Swan Region Strategy for Natural Resource Management

INVESTMENT PLAN

March 2005

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PART A: SUMMARY OF INVESTMENTS

PART A: SUMMARY OF INVESTMENTS

1. OVERVIEW

1.1 The Challenge

This Investment Plan is a counterpart to the Swan Region Strategy for Natural Resource Management, which was accredited by the Commonwealth and the State in November 2004, the first in Western Australia.

The Swan Region contains Australia's fourth largest metropolitan area, housing 1.4 million people. This population is growing faster than the Australian average, with continuing positive net immigration. The Region's environment sets it apart, and makes Perth, still, one of the most liveable cities in the world. But its environmental quality is under severe threat on many fronts:

- Natural diversity and cultural heritage throughout the region have been depleted by past practices and are threatened by many new developments.
- Inland aquatic systems and the Swan estuary suffer from changed flow and quality. Groundwater is threatened by contamination, and the environmental services it yields are threatened by draw down.
- Coastline and marine habitats are under ever-increasing pressures.
- Agriculture, horticulture, aquaculture, commerce, utilities and industrial activities throughout the region are facing the challenge of becoming environmentally sustainable.

Thus the Swan Region Strategy for Natural Resource Management is about the ecological management of a major urban region. It aspires to retain the region's sense of place in the context of continuing development.

Investment must be targeted if this is to be achieved. The Investment Plan and its six Technical Reports present a delivery framework and a set of investments required to fulfil the Strategy.

1.2 How the Investment Plan was developed

The Investment Plan draws directly on all the Management Actions set out in the accredited *Swan Region Strategy for Natural Resource Management*. It has been developed through an intensive program of stakeholder workshops. The workshops were professionally facilitated and supported by extensive desk research undertaken by staff of the Swan Catchment Centre, project proponents, and consultants. In these workshops:

- Stakeholders assessed the relative triple-bottom-line returns to investment across threats to asset values (See Technical Report No 2 *Assessment of relative returns to investment across assets and threats*). Three workshops - Theme based.
- They then prioritised all potential investments across Strategy Themes and Management Actions (See Technical Report No 3 *Assessment of overall*

priorities for investment across themes). Four workshops – three Theme based, and one comprising Swan Catchment Council members.

- Next, stakeholders identified in detail what activities are already taking place to fulfil each Management Action set out in the Strategy, and how adequate they are. From this they nominated projects and how these might be funded, whether by NHT2 or in some other way (See Technical Report No. 4 *Evaluation of current activities and gaps against Strategy management actions*). Seven workshops – five Delivery Program based, and two dealing with the Cultural Heritage and Regional Capacity Themes.
- Finally, after proponents had drafted detailed Project Statements and Technical Review Panels had undertaken preliminary assessments, a Swan Catchment Council workshop selected and prioritised projects for NHT2 funding. See Technical Report No 5 *Project Funding Priorities Workshop* and Technical Report No. 6 *Project Statements*.

1.3 Layout of the Investment Plan

This volume is in three parts and two Appendices

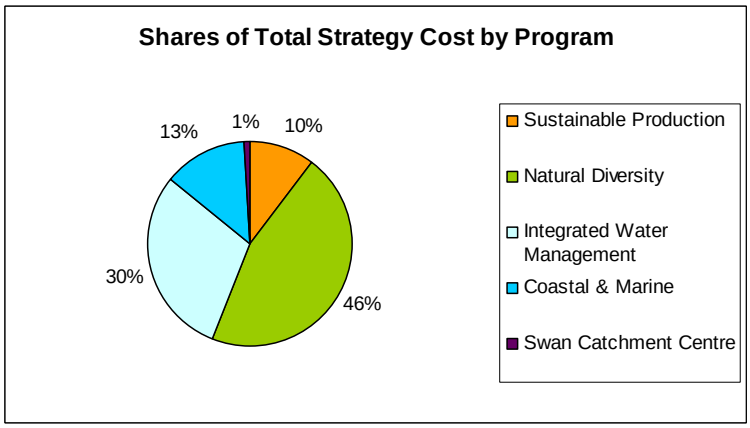
- Part A gives the main investment aggregates, for all actions required by the Strategy and for the NHT2 proposal.
- Part B, the Investment Plan Framework, sets out the institutional context for Strategy implementation, and particularly the role of the Swan Catchment Council; the methods used to develop the investment plan; and the delivery framework for ongoing implementation, monitoring and review.
- Part C describes, in turn, each of the four Regional Delivery Programs. Details are given of the particular Program's rationale, its Resource Condition and Management Action Targets, an estimate of the total costs of implementing the Strategy across all stakeholders, the NHT2 Regional Funding Proposal, sub-Program and Project abstracts, Outputs, and anticipated Outcomes.
- Appendix A gives an inventory of the proposed NHT2 projects, according to their resource condition and management action targets, their costs to NHT2 and other available funds.
- Appendix B lists Resource Condition and Management Action Targets, and shows the activities (projects) contributing to each one.

The six Technical Reports (see Contents List) provide detailed explanations of the Investment Plan Workshops and their outputs, and desk-based estimates of Total Strategy Costs. Importantly, these technical reports should provide the Swan Catchment Council with a resource for ongoing use as the Strategy gains momentum and additional funding sources are developed.

2. TOTAL STRATEGY COSTS

The estimated cost of all Management Actions to all stakeholders over the 3-year period 2004-05 to 2006-0 is $91.4 million on a Total Cost of Service basis. This excludes land purchases under the Bush Forever scheme and the costs of the Infill *Sewerage* Program. See Technical Report No 1 *Total costs of the Strategy*. Many of the Management Actions to be undertaken during the next three years will need to continue beyond 2006-07. The breakdown of Total Strategy Costs by Regional Delivery Program given in Figure 1 shows a strong emphasis in investment for protecting the region's remaining natural diversity.

