation Coordinator to arrange field verification and regional input
GIS Section to provide data

Status: New
Indicative Cost: \$50,000 one off (excluding land purchase)
Completion date: June 2006

4. Analyse Bush Forever sites to provide recommendations for inclusion into the protected area system in the Metropolitan portion of the Swan Coastal Plain.

Primary Responsibility: Regional Ecologist to take responsibility for the design and delivery of the project

Support: Regional Leader Nature Conservation to provide advice and input

District Nature Conservation Coordinator and Land Planning Officer to provide local assistance with field verification

Status: New

Indicative Cost: \$50,000 one off (excluding land purchase – purchase by WA Planning Commission)

Completion date: December 2005

5. Participate in the multi agency *Swan Bioplan* process to ensure that land use planning incorporates protection of areas significant for biodiversity conservation, including identification of additions to the protected area system for those areas of the Swan Coastal Plain outside of the Perth Metropolitan region.

Primary Responsibility: Regional Leader Nature Conservation to ensure that the protection of biodiversity values is adequately incorporated into the *Swan Bioplan* outcomes

Support: South West Region Regional Leader Nature Conservation also involved in *Swan Bioplan* for those areas within the DEC Southwest Region

Science Division to provide data on the distribution and status of flora species on the Swan Coastal Plain

Species and Communities Branch to confirm occurrences of TECs located during surveys for *Swan Bioplan* and update of TEC database

Strategic Policy Division of DEC and Department for Planning and Infrastructure and relevant Local Government Authorities

Status: New

Indicative Cost: \$100,000 pa (\$25,000 pa currently proposed to be provided by Strategic Policy Division of DEC)

Completion date: December 2007

6. Continue to provide input into land use planning processes, including statutory planning, Environmental Impact Assessments, Applications for Clearing Permits (Area Permits) throughout the Swan Region, and monitor conditions following approval and audit compliance with statutory obligations and managements plans to ensure biodiversity values are protected and maintained.

Primary Responsibility: Regional Leader Estate Planning to coordinate input and provide advice

Support: Regional Manager to ensure biodiversity values are adequately considered and addressed through these processes

Regional Leader Nature Conservation to provide advice in a regional context on biodiversity values and their protection

Environmental Management Branch to provide advice on legislation and policy, and on cross-regional project

Status: Partly

Indicative Funding: \$550,000 (currently Region allocates \$350,000 pa)

Completion date: Ongoing with review in December 2008

7. Develop and implement a strategic approach to statutory land use planning processes by ranking higher value biodiversity assets within the SC1 and SC2 subregions that enables, through timely identification and notification, decision-making authorities to incorporate the protection of significant conservation values early in the planning cycle.

Primary Responsibility: Regional Leader Estate Planning to develop approaches

Support: Director Nature Conservation and Executive Director to support processes and negotiate compliance by decision-making authorities

Nature Conservation Regional Leader to provide advice

Regional Ecologist to develop analysis tools

Environmental Management Branch to assist, provides Departmental context and specific support and advice

Status: New

Indicative Funding: \$30,000 to develop processes and collate information from Candidate Action 1 and other sources. Additional resources required to progress adoption by decision-making authorities

Completion date: December 2006

8. Acquire land, change land tenure or purpose or enter into perpetual nature conservation covenants or CALM Act Section 16 agreements to fill gaps in the conservation reserve system identified by the processes above (Candidate actions 1, 2, 3, and 4) in the SWA1, SWA2, JF1 and AW2 IBRA subregions.

Primary Responsibility: Regional Leader Estate Planning to coordinate

Support: Director Nature Conservation to provide advice on State level priorities and advice on administration processes

Park Policy and Services Branch to coordinate and carry out administrative tasks associated with acquisition and tenure changes

Status: Ongoing

Indicative Cost: \$50,000 to administer (excludes land purchases)

Completion date: Ongoing with review in December 2008

Target Three Year Outcome – T4: The condition of native vegetation of those portions of the Dandaragan Plateau (SWA1), northern Swan Coastal Plain (SWA2) and Northern Jarrah Forest (JF1) within the DEC Swan Region will be maintained

Target Three Year Outcome – T5: The condition of native vegetation of those portions of the southern Northern Jarrah Forest (JF1) within the DEC Swan Region will be maintained

Target Three Year Outcome – T6: The decline in the condition of native vegetation of those portions of the southern Swan Coastal Plain (SWA2) and Rejuvenated Drainage (AW2) within the DEC Swan Region will be reduced

Note: the majority (>90%) of the remaining vegetation of the southern Northern Jarrah Forest (JF1) within the DEC Swan Region are primarily within DEC managed lands (State forest and conservation reserves) – therefore should be primarily dealt with under protected area “Candidate Actions” including reference to FMP, FORESTCHECK etc. should aim to incorporate FMP and SFM stuff here.

Candidate Actions:

1. Establish framework for determining ecosystem condition at a subregional scale. This will provide the basis for regular monitoring, which will allow more considered management interventions and allow for measure of success in an adaptive management framework.

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

Support: Regional Ecologist to provide input into project design and assist in field validation

Status: New

Indicative Cost: \$50,000 one off

Completion date: December 2007

2. Complete first assessment of ecosystem condition of IBRA subregions within Swan Region to establish a benchmark of current ecosystem condition. This will assist in Candidate Action 1 above to identify geographic priorities for urgent conservation management to prevent further decline in those portions of the Dandaragan Plateau (SWA1), northern Swan Coastal Plain (SWA2) and Northern Jarrah Forest (JF1) within the DEC Swan Region and to reduce the rate of decline in those portions of the southern parts of Swan Coastal Plain (SWA2) and Rejuvenated Drainage (AW2) within the DEC Swan Region. This benchmark will enable future trends to be determined and priorities for urgent conservation management to be set.

Primary Responsibility: Regional Ecologist to take lead in project at regional scale and develop project and methodology cognizant of State framework and undertake or arrange data collection and analysis

Support: Director Nature Conservation to take responsibility for the framework design and input into regional project

Science Division to provide input into project design, methodology and assist in data collection and analysis

Status: New

Indicative Cost: \$600,000 one off (repeat on 5year cycle)

Completion date: June 2008

9. Create functional landscapes within SWA2 and improve landscape functionality in SWA1, JF1 and AW2 by encouragement of sympathetic management of lands surrounding the conservation reserve system. Off-reserve measures to include proactive and targeted use of market-based instruments, such as Conservation Covenants and Bushland Benefits (payment for conservation actions); targeted provision of conservation management advice, particularly Land for Wildlife and Urban Nature to priority landscapes; and integration of biodiversity conservation requirements with property management planning and private conservation lands through Land for Wildlife and Urban Nature in priority landscapes.

May need to re-word to reflect protection of areas to keep in line with rest of this section (and expand this action – split or explain better?) Include other actions on management in later sections. Ditto action relating this type of activity to benefits for ecosystems and species.

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

Support: Regional Leader Nature Conservation to advise on regional biodiversity context and priorities

District Nature Conservation Coordinators to assist in local consultation and negotiations and advice

Status: Ongoing

Indicative Cost: \$200,000 pa (cost of instruments unknown) [costs associated with Urban Nature (and LFW) included in actions below]

Completion date: Ongoing with review in December 2008

3. Improving the condition and viability of non-DEC managed bushlands and wetlands that have some level of protection through the provision of targeted advice on bushland management, including on weed, pathogen and fire management in SWA2, SWA1 and western portions of JF1. Outcomes to be augmented by cooperative support from land

managers by friends groups, local government and state agencies primarily through the Urban Nature program and other extension methods.