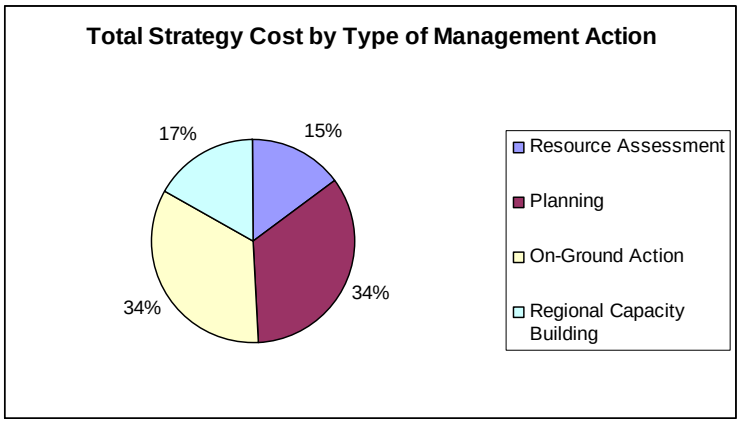
Figure 1: Shares of 3-Year Total Strategy Costs (All Investments) by Regional Delivery Program



Note: the percentage shares exclude Bush Forever Land Purchases ($10M/yr for 3 years) and the Infill Sewerage Program ($20M/Yr for 3 years).

As is shown in the following pie chart, as costed the Strategy as a whole emphasises expenditure on planning and on-ground activities relative to resource assessment and capacity building.

Figure 2: Shares of Total Strategy Cost (All Investments) by Type of Management Action



3. NHT2 FUNDING PROPOSAL

3.1 Indicative Funds for Swan Region

Indicative Allocations for Swan's Core, and Regional NHT2 funding between 2004-05 and 2006-07 is shown in Table 1.

Table 1: Indicative NHT2 Funds 2004-05 to 2006-07 at 2004 prices ($)

Source of Funds	2004-05	2005-06	2006-07
Core Funds	0	400,000	400,000
Regional Funds	4,200,000	4,600,000	4,600,000
Cross-Regional Funds (Uncertain)	0	0	0
Total Above	4,200,000	5,000,000	5,000,000
Regional Funds Increased by 25%	5,250,000	5,750,000	5,750,000

The *Regional Investment Plans Guidelines and Processes for Western Australia* (Draft 8th September 2004) indicates that "*High priority investments should be specified to 100% of indicative allocation. In addition … investments to a value of a further 25% can be proposed.*" Therefore, at the foot of Table 1 is shown the implication of receiving a full 125% of Indicative Regional Allocation.

The *Guidelines* also indicate that regions may submit proposals of up to 50% of indicative allocation for 2006-07.

The Swan Catchment Council has decided to put forward proposals having costs equal to 125% of Indicative Allocation for 2004-05 and 2005-06, and for approximately 50% for 2006-07. Throughout the Investment Plan items that could be undertaken with additional regional funding are identified separately from those proposed for funding within the 100% allocation ceiling, and termed "Supplementary Proposals".

3.2 Funding Proposal Assuming 100% Indicative Regional Allocation

3.2.1 Summary

The Western Australian Guidelines state, "*Governments will no longer be directly funding projects – projects are internal regional arrangements established and managed by regional NRM groups*". Therefore, the NHT2 bid for 2004-05 and 2005-06 is for Swan's four Regional Delivery Programs plus core functions of the Swan Catchment Council.

The proposed use of NHT2 funds for 2004-05 and 2005-06 is shown in Table 2. It is seen that the Regional Delivery programs account for a total of $8,285,000 over the two years 2004-05 and 2005-06. There will be a substantial carry-over from 2004-05, as many of the new projects within the Regional Delivery programs will not begin operations until late in financial year 2004-05. Most expenditure from the Regional Allocation for 2004-05 will be in respect of the eight pre-existing NHT2-funded projects. The component projects are described in the Program Statements given in Part C, and in detail in Investment Plan Technical Report No 6 *Project Statements*.

Table 2: Summary of Proposed Use of NHT2 Regional Allocation 2004-05 and 2005-06 at 2004 prices

	2004-05 ($)	2005-06 ($)	Total 2004-06 ($)
Activities Limited to 100% of Indicative Allocation:			
- Swan Catchment Council Core Functions	515,000	0	515,000
-Regional Delivery Programs	3,480,000	4,805,000	8,285,000
Total Use of Indicative Allocation	3,995,000	4,805,000	8,800,000
Additional Activities if Regional Allocation increased by 25%			
- Monitoring and Evaluation Position	115,000	115,000	230,000
- Regional Delivery Programs	935,000	1,035,000	2,070,000
Total Supplementary Uses	1,050,000	1,150,000	2,300,000

Proposed use of NHT2 funds for 2006-07 is shown in Table 3.

Table 3: Proposed Use of NHT2 Regional Allocation for 2006-07 at 2004 prices

	2006-07 ($)
Swan Catchment Council Core Functions	515,000
Program Implementation Frameworks (Facilitators and Coordinators)	1,800,000
Training Programs (Water Education and Training and Skills for Nature)	266,000
Total	2,581,000

The total of $2,581,000 amounts to 51.6% of Indicative Funding for 2006-07. If the amount to be allocated immediately (i.e. in April 2005) is strictly limited to 50% of Indicative Funding the total is reduced to $2,500,000, and Swan Catchment Council will scale down its allocation to the two training programs. Note, however, that these data are expressed in 2004 prices, and actual requirement will be higher to the extent of inflation.

Swan Catchment Council Core Functions arise from its role as the coordinating body for implementation of the Swan Region NRM Strategy. There is a requirement for efficient administration of the funding streams, project delivery and monitoring and evaluation components of implementation, as well as a need to build strong partnerships with State and Local Government as well as industry and community through its sub-committees and reference groups. The Council therefore requires executive support. Three staff fulfil these roles: an Executive Officer, Executive Support Officer and Administration Assistant. The core funding of the Council is an acknowledgement of the need to fund these essential services for each Regional Group. The Council is also supported through the Department of Environment, who fund a Manager for the Swan Catchment Centre, and assist with operational expenses and IT support.

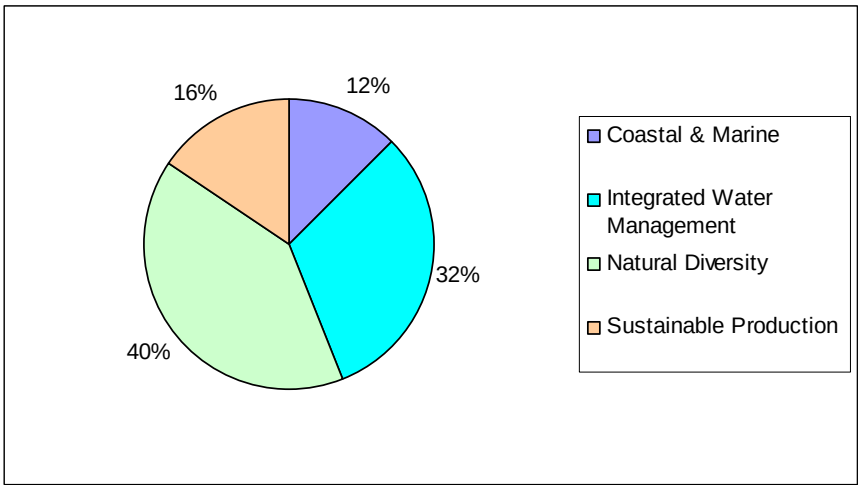
3.2.2 Regional Delivery Programs

Program aggregates and a breakdown of the projects (for 100% Indicative Allocation and including the four Program Implementation Frameworks) are shown in Table 4. Twenty-three projects plus the four "Implementation Frameworks" within the Regional Delivery Programs have been recommended for NHT2 Regional Funding, up to 100% of Indicative Allocation.

The Implementation Frameworks comprise Program Managers, Facilitators and Coordinators who are the "cement" that holds together all community and government initiatives of the Swan Coastal Council, under the Strategy. Details of their composition are given in Part C, Sections 2.8 (Natural Diversity), 3.6.6 (Integrated Water Management), 4.5.8 (Sustainable Production) and 5.5.7 (Coast & Marine).

Figure 3 shows the share of each Regional Delivery Program. It is seen that the Natural Diversity Program has received similar emphasis in the NHT2 funding proposal shown in Figure 3 as in the overall pattern of investment required by the Strategy, shown in Figure 1. This is partly a function of the emphasis given by stakeholders to natural diversity issues throughout the Investment Plan workshop program, but also to the fact that there are significant investments planned independently of NHT2 particularly in the Water Theme, so the Gap Analysis yielded less new NHT2-fundable project suggestions for Integrated Water Management than it did for natural diversity issues.

Figure 3: Shares of each Regional Delivery Program in the proposed NHT2 funding for 2004-05 and 2005-06



The recommended portfolio consolidates and strengthens existing NHT projects, particularly in Education Training and Technical Support for Water Resources Management by the Community (Project IWM05, formerly titled Ribbons of Blue, which has been re-oriented to meet the needs of this Strategy), Skills for Nature (Project ND09), the Perth Biodiversity Project allowing some extension for work in wetlands (Project ND01);Wetland Watch (Project IWM04) is widened to include incentives and is linked to the Swan-Alcoa Landcare Program; and additional investment is available for CALM's recovery programs for threatened species and communities (Projects ND03, ND06 and ND07).

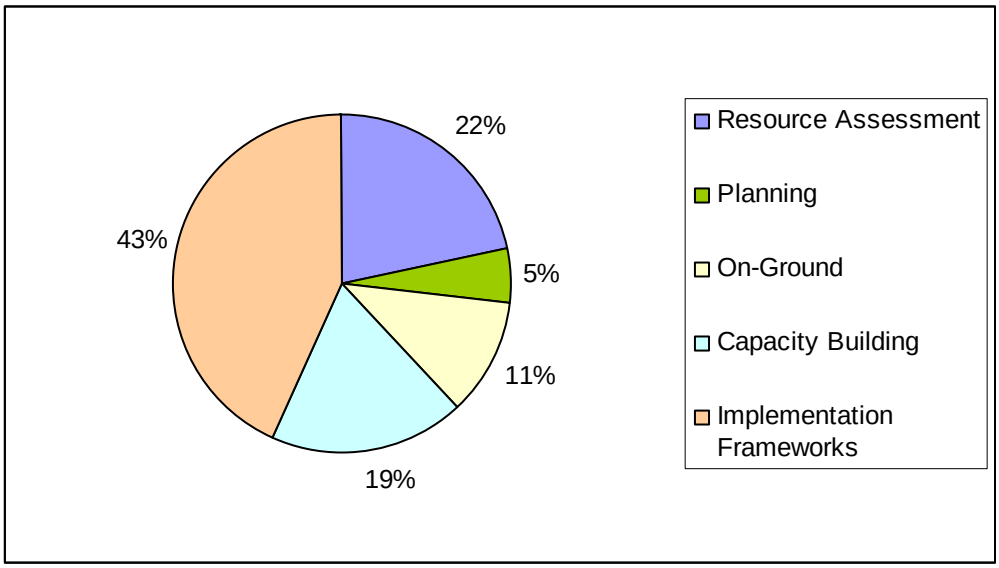
There are also new and exciting projects. These include a much needed investment in Coastal Condition Evaluation and Marine Fauna Mapping (Projects C&M01 and C&M02); a major increase in water quality monitoring to expand current data and systems to cover the full range of relevant indicators across the region (Project IWM03), a new project for community up-skilling for biodiversity and nature conservation (Project ND05), and five entirely new projects in the Sustainable

Production Program covering issues as diverse as industrial waste management (Projects SP01 and SP03); air quality (Project SP02); and land management in broad acre and intensive agriculture (Projects SP04 and SP05 respectively).