Primary Responsibility: Regional Leader Nature Conservation co-ordinate program

Support: Urban Nature Coordinator and Urban Nature team to implement program

Manager Species and Communities Branch to support through off-reserve conservation programs

Science Division to provide science-based knowledge on bushland management

Status: Ongoing

Indicative Cost: \$550,000 pa (currently funded \$170,000 DEC, and \$60,000 from Department for Planning and Infrastructure)

5. Continue to provide input into land use planning processes, including statutory planning, Environmental Impact Assessments, Applications for Clearing Permits (Area Permits) throughout the Swan Region, and monitor conditions following approval and audit compliance with statutory obligations and managements plans to ensure biodiversity values are protected and maintained.

Primary Responsibility: Regional Leader Estate Planning to coordinate input and provide advice

Support: Regional Manager to ensure biodiversity values are adequately considered and addressed through these processes

Nature Conservation Regional Leader to provide advice in a regional context on biodiversity values and their protection

Environmental Management Branch to provide advice on legislation and policy, and on cross-regional projects

Status: Partly

Indicative Funding: \$550,000 (currently Region allocates \$350,000 pa)

Completion date: Ongoing with review in December 2008

6. Conduct research on weed, pathogen, fire and vegetation management within bushlands and wetlands within the region to improve the management of threatening processes affecting the biodiversity values in these ecosystems.

Note: should probably provide more specific direction of research needs, by reference to Science Division and other actions in this document. Also identifying those research needs that are specific to Swan Region separately to state or southwest needs etc. (examples: fire in small reserves, fire on SCP, weed ecology and control, small reserve – fragmented landscape ecology – linkage-connectivity- local extinctions etc)

Primary Responsibility: Science Division to provide science-based knowledge on bushland management

Support: Regional Ecologist to ensure that management operations incorporate the results of scientific research

Status: Ongoing

Indicative Cost: \$100,000 pa. for each topic? ie \$400,000

Completion date: Ongoing with review in December 2008

7. Complete a regional *Phytophthora cinnamomi* risk and hazard analysis based on a regional scale survey of the location and distribution of *P. cinnamomi*, assessment of the current impact on conservation values, modelling of future spread and impact (incorporating climate change affects). Priority to be given to the Swan Coastal Plain IBRA region where information and predictive models are limited but risk of significant environmental degradation are high.

Primary Responsibility: Regional Leader Nature Conservation to plan and coordinate analysis

Support: Environmental Protection Branch to provide overarching framework for risk assessment, and set standards for survey work, database management and reporting

Science Division to assist in design of survey and monitoring work and undertake modelling

Sustainable Forest Management Division to conduct field assessments and mapping

Status: New

Funding: \$250,000 pa

Completion date: June 2008

7. Develop a *Phytophthora cinnamomi* regional response plan, based on the information obtained from Candidate Action 6 (3.1 Targets 4-6), to identify the appropriate access control, hygiene practices and the targeted use of phosphite and other control measures and monitoring to reduce the decline in landscape condition caused by *P. cinnamomi*. Interim management to follow guidelines within the CALM (2000) *Phytophthora cinnamomi* and disease caused by it Vol 1-4.

Primary Responsibility: Regional Leader Nature Conservation to determine *P. cinnamomi* management priorities

Support: Environmental Protection Branch to provide application standards and methodologies

Status: New

Funding: \$25,000 pa

Completion date: June 2008

Target Three Year Outcome – T 7: Reduce the rate of decline in the condition of the Drummond Natural Diversity Recovery Catchment

Candidate Actions:

1. Finalise the Drummond Natural Diversity Recovery Catchment Plan by January 2006, and in the meantime continue to implement priority actions that aim to reduce surface water flows into the Drummond Nature Reserve, determine the seasonal fluctuations in levels and quality surface and groundwater in the vicinity of the Drummond Nature Reserve and recover threatened flora in the Drummond Recovery Catchment until completion of recovery plan.

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

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

Recovery Catchment Coordinator and Regional Ecologist to write draft Recovery Plan

Midwest Region Regional Leader Nature Conservation and Nature Conservation staff to provide input

Status: Ongoing

Indicative Funding: \$280,000 pa

Completion date: December 2008

2. Implement the Drummond Natural Diversity Recovery Catchment Plan and the Salinity Strategy Crown Reserves program in the AW2 and eastern areas of the JF1. Priority Actions for the Drummond Natural Diversity Recovery Catchment include:

- a. Measure the hydrological characteristics of target catchments.
- b. Develop surface water management strategies for target areas by identifying points for farm-dams in short catchment.
- c. Develop surface and ground water management strategies for cleared areas using a combination of targeted revegetation and pasture management practises.
- d. Implement rehabilitation strategies for degraded areas in the north-east corner of Drummond Nature Reserve.

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- e. Complete trend analysis of Marri (*Corymbia calophylla*) decline in Drummond Nature Reserve.
- f. Collect seed of endemic species that appear to be declining or are threatened, including Marri in Drummond Nature Reserve.
- g. Implement a Marri regeneration plan in Drummond Nature Reserve.

Priority Actions for the Salinity Strategy Crown Reserves program include: collation of reserve values and condition data to allow development and prioritisation of works programs that deal with threatening processes affecting reserve condition and hydrological function.

Primary Responsibility: District Manager Perth Hills to coordinate and implement actions

Support: Natural Resources Branch and Science Division to provide advice

Regional Ecologist and Regional Leader Nature Conservation to assist Hills District staff in implementation and monitoring of recovery actions

Midwest Region Regional Leader Nature Conservation and Nature Conservation staff to provide input

Status: Ongoing

Indicative Funding: \$500,000 pa

Completion date: December 2008

Target Three Year Outcome – T8: The condition of the existing and proposed conservation reserve system with an effective area of greater than 1000 ha¹² will be maintained

Target Three Year Outcome – T9: The decline in the overall condition of the existing and proposed conservation reserve system with an effective area of less than 1,000ha will be reduced; with improved condition of selected/targeted significant reserves

Candidate Actions:

1. Develop a prioritised list of reserves requiring interim management guidelines and management plans based on a value/threat analysis. Prepare a minimum of 15 interim management guidelines by June 2008. Implement all the actions with specified target dates of completion before June 2008, including access and weed control.

¹² A protocol for determining the 'effective areas of' is required.

Note: may need a separate action relating to operational management- either implement IMGs and in absence of IMGs carry out specific actions relating to ameliorating TPs on reserves. Maybe specify access control, weeds, etc..

Primary Responsibility: Regional Leader Nature Conservation

Support: Regional Leader Estate Planning to supervise preparation of Interim Management Guidelines
District Nature Conservation Coordinators to assist Regional Leader in determining priorities
Nature Conservation Directorate to update and provide framework for IMGs and apply standards

Status: New

Indicative Cost: \$52,500 (\$22,500 preparation of Interim Management Guidelines; \$30,000 implementation for each reserve).

Completion date: June 2008

2. Review and audit implementation of all existing management plans and interim management guidelines. Prepare costed program for implementation of action listed in current interim management guidelines and management plans by 2008.

Note: may need a separate action relating to operational management- either implement IMGs and in absence of IMGs carry out specific actions relating to ameliorating TPs on reserves. Maybe specify access control, weeds, etc..

Primary Responsibility: Regional Leader Nature Conservation

Support: District Nature Conservation Coordinators to assist in review
Nature Conservation Directorate to provide framework
Management Planning Unit to provide guidance and support on methodology
Science Division to provide advice on priority of actions for implementation

Status: Partially new

Indicative Cost: \$50,000 new and \$25,000 existing for review of existing management plans and Interim Management Guidelines

\$3.5 million additional for implementation of 75% actions

Completion date: December 2008

3. Develop a reserve management database to record management actions and monitor the success of management actions in protecting and maintaining biodiversity on conservation reserves.