The NHT2 proposal does not include a specific project for Cultural Heritage. It was judged that alternative funding sources are available for several cultural heritage initiatives in the Strategy, particularly for indigenous heritage issues.

A breakdown of the proposed NHT funds across types of Management Action is shown in Figure 4. It is seen that the Implementation Frameworks of the four Regional Delivery Programs, which include all NHT-funded Facilitators and Coordinators, account for almost a half (43%) of the total NHT funds. Of the remainder, most investment is currently devoted to resource assessment (22%) and capacity building (19%).

Figure 4: Breakdown of Proposed NHT Funds by Type of Management Action



A relatively small proportion of funds will be spent directly on planning (5%) or on-ground work (11%). However, in several cases, the projects proposed for NHT funding will guide much larger investments in on-ground work or strategic decisions by the State or Local Government. This is true, for example, of Coastal Condition Evaluation, Marine Fauna Mapping, Canning Environmental Flows, Swan-Canning Foreshore Assessment, Water Quality Monitoring Framework, Perth Biodiversity Project and the Threatened Ecological Communities Project. Also, many of the other projects proposed for NHT2 funding are there to leverage on-ground work by private stakeholders and community groups.

Table 4: Proposed Program and Project Funding from NHT2 Regional Allocation in 2004-05 and 2005-06 (2004 prices)

Project ID	Program/Project Title	2004-05	2005-06
C&M01	Coastal Condition Evaluation	100,000	0
C&M03	Marine Fauna Mapping	250,000	128,000
C&M10	Program Implementation Framework	284,000	284,000
	Total Coastal & Marine Delivery Program	***634,000***	***412,000***
IWM01*	Canning Environmental Flows	0	152,000
IWM02*	Swan-Canning Foreshore Assessment	0	150,000
IWM03	Water Quality Monitoring & Evaluation Framework	350,000	350,000
IWM04	Wetland Watch Continuation, plus Incentives through SALP	174,000	208,000
IWM05*	Water Education, Training & Technical Support	0	165,000
IWM10	Program Implementation Framework	561,000	561,000
	Total Integrated Water Management Delivery Program	***1,085,000***	***1,586,000***
ND01*	Perth Biodiversity Project	430,000	417,000
ND02*	Dieback Working Group	0	106,000
ND03*	Threatened Ecological Communities of the Swan Coastal Plain	0	196,000
ND04	Predictive Mapping Tool for Threatened Species & Communities	0	160,000
ND05*	Western Swamp Tortoise Recovery Plan	0	120,000
ND06	Recovery of Threatened Flora of the Swan Region	100,000	100,000
ND07	Recovery of Threatened Terrestrial Fauna of the Swan Region	0	93,000
ND08	Biodiversity Action Learning Program	0	324,000
ND09*	Skills for Nature Conservation	101,000	101,000
ND10	Program Implementation Framework	587,000	587,000
	Total Natural Diversity Delivery Program	***1,218,000***	***2,204,000***
SP01	Waste Management Survey Benchmarking	60,000	0
SP02	Light Industry Emissions Study	0	50,000
SP03	SME Tracking & Auditing	50,000	0
SP04	Multi-User Decision Support Tool for Salinity	65,000	65,000
SP05	Linking Best Management Practices with Property Planning in Intensive Agriculture	0	120,000
SP10	Program Implementation Framework	368,000	368,000
	Total Sustainable Production Delivery Program	***543,000***	***603,000***
	Total Programs	**3,480,000**	**4,805,000**
	Plus Swan Catchment Council Core Functions	515,000	0
	TOTAL	**3,995,000**	**4,805,000**
	Carry-Over from 2004-05 into 2005-06	**+205,000**	
	NHT2 Indicative Regional Funding	**4,200,000**	**4,600,000**

* These projects have received NHT funds up to and including 2004-05, but not necessarily from the Regional Allocation. Projects 3, 4, 7, 8 and 9 all received some NHT funding in 2004-05, but this was not from the Regional Allocation

3.3 Supplementary Proposals Assuming Additional 25% Funds

Table 5 lists activities that could be funded within 125% Regional Allocation. These projects were selected from a longer list of potential projects on the basis of (i) preference given to well-argued cases for extensions of existing NHT projects, and (ii) ratings given in the Swan Catchment Council's Project Funding Priorities Workshop.

Table 5: Supplementary Proposals for NHT2 Regional Funding for a 25% Increase in Regional Allocation

Priority	Project Title	Funds Required ($/2Yrs)	Cumulative Total ($/2Yrs)
1	New position for Monitoring and Evaluation	240,000	240,000
2	Wetland Watch Project Extension	370,000	610,000
3	Perth Biodiversity Project Extension	300,000	910,000
4	Small & Medium Enterprise Tracking and Auditing	200,000	1,110,000
5	Coastal Targets	200,000	1,310,000
6	Integrating Best Management Practices with Property Planning	500,000	1,810,000
7	Weeds Officer	200,000	2,010,000
8	Carnaby's Cockatoo Recovery Plan	240,000	2,250,000
	Total	2,250,000	

A project on Perth's Fungi (see Part C Section 2.5.2) had one less "vote" in the Project Priorities Workshop than Carnaby's Cockatoo.

A project titled *Large Scale Remediation Project in Upper-Swan Avon* scored higher than Projects 7 and 8 in Table 5, but was omitted because its budget ($1,000,000 over two years) is too large. A comparable proposal is being developed by the Avon Catchment Council for funding under NAP.