Primary Responsibility: Environmental Management Branch to coordinate the development of a statewide reserve database system

Support: Director of Nature Conservation to provide resources and support costs to develop the framework of the system

Regional Leader Nature Conservation and District staff to record and enter data

Science Division to provide specialist advice

Status: Partially New (designs available – implementation new)

Indicative Cost: \$750,000 (Statewide) for the development of the system over 3 yrs

Completion date: December 2008

4. Document and describe the current fire regimes and practices, quantify the impacts on condition of the major vegetation complexes of the Swan Coastal Plain and Dandaragan Plateau, and collate available data on vital attributes and fire responses of key (indicator) flora within SCA1 and SCA2. (Prepare interim guidelines on appropriate fire regimes by June 2008.)

Primary Responsibility: Regional Ecologist to develop research project

Support: Science Division to participate in project and provide guiding principles and advice on ecologically appropriate fire regimes

Swan Coastal Conservation Officer to undertake/supervise collaboratively with Science Division

Region and District Fire Coordinators to provide input

Status: New

Indicative Cost: \$200,000

Completion date: December 2006

5. Describe the current fire regimes and practices on **small reserves** within SWA1, SWA2, northern sections of JF1 and AW2 and quantify the impacts on condition and prepare fire management guidelines by 2008.

Primary Responsibility: Regional Leader Nature Conservation to develop and supervise project and provide guiding principles and advice on ecologically appropriate fire regimes

Support: Regional Leader Fire to implement and report on outcomes

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

Status: New
Indicative Cost: \$100,000
Completion date: June 2008

7. Continue to apply Departmental environmental impact assessments processes for DEC managed lands, including fire management and sustainable use of resources (sustainable forest management and recreation). Improve, using an adaptive management monitoring framework Departmental procedures for necessary operations and compatible operations on DEC lands to amend and update vegetation, fauna and threatened species condition trends on these lands. Monitor compliance with conditions and management plans [of what?] to ensure biodiversity values are maintained. Note this could be moved to protected area "candidate actions"

Primary Responsibility: Regional Manager to ensure biodiversity values are adequately considered to achieve target outcomes

Support: Regional Leader Nature Conservation to provide advice on regional biodiversity context and input into processes

Environmental Management Branch to update Departmental procedures for necessary operations and compatible operations; and provide advice on Departmental policy, standards and compliance

Status: Ongoing and new

Indicative Funding: \$250,000

Completion date: December 2008

Comment [M2]: This is a "revision/implementation of monitoring" project which requires a substantial investment.

8. Document existing occurrence of feral pigs and goats on the conservation reserve system, complete a risk analysis of threat to biodiversity, develop an interim management strategy by June 2008.

Primary Responsibility: Regional Ecologist

Support: District Nature Conservation Leaders to co-ordinate field proofing of disturbance, and control actions

Manager Environmental Management Branch to provide planning framework, standards and advice

Status: New

Indicative Cost: \$200,000

Completion date: December 2008

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

Primary Responsibility: Environmental Protection Branch (Species and Communities Branch?) to coordinate and implement Western Shield

Support: Science Division to carry out research and provide direction on appropriate baiting regimes, non-target affects, meso-predator interactions and ecosystem processes

Species and Communities Branch to provide advice on fauna reconstruction sites

Regional Ecologist to provide analysis of Western Shield data for Swan Region

Status: Ongoing

Indicative Cost: \$110,000 pa Darling Range
\$xxxxxx District pa

Completion date: Ongoing with a review in December 2008

10. (In conjunction with landscapes and seascapes candidate action 6 and 7) Develop a protected area system *Phytophthora cinnamomi* regional response plan that includes a value /threat analysis, regional scale survey of the location and distribution of dieback, assessment of current impact, determine priorities for survey and management.

Undertake dieback surveys of one third of the conservation reserves and develop management procedures for these reserves. Interim management to follow guidelines within the CALM (2000) *Phytophthora cinnamomi* and disease caused by it Vol 1-4.

Primary Responsibility: Regional Leader Nature Conservation to coordinate the development of the program

Support: Environmental Protection Branch and Forest Management Branch to provide frameworks and standards for assessments

Science Division to assist with the design of the survey and study

Status: New

Indicative Cost: \$750,000

Completion date: June 2008

11. Conduct a regional scale survey of weeds, undertake value/threat analysis, and develop a costed /prioritised weed control program. Continue current weed control program with an additional emphasis of post-control survey and analysis of effectiveness.

Primary Responsibility: District staff to carry out survey

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

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

Regional Ecologist and Regional Leader Nature Conservation to advise on program and determine priorities

Status: New

Indicative Cost: \$1.6 million (Survey \$100,000, control 1.5 million)

Completion date: December 2008

3.2 SEASCAPES AND MARINE PROTECTED AREA SYSTEM.

Target Three Year Outcome – T10: The condition of the existing and proposed marine parks and islands will be maintained with specific emphasis on sanctuary zones

Target Three Year Outcome – T11: The area of marine sanctuary zones (100s hectares) will be doubled (to xxxx ha) to maintain condition of seascapes

Candidate Actions:

1. Finalise and gain approval for the Shoalwater Islands Marine Park Management Plan. Implement the priority biodiversity protection actions prescribed in the Draft Shoalwater Islands Management Plan (when and if approved by the Minister). These include the gazettal and establishment of three sanctuary zones (Seal Island, total area xxx hectares), implementation of a communication/education plan, compliance plan, and mooring control plan.

Primary Responsibility: District Manager, Swan Coastal District to direct and coordinate actions

Support: Marine Policy and Planning Branch to facilitate gazettal of sanctuary zone

Status: New

Indicative Cost: \$800,000 pa

Completion date: December 2008

2. Prepare a new management plan for Marmion Marine Park, including an analysis of condition, monitoring and review of existing sanctuary zones, including commencing consultation process for review.

Primary Responsibility: Marine Policy and Planning Branch to prepare plan

Support: District Manager Swan Coastal to assist with operational input.

Status: New

Indicative Cost: \$300,000 one off

Completion date: December 2008

3. Implement the Swan Coastal District Marine Monitoring and Compliance Plans (derived to implement Marine Park Management Plans and other requirements). Complete and implement the Swan Coastal Public Education and Interpretation Plan.

Primary Responsibility: District Manager Swan Coastal District to direct and coordinate actions

Support: Marine Policy and Planning Branch to assist with monitoring and reporting to the Marine Parks and Reserves Authority (MPRA) of works plan

Regional Leader Parks and Visitor Services to assist with the development of the education and interpretation plan

Nature Protection Branch to assist with implementation of compliance actions outlined in the Compliance Plan

Status: Partially new

Indicative Cost: \$400,000 current and \$100,000 new

Completion date: December 2008

4. Prepare annual performance assessment report for the MPRA.

Primary Responsibility: Marine Policy and Planning Branch to coordinate preparation of Annual Performance Assessment Reports

Support: District Manager to support Marine Policy and Planning Branch in the preparation of reports

Status: Ongoing

Indicative Cost: \$10,000 from Swan Region (current funding) Increase in Marine Policy and Planning Branch required

Completion date: December 2008

5. Implement 75% of Carnac Island Management Plan actions including those relating to monitoring and managing condition and threats to the island terrestrial ecosystem, beaches and rocks (works program for this implementation is appended).

Primary Responsibility: District Manager to coordinate implementation

Support: Regional Ecologist and Science Division to assist with implementation of actions required monitoring of condition and threats to island ecosystem

Marine Policy and Planning Branch to assist, and provide advice and support on

Status: Partially new

Indicative Cost: \$150,000 (over three years of which \$100,000 would be new funding)

Completion date: December 2008

3.3 WETLANDS/RIPARIAN

Target Three Year Outcome – T 12: Reduce the decline in the condition of three Ramsar wetlands managed by DEC (Forrestdale and Thomsons Lakes; the Becher Point Wetlands; and DEC managed parts of the Peel-Yalgorup System¹³)

Candidate Actions:

1. Achieve the three year Key Performance Indicators identified in management plans for Forrestdale Lake, Thomsons Lake, Lake McLarty and Port Kennedy (Holocene Swale Wetland Recovery Plan).

Primary Responsibility: District Manager to ensure implementation of on ground works

Supported by: Regional Leader Nature Conservation to assist in implementation

Science Division to provide specialist advice on methodology and monitoring requirements

Regional Parks Unit to carry out works on areas under their responsibility

Species and Communities Branch to provide specialist advice

Status: Partially new

Indicative budget: Covered in T 7 and T 8 Action 2

Completion date: To be reviewed in December 2008

2. Review and collate existing statewide monitoring datasets that are held by various sections within DEC, external agencies and stakeholder groups to allow rapid assessment

¹³ It is expected that with continued climatic conditions that water depths will decline. With continued urbanisation and or rural use of catchments it is likely that water quality will decline. Both factors are beyond the control of DEC to influence significantly.

and review of Ramsar wetland sites by Swan Region staff in adaptive management decision-making, including the development of protocols to maintain an integrated dataset.

Primary Responsibility: Science Division to collate and develop protocol

Supported by: Regional Ecologists to provide regional datasets and provide input into protocol development

Species and Communities Branch to provide specialist advice

Status: New

Indicative budget: \$100,000 initially as one off, then \$50,000 pa for maintenance

Completion date: December 2008

Target Three Year Outcome – T 13: The condition of those parts of the Peel-Yalgorup System Ramsar wetlands not managed by DEC will be maintained

Candidate Actions:

1. Review existing legislative and planning framework impacting management of the Ramsar site. Develop strategic approach to influence appropriate land use planning and management responsibilities of other agencies, legislative authorities and natural resource management (NRM) groups.

Primary Responsibility: Regional Leader Estate Planning

Supported by: District Manager to provide local staff support

Other State and Local government agencies to

Status: New

Indicative budget: \$50,000 to be allocated from existing salaries

Completion date: December 2008

Target Three Year Outcome – T 14: The condition of 17 *Directory of Important Wetlands of Australia* listed wetlands (Appendix 5 – List of wetlands) managed or proposed for management by DEC will be maintained

1. Review existing condition monitoring programs (with regard to those elements for which each wetland is included on the national list) for the 17 wetlands and identify future monitoring requirements and responsibilities. Analyse condition trends and update adaptive management targets on the basis of these trends.

Primary Responsibility: Wetlands Co-ordination Committee to provide review and advice

Support: District Nature Conservation Co-ordinator to ???
Science Division to provide expertise in developing monitoring program

Status: New

Indicative Cost: \$45,000 for review program (\$100,000 for implementation)

Completion date: December 2008

2. Undertake a value/threat analysis of the 14 listed wetlands (Appendix 5) and existing level of management. Develop a priority list of wetlands requiring management actions or interim management guidelines with regard to management of highest risk threatening processes including water quality, weeds, inappropriate fire regimes, wildfire and groundwater decline. (Current actions link T7 & 8 Candidate Action 1 and T13 Candidate Action 1).

Primary Responsibility: Regional Nature Conservation Leader

Supported by: District Nature Conservation Coordinators to review priority ranking
Regional Ecologist to undertake threat and values analysis and produce priority ranking
Species and Communities Branch (Wetland Coordinator) to assist with off reserve wetlands

Status: New

Indicative budget: \$50,000 over three years (\$50,000 for implementation)

Completion date: December 2008

Target Three Year Outcome – T 15: The condition of 6 *Directory of Important Wetlands of Australia* listed wetlands (Appendix 5 – List of wetlands) that are not under direct DEC management will be maintained

Candidate Actions:

1. Review existing legislative and planning framework impacting management of the wetland sites. Develop strategic approach to influence appropriate land use planning and management responsibilities of other agencies, legislative authorities and NRM groups.

Primary Responsibility: Regional Leader Estate Planning

Supported by: District Manager to provide local staff support

Other State and Local government agencies to

Status: New

Indicative budget: \$50,000 to be allocated from existing salaries

Completion date: December 2008

2. Continue to provide input into land use planning processes, including statutory planning, Environmental Impact Assessments, Applications for Clearing Permits (Area Permits) throughout the Swan Region, and monitor conditions following approval and audit compliance with statutory obligations and managements plans to ensure biodiversity values are protected and maintained.

Primary Responsibility: Regional Leader Estate Planning to coordinate input and provide advice

Support: Regional Manager to ensure biodiversity values are adequately considered and addressed through these processes

Nature Conservation Regional Leader to provide advice in a regional context on biodiversity values and their protection

Environmental Management Branch to provide advice on legislation and policy, and on cross-regional projects

Status: Partly

Indicative Funding: \$500,000 (currently Region allocates \$350,000 pa)

Completion date: Ongoing with review in December 2008

3.4 ECOSYSTEMS AT RISK

Target Three Year Outcome – T16: The condition of 10 Critically Endangered and four Endangered Threatened Ecological Communities (Appendix 6 – List of TECs) will be improved.

Candidate Actions:

1. Continue to provide input into land use planning processes, including statutory planning, Environmental Impact Assessments, Applications for Clearing Permits (Area Permits) throughout the Swan Region, and monitor conditions following approval and audit compliance with statutory obligations and managements plans to ensure that Critically Endangered and Endangered Threatened Ecological Communities are protected and maintained.

Primary Responsibility: Regional Leader Estate Planning to coordinate input and provide advice

Support: Regional Manager to ensure biodiversity values are adequately considered and addressed through these processes

Nature Conservation Regional Leader to provide advice in a regional context on biodiversity values and their protection

Environmental Management Branch to provide advice on legislation and policy, and on cross-regional projects

Status: Partly

Indicative Funding: \$500,000 (currently Region allocates \$350,000 pa)

Completion date: Ongoing with review in December 2008

2. Develop Statewide Departmental processes for assessment and approvals of Departmental management actions (eg prescribed burning, fencing, trend monitoring) to be undertaken on Threatened Ecological Communities to audit and streamline the approvals process and management actions.

Primary Responsibility: Species and Communities Branch to undertake review of conservation status

Supported by: Regional Leader Nature Conservation to provide a review for Swan Region Threatened Ecological Communities

Corporate Executive to endorse protocols

Status: New

Indicative budget: \$60,000

Completion date: December 2006

3. Complete urgent actions identified in the interim recovery plans (and any urgent other actions identified by the recovery team) for 10 Critically Endangered Threatened Ecological Communities within the Swan Region with a result of meeting the success criteria of each IRP. (Works programs related to Critically Endangered and Endangered TECs are appended (Appendix yyy)).

Primary Responsibility: Species and Communities Branch to undertake review of conservation status

Supported by: Regional Leader Nature Conservation to coordinate and arrange actions

Perth Hills and Swan Coastal District Nature Conservation Coordinators to develop works programs

Status: Partly

Indicative budget: \$350,000 pa

Completion date: December 2008

4. Successfully complete the supplementary watering system for the Yanchep Caves to provide sufficient 'in cave' habitat for the Critically Endangered Aquatic Root Mat Community and Critically Endangered Crystal Cave Crangonyctoid by December 2005. (note: This candidate action covers one Cave Fauna action from section 3.4 Threatened Species).

Primary Responsibility: Swan Coastal District Manager to oversee and implement project

Supported by: Swan Coastal District Conservation Officer to assist
Regional Ecologist to provide advice
Representatives of Water Corporation and Department of Environment to provide specialist hydrological and environmental and engineering advice

Status: Ongoing

Indicative budget: \$1.1 million one off with recurrent operations and monitoring of \$50,000 pa

Completion date: December 2005 for installation and commissioning – otherwise ongoing

5. Develop a framework for monitoring and evaluation of condition and health of (Critically Endangered) Threatened Ecological Communities to allow regions to develop standardised monitoring procedures and ensure the long-term condition of Critically Endangered Threatened Ecological Communities.