3.4 Cross-Regional Funding

During the Investment Planning process, the Swan Catchment Council identified projects that could be implemented in conjunction with other regions. These projects have a "cross regional" aspect and have direct application to regional NATURAL RESOURCE MANAGEMENT bodies beyond the Swan Region. Two projects were identified during the investment planning process. The two projects are

- *Waste Management Survey – Benchmarking.* This project proposes to provide benchmarking of the type and quantity of waste produced by small to medium enterprises, and the disposal method employed by these enterprises. The Northern Agriculture Catchment Council, South West Catchment Council and South Coast Region Initiative Planning Team have also expressed interest in placing importance on light industry within their areas.

- *Linking Best Management Practices with Property Planning in Irrigated Agriculture.* The project proposes to compile Best Management Practice measures applicable to the vegetable industry. The proposal includes the preparation of property management plans with key stakeholders, establishment of best practice farms in conjunction with an extension/education program, and implementation of best management property plans through an incentive program. This project proposes to involve the Swan Catchment Council, South West Catchment Council, Northern Agriculture Catchments Council and South Coast Regional Initiative Planning Team.

4. OTHER STRATEGY ACTIVITIES

Implementation of the Swan Region Strategy will involve many more actions across the whole range of stakeholders, than the limited set proposed for NHT2 funding. Technical Report No 4 *Evaluation of current activities and gaps against Strategy management actions* identifies activities that are already being carried out to address each of the Strategy Management Actions.

The Gap Analysis identified many new projects and potential extensions of existing projects. A number were considered for NHT2 funding but could not be put forward at this time given Swan's indicative NHT2 allocation. Some of the projects could be considered for cross-regional or competitive funding in future.

5. BENEFITS OF THE STRATEGY

Economic benefits of the strategy over a twenty-year period discounted at a real rate of 3.5% are estimated at $1,065 M. This may be compared with total costs (excluding Infill Sewerage) taken over a five-year period of $202 M giving a benefit to cost ratio of more than 5:1. With the costs of Infill Sewerage included the benefit cost ratio is approximately 3:1. It should be noted that the benefit estimate excludes benefits to water quality in Darling Range streams other than Wooroloo Brook. Also, the estimated benefits of the Strategy's coastal and marine initiatives have been limited to species preserved. Benefits and costs for air quality improvement and cultural heritage preservation have been excluded. Thus the estimated benefits can be considered as a minimum. Part C, Chapter 6 provides the detailed assessment.

It is concluded that the Strategy and the Investment Plan will generate a high level of environmental, social and economic returns. The Strategy Investment Plan is therefore recommended to the Commonwealth and to the Government of Western Australia.

PART B: INVESTMENT FRAMEWORK

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1. RATIONALE

This Investment Plan:

- Acknowledges the aspirational targets the wider regional community has for the asset in the longer term (50 years) identified within the Swan Region Strategy;
- Acknowledges and clearly identifies the links between natural assets that reflect local, regional and institutional priorities in the Swan Region Strategy; and
- Reflects the urgency of required change in assets condition.

Taking the proposals contained in the Strategy, the Investment Plan:

- Provides the underlying rationale for evaluating management options, and combining them;
- Tests whether proposed actions are efficient in a Triple Bottom Line sense;
- Prioritises the actions available to achieve the target for the asset, and the relative cost effectiveness of these options;
- Achieves best value for the money spent in enhancing environmental services and social outmodes.
- Coordinates effort, and confirms that sub-regional plans are consistent with Swan Region Strategy objectives and targets;
- Defines appropriate indicators to allow ongoing measurement of target achievement; and
- Identifies a monitoring approach to assess progress in achieving targets through time in the context of the Swan Region Strategy

In addition, the Investment Plan:

- Accounts for current effort across and within Themes;
- Coordinates effort across Themes;
- Supports communities in their bids for funding;
- Informs all potential investors about the benefits of improved natural resource management in the region;
- Contains enough information for stakeholder partnerships, investors, and potential investors, to make informed decisions; and
- Shows how the region can achieve best value for money spent in enhancing environmental services and social outcomes.

The investment principles incorporated in the plan are that:

- The top priority public investments are those that generate the greatest public benefits per dollar of public investment.
- Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.
- Investment should not exceed the public benefits that result.

- Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.
- Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.
- Targeted investment in NATURAL RESOURCE MANAGEMENT will be likely to result in an unequal distribution of investment across the region.
- The processes required for setting priorities will involve ongoing learning and need constant feedback.
- Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.

2. SWAN CATCHMENT COUNCIL

The Swan Catchment Council is a community-chaired and led committee with management responsibility for coordinating and supporting natural resource management in the Swan Region. The Council was originally formed as a representative body for integrated catchment management in 1995. Its legal constitution is that of an incorporated association.