Primary Responsibility: Species and Communities Branch to develop frameworks and methodologies to be applied across State

Supported by: Regional Ecologist, Regional Leader Nature Conservation and Science Division to provide input to development
Corporate Executive to endorse protocols

Status: New

Indicative budget: \$150,000 one off

6. Implement a regional program of monitoring and evaluation of (Critically Endangered) Threatened Ecological Communities within the Swan Region to allow for adaptive experimental management of these ecosystems by links with data and outcomes of Candidate Actions 2 and 5.

Primary Responsibility: Regional Leader Nature Conservation to develop frameworks and methodologies

Supported by: Species and Communities Branch to provide framework
Regional Ecologist, and Science Division to provide input to development

Status: New
Indicative budget: \$50,000 pa for monitoring
Completion date: December 2008

7. Review the existing recovery plans and Interim Recovery Plans for Threatened Ecological Communities within the Swan Region to determine priorities for re-drafting of existing plans and writing of new plans. Plans to include SMART success criteria and monitoring procedures.

Primary Responsibility: Species and Communities Branch to undertake review of conservation status

Supported by: Regional Leader Nature Conservation to coordinate and arrange actions

Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators to provide advice

Status: New
Indicative budget: \$70,000
Completion date: December 2006

8. Implement a strategic approach to statutory land use planning processes by ranking Threatened Ecological Communities within the SC1 and SC2 subregions that enables, through timely identification and notification, decision-making authorities to incorporate the protection of significant conservation values early in the planning cycle. (Links to Target 1 Candidate Action 6.)

Primary Responsibility: Regional Leader Estate Planning to develop approaches

Support: Director Nature Conservation and Executive Director to support processes and negotiate compliance by decision-making authorities

Species and Communities Branch to provide Departmental context and specific support and advice

Nature Conservation Regional Leader to provide advice

Regional Ecologist to develop analysis tools

Environmental Management Branch to assist provide Departmental context and specific support and advice

Status: New
Indicative Funding: Funding covered in Target 1 Candidate Action 6

Completion date: December 2006

Target Three Year Outcome – T17: The condition of seven Vulnerable Threatened Ecological Communities (Appendix 6 – List of TECs) will be improved

Candidate Actions:

1. Complete a values-risk analysis of occurrences of Vulnerable Threatened Ecological Communities within the Swan Region (but within a Statewide context) to determine which occurrences require the most urgent actions (e.g. priorities for possible acquisition, protection, management action).

Primary Responsibility: Species and Communities Branch to undertake analysis across full distribution of each Threatened Ecological Community

Supported by: Regional Ecologist, Regional Leader Nature Conservation, and Perth Hills and Swan Coastal District Nature Conservation Coordinators to provide advice

Status: New

Indicative Funding: \$50,000 one off (may need repeat after 5year interval?)

Completion date: June 2006

2. Continue to provide input into land use planning processes, including statutory planning, Environmental Impact Assessments, Vegetation Clearing Applications throughout the Swan Region to ensure occurrences of the seven Vulnerable Threatened Ecological Communities are identified and protected.

Primary Responsibility: Regional Leader Estate Planning to coordinate Departmental input into processes

Supported by: Regional Leader Nature Conservation, Regional Ecologist, and Perth Hills and Swan Coastal District Nature Conservation Coordinators to assist

Species and Communities Branch to provide advice

Status: Partly

Indicative Funding: \$500,000 (included as part of similar actions)

Completion date: June 2007

3. Seek to identify and protect occurrences on DEC managed estate of the seven Vulnerable Threatened Ecological Communities within the Swan Region to ensure that DEC managed occurrences are not degraded, and that the presence of these occurrences is included in Departmental planning.

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

Supported by: Perth Hills and Swan Coastal District Nature Conservation Coordinators to implement monitoring and management actions

Status: Partly New

Indicative budget: \$100,000

Completion date: December 2006

Target Three Year Outcome – T18a: The status¹⁴ of eight Priority (Priority 1, 2 & 3) ecological communities will be determined (Appendix 7 – List of Priority ecological communities).

Target Three Year Outcome – T18b: In the absence of clarification of status of the eight Priority ecological communities, respond to threats and take actions to limit impacts on them to retain the existing area and condition of these Priority ecological communities.

Candidate Actions:

1. Survey and map occurrences of the eight Priority ecological communities within the Swan Region to enable the conservation status of these communities to be established.

Primary Responsibility: Species and Communities Branch to undertake review of conservation status

Supported by: Regional Leader Nature Conservation to coordinate and arrange actions

Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators to coordinate surveys

Status: New

Indicative budget: \$60,000

Completion date: December 2006

2. Continue to provide input into land use planning processes, including statutory planning, Environmental Impact Assessments, Vegetation Clearing Applications throughout the region to ensure data deficient ecosystems are identified and consideration is made of likely status and potential for protection.

Primary Responsibility: Regional Leader Estate Planning to coordinate Departmental input into processes

¹⁴ Including by being protected by inclusion in the protected area system.

Supported by: Regional Leader Nature Conservation, Regional Ecologist, and Perth Hills and Swan Coastal District Nature Conservation Coordinators to...

Status: Partly

Indicative Funding: \$500,000 (included as part of similar actions)

Completion date: December 2008

3. Seek to identify and protect occurrences on DEC managed estate of the eight Priority ecological communities within the Swan Region to ensure that DEC managed occurrences are not degraded, and that the presence of these occurrences is included in Departmental planning.

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

Supported by: Perth Hills and Swan Coastal District Nature Conservation Coordinators to implement monitoring and management actions

Status: Partly new

Indicative budget: \$100,000

Completion date: December 2008

3.4 SPECIES AT RISK

Target Three Year Outcome – T19: Improve the conservation status of those 20 species identified in the Swan Region Threatened Flora Plan (page 20 of plan, included as Appendix 10) as those species with the highest requirement for recovery action

Candidate Actions:

1. Field survey, mapping and monitoring of known populations of 20 species of threatened flora within the Swan Region identified in the Swan Region Threatened Flora Recovery Plan, as the basis for the review of conservation status.

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

Supported by: Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators, in collaboration with Regional Leaders Nature Conservation Southwest, Wheatbelt and Midwest

Consultation with Kings Park and Botanic Gardens

Species and Communities Branch to undertake review of conservation status

Status: Ongoing
Indicative budget: \$240,000 pa
Completion date: December 2007

2. Seek to protect known populations of 20 species of threatened flora within the Swan Region identified in the Swan Region Threatened Flora Recovery Plan.

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

Supported by: Perth Hills and Swan Coastal District Nature Conservation Coordinators to implement management actions

Status: Partly New

Indicative budget: \$150,000

Completion date: December 2008

3. Continue to provide input into land use planning processes, including statutory planning, Environmental Impact Assessments, Applications for Clearing Permits (Area Permits) throughout the Swan Region, and monitor conditions following approval and audit compliance with statutory obligations and managements plans to ensure critically endangered flora species are protected and maintained.

Primary Responsibility: Regional Leader Estate Planning to coordinate input and provide advice

Support: Regional Manager to ensure biodiversity values are adequately considered and addressed through these processes

Nature Conservation Regional Leader to provide advice in a regional context on biodiversity values and their protection

Environmental Management Branch to provide advice on legislation and policy, and on cross-regional projects

Status: Partly

Indicative Funding: \$500,000 (currently Region allocates \$350,000 pa)

Completion date: Ongoing with review in December 2008

4. Continue to apply Departmental environmental impact assessments processes for DEC managed lands, including fire management and sustainable use of resources (sustainable forest management and recreation). Monitor compliance with conditions and management plans to ensure critically endangered flora species are protected.

Primary Responsibility: Regional Manager to ensure biodiversity values are adequately considered to achieve target outcomes

Support: Regional Leader Nature Conservation to provide advice on regional biodiversity context and input into processes

Environmental Management Branch to update Departmental procedures for necessary operations and compatible operations; and provide advice on Departmental policy, standards and compliance

Status: Ongoing and new

Indicative Funding:

5. Undertake spatial modelling and predictive mapping to identify possible localities with suitable habitat for Declared Rare Flora orchid species *Caladenia huegelii*, *Diuris purdiei* and *Drakaea elastica* with validation of spatial models by field survey.

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

Supported by: Science Division to provide advice and undertake modelling projects

GIS Section to provide advice and spatial data

Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators, in collaboration with Nature Conservation Regional Leader - Southwest

Status: New

Indicative budget: \$100,000

Completion date: June 2008

6. Determine the life history and vital attributes of 20 species within the Swan Region identified in the Swan Region Threatened Flora Recovery Plan as a basis for implementing appropriate fire management plans.

Primary Responsibility: Regional Leader Nature Conservation to coordinate and arrange actions in collaboration with Swan Regional Fire Coordinator

Supported by: Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators

Science Division to provide advice and collaborate in adaptive management experiments

Status: New

Indicative budget: \$300,000

Completion date: December 2008

7. Determine the requirements for land acquisition (or offset negotiation) in statutory land planning and environmental impact assessment processes to ensure no loss of populations of 20 Critically Endangered flora within the Swan Region identified in the Swan Region Threatened Flora Recovery Plan (see also Landscape Candidate Action T zzzzzz) as those species with the highest requirement for recovery action.

Primary Responsibility: Regional Leader Estate Planning to coordinate and arrange actions.

Supported by: Science Division to provide advice
Regional Leader Nature Conservation to provide advice and regional priorities and context
Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators

Status: New

Indicative budget: \$50,000 (excluding land purchase)

Completion date: December 2006

8. Undertake a strategic threat analysis (Weeds, *Phytophthora cinnamomi*, native and introduced species grazing, and others) of 20 species of Threatened flora within the Swan Region identified in the Swan Region Threatened Flora Recovery Plans those species with the highest requirement for recovery action as a basis for prioritising urgent management actions to ameliorate the threatening process(es). Interim management measures include monitoring threatening processes impacting populations and conducting urgent weed management action.

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

Supported by: Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators, Urban Nature Coordinator
Science Division to provide advice on threatening processes and ranking threats

Status: New

Indicative budget: \$100,000

Completion date: December 2008

Target Three Year Outcome – T20: Maintain the number and size of the populations of the remaining 11 Endangered flora species and 22 Vulnerable flora species¹⁵ (Appendix 8 – List of threatened flora) in those portions of the four IBRA

¹⁵ Priority to be determined by completing a risk analysis

subregions within the DEC Swan Region where they occur.

Candidate Actions:

1. Field survey, mapping and monitoring of known populations of 11 Endangered and 22 Vulnerable species within the Swan Region identified in the Swan Region Threatened Flora Recovery Plan, as the basis for the review of conservation status.

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

Supported by: Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators, in collaboration with Regional Leaders Nature Conservation Southwest, Wheatbelt and Midwest

Species and Communities Branch to undertake review of conservation status

Consultation with Kings Park and Botanic Gardens

Status: Ongoing

Indicative budget: \$250,000 p.a.

Completion date: December 2007

2. Continue to provide input into land use planning processes, including statutory planning, Environmental Impact Assessments, Applications for Clearing Permits (Area Permits) throughout the Swan Region, and monitor conditions following approval and audit compliance with statutory obligations and managements plans to ensure Endangered and Vulnerable flora species are protected and maintained.

Primary Responsibility: Regional Leader Estate Planning to coordinate input and provide advice

Support: Regional Manager to ensure biodiversity values are adequately considered and addressed through these processes

Nature Conservation Regional Leader to provide advice in a regional context on biodiversity values and their protection

Environmental Management Branch to provide advice on legislation and policy, and on cross-regional projects

Status: Partly

Indicative Funding: \$500,000 (currently Region allocates \$350,000 pa)

Completion date: Ongoing with review in December 2008

3. Continue to apply Departmental environmental impact assessments processes for DEC managed lands, including fire management and sustainable use of resources (sustainable

forest management and recreation). Monitor compliance with conditions and management plans to ensure Endangered and Vulnerable flora species are protected.

Primary Responsibility: Regional Manager to ensure biodiversity values are adequately considered to achieve target outcomes

Support: Regional Leader Nature Conservation to provide advice on regional biodiversity context and input into processes

Environmental Management Branch to update Departmental procedures for necessary operations and compatible operations; and provide advice on Departmental policy, standards and compliance

Status: Ongoing and new

Indicative Funding:

Completion date:

4. Determine the life history and vital attributes of 11 Endangered and 22 Vulnerable species within the Swan Region identified in the Swan Region Threatened Flora Recovery Plan as a basis for implementing appropriate regional fire management plans.

Primary Responsibility: Regional Leader Nature Conservation to coordinate and arrange actions in collaboration with Swan Regional Fire Coordinator

Supported by: Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators

Status: New

Indicative budget: \$250,000

Completion date: December 2008

5. Determine the requirements for land acquisition (or offset negotiation) in statutory land planning and environmental impact assessment processes to ensure no loss of populations of 11 Endangered and 22 Vulnerable threatened flora species identified in the Swan Region Threatened Flora Recovery Plan (see also Landscape Candidate Action T zzzzzz).

Primary Responsibility: Regional Leader Estate Planning to coordinate and arrange actions.

Supported by: Regional Ecologist, Regional Leader Nature Conservation, Perth Hills and Swan Coastal District Nature Conservation Coordinators

Status: New

Indicative budget: \$50,000 (excluding land purchase)

Completion date: June 2006

6. Undertake a strategic threat analysis (Weeds, *Phytophthora cinnamomi*, native and introduced species grazing, and others) as a basis for prioritising urgent management actions to ameliorate the threatening process(es).

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

Supported by: Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators, Urban Nature Coordinator

Science Division to provide advice

Status: New

Indicative budget: \$100,000

Completion date: December 2008

7. Undertake urgent management actions determined in action 6 to ameliorate the threatening process(es).

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

Supported by: Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators, Urban Nature Coordinator

Science Division to provide advice

Status: New

Indicative budget: \$150,000 pa

Completion date: December 2008

Target Three Year Outcome – T21: Resolve the conservation status of 58 taxa (25%) of Priority flora in those portions of the four IBRA subregion within the DEC Swan Region. (note: list of candidate species to be obtained from the Swan Region Threatened Flora Plan)

Note: need a target relating to protection or management of priority flora.

Candidate Actions:

1. Field survey and mapping of known populations of 58 Priority flora species within the Swan Region identified in the Swan Region Threatened Flora Recovery Plan, as the basis for the review of conservation status.

Primary Responsibility: Species and Communities Branch to undertake review of conservation status

Supported by: Regional Leader Nature Conservation to coordinate and arrange actions. Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators, in collaboration with Regional Leaders Nature Conservation Southwest, Wheatbelt and Midwest

Status: New

Indicative budget: \$500,000 pa

Completion date: December 2008

2. Targeted surveys for new populations of 58 Priority flora species within the Swan Region identified in the Swan Region Threatened Flora Recovery Plan, as the basis for the review of conservation status.