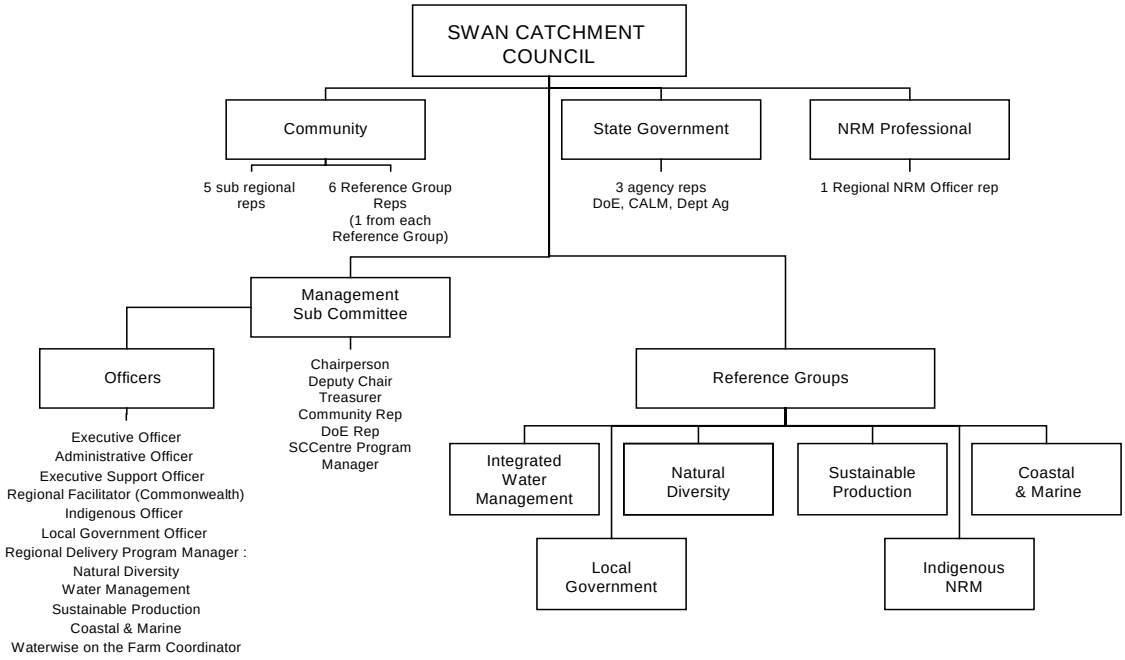
The Swan-Avon Integrated Catchment Management Program was established in 1995 with Commonwealth and State government assistance as a community-driven partnership to protect land and water resources within the Swan-Avon catchment. The vision of the program was to enhance well-being within the urban and rural community in the Swan-Avon catchment through a sense of community interdependence. Working Together (1997) was developed by the Swan-Avon Integrated Catchment Management Coordinating Group to provide a strategic framework. The Swan-Avon Integrated Catchment Management Program is thus supported by the Swan Catchment Council and the Avon Catchment Council, who have a close working relationship.

Besides developing and implementing the Swan Regional Natural Resource Management Strategy the Council attends to a number of other roles:

- supporting and coordinating the activities of community NRM groups in the Swan Region;
- understanding NRM issues and developing regional and local processes to address issues;
- developing and supporting strategic projects to address NRM priorities and attracting funding for these investments, and
- encouraging institutional change in government agencies so that community needs and activities are better addressed and supported.

In preparation for the regional NRM approach from 2000, the Swan Catchment Council reorganized its structure and membership. A working group of the Council prepared a membership model that was representative of community and stakeholders based on partnerships. The model, shown in Figure 5, was adopted and implemented in August 2002.

Figure 5: Structure of the Swan Catchment Council



The Swan Region is now divided into sub regions based on catchments. Each sub region called for nominations from within their region by public notice in August 2002. Nominees were required to address a set of selection criteria and subsequent to election of representatives from each sub region the names were forwarded to the Swan Catchment Council with a profile outlining the skills and experience of the nominees. The existing Committee of the Swan Catchment Council then voted to appoint members to the Council. This was the transitional arrangement to appoint the first democratically elected council and in subsequent years there will be a rolling round of elections with members being elected for biennial terms with half of the community representatives retiring every two years.

State NRM agencies have representation with senior officers from Department of the Environment, Department of Conservation and Land Management, and the Department of Agriculture included as members of the Council. The council also has representatives from local government, education, biodiversity (community environmental groups) planning and coastal and marine interest areas (see Figure 1).

The working groups of council consist of members drawn for their experience and networks within the region. The chairperson of each working group is a member of the Council. The Council directly employs staff and provides an organisational structure for the capacity to deliver on the strategic planning and implementation, as well as the direct engagement of key stakeholder groups.

The Council was nominated as the responsible body for developing the Swan Region Natural Resource Management Strategy, jointly agreed with the Government of Western Australia and the Australian Government under the Bilateral Agreement. As such the Council is responsible for administration of NHT2, and liaison with the Avon Regional Strategy in relation to possible NAP investments in salinity abatement in the Avon Upper Swan Region. Following Accreditation of the Strategy an Agreement

will be set up between the Commonwealth, the Government of Western Australia and the Council which will empower the Council to undertake such tasks as are agreed to be necessary in order to implement the Strategy and the Investment Plan.

3. THE ACCREDITED STRATEGY FOR NATURAL RESOURCES MANAGEMENT

The Swan Region Strategy for Natural Resource Management, which was accredited jointly by the respective Commonwealth and State ministers in November 2004, is about the ecological management of a major urban region. The Strategy incorporates Aspirational Targets, Matters for Target, Resource Condition Targets and proposed Management Actions (together with appropriate indicators for monitoring and evaluation) for each Asset Category. The asset categories are referred to in this Investment Plan as Themes.

The Strategy has articulated seven Aspirational Targets to meet the challenges facing each Theme.

- Improve land condition ands ensure that land use planning and development is sustainable and appropriate to the land capability and suitability.
- Improve the quality, ensure appropriate and environmentally sustainable use, and minimise impacts, to maintain water resources in all aquatic systems in the Region.
- Conserve, maintain and enhance biodiversity and natural habitat of all species in the region's indigenous plants and animals, natural fungi and micro-organisms including their genetic variation, and the functionality of the ecosystems which contain these species.
- Conserve, maintain and enhance coastal and marine biodiversity, and improve marine water quality to ensure the ecological integrity of coastal and marine systems.
- Improve air quality in the region to ensure healthy ecosystems.
- Protect, enhance and incorporate cultural heritage values within the region to achieve sustainable natural resource condition outcomes.
- Build regional capacity to promote attitudinal, behavioural and institutional change to achieve sustainable natural resource management outcomes.

The Strategy also sets out targets for resource condition and management actions under each of the seven Themes. These Matters for Target and their associated Management Actions, which are summarised in Table 6, are the focus of the Investment Plan.