Primary Responsibility: Regional Threatened Flora Officer to identify priorities and coordinate searches

Supported by: Regional Leader Nature Conservation to provide overall coordination of actions. Regional Ecologist, Perth Hills and Swan Coastal District Nature Conservation Coordinators, in collaboration with Regional Leaders Nature Conservation Southwest, Wheatbelt and Midwest. Species and Communities Branch to undertake review of conservation status

Status: New

Indicative budget: \$500,000 pa

Completion date: December 2008

2. Continue to provide input into land use planning processes, including statutory planning, Environmental Impact Assessments, Applications for Clearing Permits (Area Permits) throughout the Swan Region to ensure that these processes adequately identify and include Priority flora in decision-making, and that priority flora species are protected and maintained.

Primary Responsibility: Regional Leader Estate Planning to coordinate input and provide advice

Support: Regional Manager to ensure biodiversity values are adequately considered and addressed through these processes

Nature Conservation Regional Leader to provide advice in a regional context on biodiversity values and their protection

Environmental Management Branch to provide advice on legislation and policy, and on cross-regional projects

Status: Partly

Indicative Funding: \$500,000 (currently Region allocates \$350,000 pa)

Completion date: Ongoing with review in December 2008

3. Continue to apply Departmental environmental impact assessments processes for DEC managed lands, including fire management and sustainable use of resources (sustainable forest management and recreation). Monitor compliance with conditions and management plans to ensure Priority flora species are considered and protected.

Primary Responsibility: Regional Manager to ensure biodiversity values are adequately considered to achieve target outcomes

Support: Regional Leader Nature Conservation to provide advice on regional biodiversity context and input into processes

Environmental Management Branch to update Departmental procedures for necessary operations and compatible operations; and provide advice on Departmental policy, standards and compliance

Status: Ongoing and new

Indicative Funding:

Completion date:

Target Three Year Outcome – T22: No decline in the conservation status of two species of terrestrial Critically Endangered fauna (*Pseudemydura umbrina*, Western Swamp Tortoise, *Hurleya* sp. (WAM#642-97), Crystal Cave Crangonyctoid) and five species of Endangered terrestrial fauna (*Calyptorhynchus baudinii*, Baudin's Black-Cockatoo; *Calyptorhynchus latirostris*, Carnaby's Black-Cockatoo; *Leioproctus douglasiellus* and *Neopasiphae simplicior*, native bees, and *Synemon gratiosa*, Graceful Sunmoth) and the Priority 3 listed Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) in those portions of the four IBRA subregion within the DEC Swan Region.¹⁶

Candidate Actions:

1. Implement actions specified in the approved (interim) recovery plans for the Critically Endangered *Pseudemydura umbrina*, Western Swamp Tortoise and *Hurleya* sp. (WAM#642-97), Crystal Cave Crangonyctoid; and the Endangered *Calyptorhynchus latirostris* Carnaby's Cockatoo, *Calyptorhynchus baudinii* Baudin's Cockatoo; and the Priority 3 listed Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*¹⁷ occurring within the IBRA subregions of the Swan Region.

¹⁶ This is all terrestrial Critically Endangered and Endangered fauna recorded from the Swan Region.

¹⁷ Baudin's and Forest Red-tailed Black Cockatoo recovery actions are detailed in a single "Forest Black Cockatoos Recovery Plan", therefore both the Endangered and Priority 3 species are included under the one Candidate Action.

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

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

District Nature Conservation Coordinators Perth Hills and Swan Coastal and Regional Ecologist Swan (and Regional Leaders Nature Conservation Midwest, South West and Wheatbelt and Regional Ecologist Warren and South Coast) to provide advice and undertake select actions, and participate on recovery teams

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

Status: Ongoing

Indicative Funding: \$150,000 existing (Western Swamp Tortoise)
\$120,000 NHT (Western Swamp Tortoise)
Additional capital needed \$350,000 (Western Swamp Tortoise)
\$160,000 p.a. (Western Swamp Tortoise)
\$50,000 p.a. running cost (Cave communities and threatened species)
\$50,000 p.a. monitoring (0.5 existing, 0.5 additional) (Cave communities and threatened species)
Depreciation of \$1,100,000 over 15 years. (Cave communities and threatened species)
\$100,000 for Carnaby's Cockatoo.
\$175,000 for Baudin's Cockatoo.

Completion date: December 2008

3. Prepare and implement recovery plans for the three Endangered species *Leioproctus douglasiellus* and *Neopasiphae simplicior*, native bees, and *Synemon gratiosa*, Graceful Sunmoth which occur in remnant bushlands sites in SCA2.

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

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

Swan Coastal District Nature Conservation Coordinator and Regional Ecologist Swan (and Regional Leader Nature Conservation Midwest for *Neopasiphae simplicior*) to provide advice and undertake select actions, and participate on recovery teams

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

Status: New

Indicative Funding: \$60,000 one off plan preparation
\$60,000 p.a. implementation
(have NHT funding of \$60,000)

Completion date: December 2006

Target Three Year Outcome – T23: Maintain the density of the populations of the five species of Vulnerable terrestrial fauna (*Dasyurus geoffroii*, Chuditch; *Setonix brachyurus*, Quokka; *Leipoa ocellata*, Malleefowl; *Rostratula benghalensis australis*, Australian Painted Snipe; *Botaurus poiciloptilus*, Australasian Bittern) in those portions of the four IBRA subregion within the DEC Swan Region

1. Implement by actions specified in the approved recovery plan for the Vulnerable Chuditch *Dasyurus geoffroii* for populations within the Swan Region (in particular fox control, and population monitoring), with activities integrated with other regions.

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

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

Perth Hills District Nature Conservation Coordinator and Regional Ecologist Swan, in collaboration with Regional Leaders Nature Conservation Southwest, Warren and South Coast to provide advice and undertake select actions, and participate on recovery teams

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

Status: Ongoing

Indicative Funding: \$40,000 for monitoring (does not include the cost of Departmental Western Shield baiting)

Completion date: Review in December 2008

2. Determine and implement appropriate regional level response/actions (in the context of state wide recovery efforts) for recovery of the three Vulnerable bird species *Leipoa ocellata* Malleefowl, *Rostratula benghalensis australis*, Australian Painted Snipe and *Botaurus poiciloptilus* Australasian Bittern to ensure populations of these species within the region are maintained, and the overall species status does not decline.

Primary Responsibility: Species and Communities Branch to provide advice and participate on relevant recovery teams in collaboration with Regional Leader Nature Conservation to coordinate and arrange actions

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

Regional Ecologist Swan, (in collaboration with Regional Leader Nature Conservation Southwest, Warren, South Coast, Goldfields, Midwest for *Leipoa ocellata* Malleefowl and Regional Leader Nature Conservation Warren for *Botaurus poiciloptilus* Australasian Bittern) to provide advice and undertake select actions, and participate on recovery teams

Status: New

Indicative Funding: \$70,000

Completion date: December 2008

3. Continue to implement the interim Fire Management Guidelines for Vulnerable Quokka conservation and complete the rapid survey of Quokka occurrence and determine conservation status and habitat condition.

Primary Responsibility: Regional Ecologist Swan to coordinate and arrange actions

Support: Science Division to provide advice

Regional Leader Nature Conservation, Regional Fire Coordinator Swan and Perth Hills District Nature Conservation Coordinator, in collaboration with Regional Leader Nature Conservation Southwest, Warren and South Coast, to provide advice

Status: New

Indicative Funding: \$70,000 (does not include fire management costs)

Completion date: Review in December 2008

Target Three Year Outcome – T24: Increase the distribution and abundance of five locally extinct and Threatened fauna species (*Atrichornis clamosus*, Noisy Scrub-bird; *Petrogale lateralis lateralis*, Black-flanked Rock-wallaby; *Pseudocheirus occidentalis*, Western Ringtail Possum; *Myrmecobius fasciatus*, Numbat; *Bettongia penicillata ogilbyi*, Woylie) by establishing sustainable populations where this forms part of a formal recovery action for the species (or is approved fauna reconstruction site – eg Julimar, Hills Forest)

Target Three Year Outcome – Txx: resolve the conservation status of eight (30%) Priority fauna found within (endemic to) the DEC Swan Region (Appendix 12)

Candidate Actions:

1. Implement by actions specified in the approved recovery plans for the *Atrichornis clamosus*, Tjimiluk, Noisy Scrub-bird, *Myrmecobius fasciatus*, Numbat, Walpurti; *Bettongia penicillata ogilbyi*, Woylie, in particular continue monitoring of Swan Region translocated populations and threatening processes to determine the success of translocation program (success criteria defined in approved recovery plans).

Primary Responsibility: Regional Leader Nature Conservation and Regional Ecologist to coordinate and arrange monitoring within the region. Species and Communities Branch to collate data and provide annual Statewide analysis and report back to regions

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

Perth Hills District Nature Conservation Coordinators, in collaboration with Regional Leaders Nature Conservation South Coast and Southwest for *Atrichornis clamosus*, Tjimiluk, Noisy Scrub-bird and Regional Leaders Nature Conservation Wheatbelt, Warren, Southwest and Midwest for Numbat, Walpurti; *Bettongia penicillata ogilbyi*, Woylie to provide advice and undertake select actions, and participate on recovery teams

Status: Ongoing and new

Indicative Funding: \$40,000 (monitoring populations)
\$60,000 (threatening process monitoring)

Completion date: December 2008

2. Determine and implement appropriate regional level response/actions (in the context of state wide recovery efforts) for *Pseudocheirus occidentalis*, Nguara, Western Ringtail Possum and *Petrogale lateralis lateralis*, Black-flanked Rock-wallaby to ensure relic and translocated populations are maintained.

Primary Responsibility: Regional Leader Nature Conservation (Western Ringtail Possum) and Regional Ecologist Swan (Black-flanked Rock-wallaby) to coordinate and arrange actions with advice from Species and Communities Branch to provide advice

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

Perth Hills District Nature Conservation Coordinator, in collaboration with Regional Leaders Nature Conservation from those regions where these species also occur to provide advice and undertake select actions, and participate on recovery teams

Status: Ongoing

Indicative Funding: \$30,000

Completion date: December 2008

3. Undertake conservation assessment using desktop analysis of Species and Communities Branch databases and Western Australian Museum Records for southwest populations of:

- Quenda *Isoodon obesulus fusciventer*
- Woylie *Bettongia penicillata ogilbyi*
- Tammar Wallaby *Macropus eugenii derbianus*
- Dell's Skink *Ctenoutus delli*

To ensure correct management actions for these species are being implemented and populations are maintained.

Primary Responsibility: Species and Communities Branch to provide advice and coordinate assessments

Support: Regional Ecologist to undertake actions to provide data to Species and Communities Branch

Science Division to provide advice and participate on relevant assessments

Regional Leader Nature Conservation, Perth Hills and Swan Coastal District Nature Conservation Coordinators, in collaboration with Regional Leaders Nature Conservation Southwest, Wheatbelt, Warren and South Coast to provide advice and undertake select actions

Status: New

Indicative Funding: \$30,000

Completion date: December 2008

4. Undertake a Statewide survey of the distribution and estimate the abundance of Western Brush Wallaby *Macropus irma*, initiate a desktop assessment and field survey of Water Rat *Hydromys chrysogaster* within JF1 and AW2, review the population trends for Carpet Python *Morelia spilota imbricata* and Dell's Skink *Ctenoutus delli* and undertake surveys and resolve the conservation status of Forest Red-tailed Black-cockatoo *Calyptorhynchus banksii* naso to ensure correct management actions are being implemented and populations of these species are being maintained.

Primary Responsibility: Species and Communities Branch to coordinate assessments

Support: Regional Ecologist to undertake actions to provide data to Species and Communities Branch

Science Division to provide advice and coordinate assessments

Regional Leader Nature Conservation, Perth Hills and Swan Coastal District Nature Conservation Coordinators, in collaboration with Regional Leaders Nature Conservation

Midwest, Southwest, Wheatbelt, Warren and South Coast to provide advise and undertake select actions

Status: New

Indicative Funding: \$30,000

Completion date: December 2008

Target Three Year Outcome: T25 – The populations of Australian Sea lions at haul out sites at Carnac Island, Seal Island (Shoalwater Marine Park), and Little Island and Burns Rocks (Marmion Marine Park) will be maintained

Candidate Actions:

1. Implement the actions of the Carnac Island Nature Reserve Management Plan relating to the establishment of a sea lion refuge beach and manage human disturbance.

Primary Responsibility: District Manager to implement plan

Support: Nature Protection Branch to provide support to enforcement of people management to minimizing undesirable human interaction

Status: Completed, ongoing maintenance

Indicative Cost: \$20,000 existing, \$20,000 new

Completion date: December 2008

2. Ensure the conservation of sea lion haul outs within the Shoalwater Island Marine Park, Patrol and maintain Seal Island as a public exclusion area.

Primary Responsibility: District Manager to implement plan

Support: Nature Protection Branch to assist with compliance

Status: Partially new

Indicative Cost: \$5,000 existing, \$15,000 new

Completion date: December 2008

3. To ensure the conservation of sea lion haul outs on Little Island and Burns Rocks in Marmion Marine Park, and undertake review of public access to the islands in accordance with the Marmion Management Plan

Primary Responsibility: District Manager to undertake review

Support: Marine Conservation Branch in preparing plan

Status: New

Indicative Cost \$25,000 pa

Completion date: June 2008

4. Assess and manage injured sea lions to prevent losses to the population where practical.

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Primary Responsibility: Nature Protection Branch

Support: Swan Coastal Marine Operations Group

Status: Existing

Indicative Cost: \$15,000

Completion date: June 2008

Target Three Year Outcome: T26 - The population size and abundance of the Vulnerable Southern Right and Humpback, and Endangered Blue Whales¹⁸ will be maintained

(through management of threats posed by fishing and tourist operations on the migration and use of waters in the Swan Region)

Candidate Actions

1. Designated marine staff to participate in Whale entanglement group with Nature Protection Branch.

Primary Responsibility: District Manager

Support: Nature Protection Branch

Status: Existing

Indicative Cost: \$5,000 existing

Completion date:

2. Department to undertake a review on risk of new aquaculture proposals for protected whale species.

Primary Responsibility: Nature Protection Branch

Support: Science Division

Status: New

Indicative Cost: \$50,000?

Completion date:

¹⁸ Contributes to the global conservation of this species.

NOTE: there are 13 species of listed marine birds recorded from the region (one CR albatross, one EN albatross, eight VU albatross, one EN petrel, one VU petrel and one VU skua) that do not have any actions identified. Similarly 3 (1 EN, 2 VU) marine turtles, 2 VU species of shark.

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.

Key question investigated were (Appendix 4 Details of Resource Analysis):

1. What is the actual or estimated cost (includes salaries, wages, plant, materials, contract and overheads) pa and over 3 years of each candidate action?
2. What is the total annual cost (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?
3. 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?
4. 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?
5. What are the sources of funds (specify e.g. Western Shield, SAP, NRM, DEC Recurrent, Other Outputs etc) and the amounts used to implement the candidate actions?

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.

Note on previous page Appendix 1 Matrix of values/assets and threats and relative importance for regional Scale Actions for DEC Swan Region

There needs to be a review in context of targets and actions proposed in the plan (i.e. do we have a response to all threats identified? Will the successful implementation of actions really result in any change to threat status? Need to also look at other docs – eg threats table from Managing the Wheatbelt etc.)