Table 6: Number of Resource Condition Targets and Management Actions in the Swan Region Strategy

Theme	Resource Condition Targets	Matters for Target	Number of Management Actions
Land	2	Land Salinity, Soil Condition	34
Water	7	Aquatic Ecosystems, Nutrients, Turbidity & Particulate Materials, Salinity	91
Biodiversity	3	Native Vegetation, Significant Species, Invasive Species	47
Coastal/Marine	3	Coastal Habitats, Marine Habitats, Marine Fauna	60
Air	2	Air Quality	22
Cultural Heritage		Indigenous history, Institutional Opportunities, Employment in NRM, Partnerships	7
Regional Capacity		Adaptive Management, Strategy Linkages, Regional Structure, Information System	5
Total	17		266

4. MANAGEMENT ARRANGEMENTS

The Investment Plan is consistent with the following documents issued by the Commonwealth:

- *National Guidelines for the Accreditation of Integrated Catchment/Regional Natural Resource Management Plans - Investing in Regional Plans*;
- *National Framework for Natural Resource Management Standards and Targets* (April 2003);

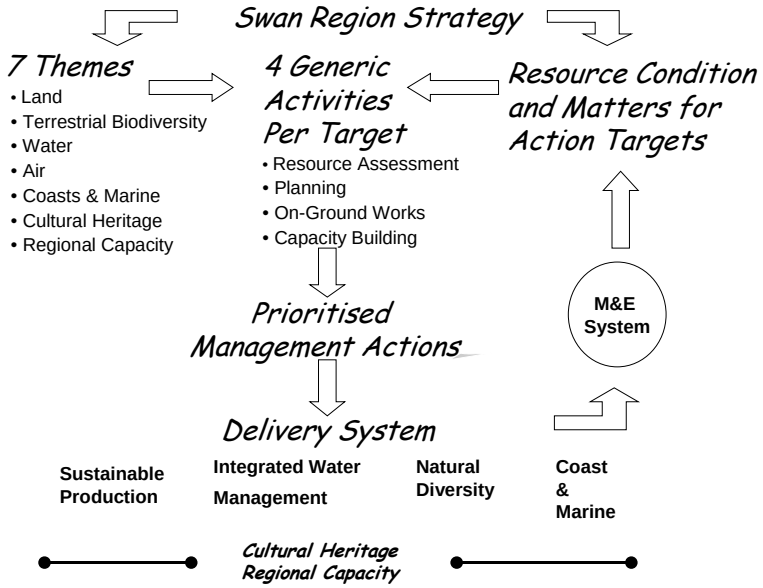
And the following Western Australian State Government documents:

- *Regional Investment Plans Guidelines and Processes* (Joint Steering Committee for Western Australia);
- *Guidelines for the Assessment of Regional Investment Plans* (State Investment Committee, Western Australia);
- *Monitoring and Evaluation Implementation Plan for the National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust (NHT2) in Western Australia* Version 2.4 Dec 2004 (Joint Steering Committee for Western Australia).

The management structure of the Swan Region Strategy follows the *Regional Investment Plans Guidelines and Processes* for Western Australia (Draft 8th September 2004).

The structure of the Investment Plan is illustrated in Figure 6. The Plan integrates the seven Themes, each comprising a number of Management Actions. The latter are classified as: (i) Resource Assessment, (ii) Planning, (iii) On-Ground Works, and (iv) Regional Capacity Building. Each Management Action addresses a Resource Condition Target or a Matter for Action Target. In addition, all Management Actions within a Theme have been grouped under the Matters for Target agreed between the State of Western Australia and the Commonwealth under the Bilateral Agreement.

Figure 6: Structure of the Investment Plan



In common with other Western Australian regions, management of activities under the Strategy will be organised by Four Regional Delivery Programs, called respectively:

- Natural Diversity
- Integrated Water Management
- Coastal and Marine, and
- Sustainable Production

Therefore the Investment Plan presents costs within each Regional Delivery Program, taking account of the fact that each Delivery Program picks up a number of different themes as well as its "core theme". All Management Actions contained in the Cultural Heritage and Regional Capacity Building Themes have been distributed across the four Regional Delivery Programs.

The Monitoring and Evaluation system keeps track of progress in implementation and changed resource condition, and provides the feedback loop leading to adjustment on a rolling basis. In this Investment Plan the Monitoring and Evaluation Framework closely follows the guidelines given in the document *Monitoring and Evaluation Implementation Plan for the National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust (NHT2) in Western Australia* (Version 2.4 December 2004).

5. METHODOLOGY

The priority actions contained in this Investment Plan were developed through an extensive program of stakeholder consultation conducted as a part of the Strategy's development. Swan Catchment Council sees community ownership of the Investment Plan as being essential to its success.

Steps in developing the Investment Framework and Investment Plan are shown in Figure 7. Each step used the Management Actions set out in the Accredited Strategy as its basic framework, and considered all Management Actions explicitly. The Technical Reports thoroughly document the methods used to identify and prioritise investments. Stakeholder workshops were held at each stage in its genesis. The Swan Catchment Council is committed to ensuring that the whole of Swan's community becomes aware of the Strategy and is engaged in its implementation, not least through direct investment.

Priorities were established for:

- Key threats to asset values;
- Management Actions within Themes;
- Balance of aggregate investment across Themes; and
- Project funding

Throughout the series of intensive workshops stakeholders were asked to express their investment recommendations in the context of potential changes in asset values, estimated costs and financial constraints, following the general approach used in Choice Modelling in environmental economics.

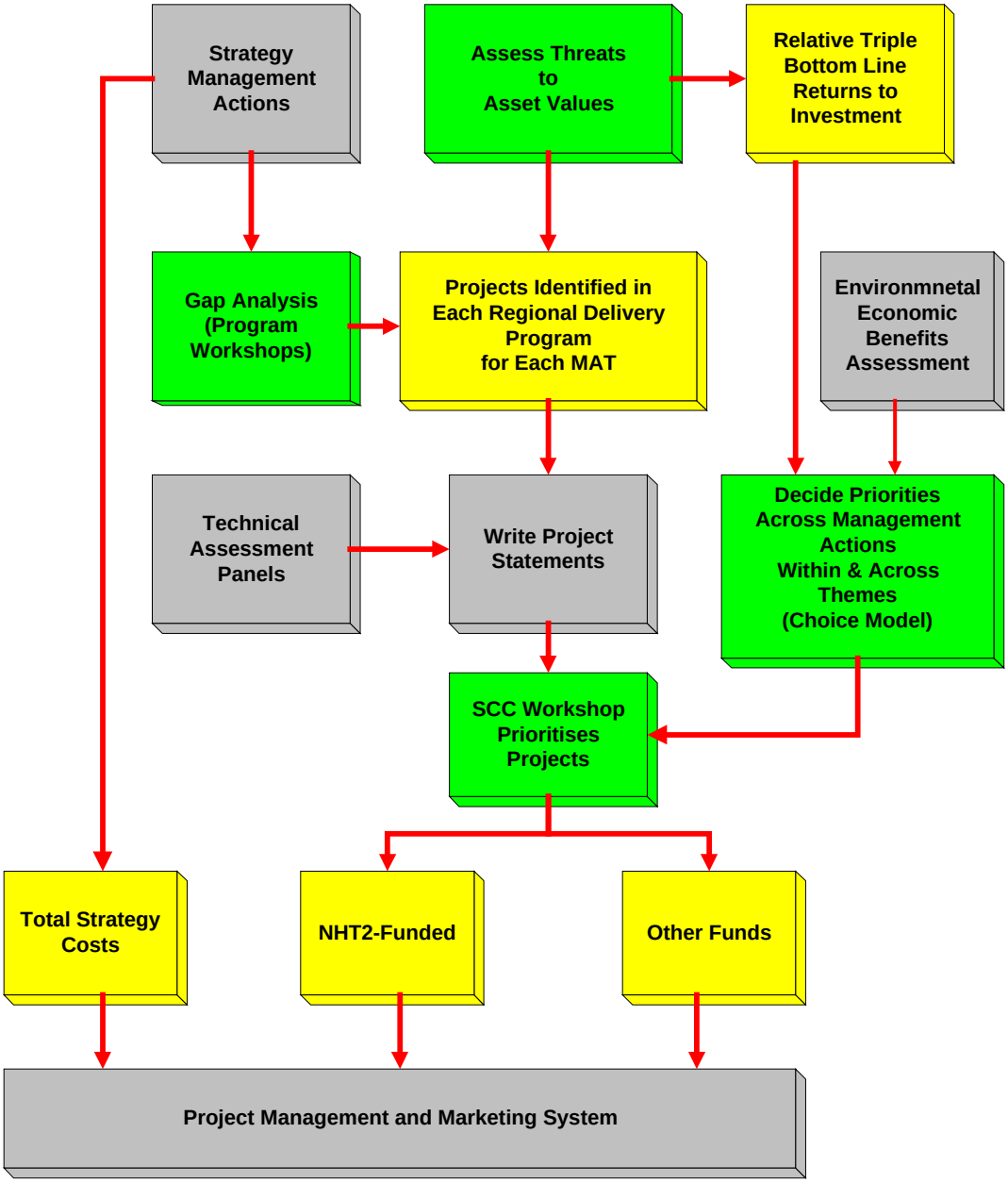
The steps were as follows.

- ***Review Resource Allocation Issues.*** The Swan Region Strategy for Natural Resource Management identifies assets under threat, proposes aspirational and resource condition targets for these assets, develops management options, and derives indicators of performance. During the development of the Investment Framework and Plan, all these aspects of the Strategy were reviewed in the light of the resource allocation issues that are implicit in any Investment Plan.

- ***Consult Stakeholders.*** Development of the Investment Plan involved conducting 13 intensive stakeholder workshops, which are described briefly below, and in more detail in Investment Plan Technical Reports Nos 2, 3, 4, and 7. Meetings were held to determine State and Commonwealth governments' latest thinking about their requirements/preferences for the format of investment frameworks and plans. Notable guideline documents that have been influential in the development of this Investment Plan include (i) *Regional Investment Plans Guidelines and Processes* for Western Australia (Draft 8th September 2004); (ii) *Guidelines for the Assessment of Regional Investment Plans* (State Investment Committee, Western Australia); and (iii) *Monitoring and Evaluation Implementation Plan for the National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust (NHT2) in Western Australia* Version 2.4 Dec 2004 (Joint Steering Committee for Western Australia).

- ***Estimate Total Strategy Costs.*** Desk research was undertaken into all asset categories confirming target scenarios, resource condition outcomes and associated financial cost estimates. Financial budgets were prepared for all management options. The Management Actions are detailed in each Delivery Program Statement and Investment Plan Technical Report No 1. *Total Costs of the Strategy*. This provided estimates of the ***total*** costs of each Strategy Management Action (i.e. not just NHT-funded components, but all costs corresponding to each action that will need to be incurred by all stakeholders). As a part of this task, an Excel-based forward investment plan linking targets with required investments was developed for ongoing use.
- ***Estimate Benefits.*** A review was made of environmental economic studies of the community's willingness to pay for improved natural resource and environmental outcomes in the Swan Region, and "benefit transfer" estimates were made to derive an indicative cost-benefit analysis of the overall Strategy and investments in its principle themes.
- ***Obtain stakeholder agreement about the relative returns to investment across asset /threat categories*** (June 2004). Three stakeholder workshops were held to elicit views on (i) relative "Triple Bottom Line" returns to investment in addressing threats to assets, and (ii) the region's capacity to deal with threats to assets: see Investment Plan Technical Report No 2 *Assessment of the elative returns from Investment Across Assets and Threats*.
- ***Obtain stakeholder agreement about relative total investment priorities across the Strategy's Themes and Management Actions.*** Four stakeholder workshops (held in July/August 2004) were held to elicit investment priorities across management actions and asset categories. These presented participants with alternative scenarios for targets, management practices and associated costs, using a Choice Modelling framework. See Investment Plan Technical Report No 3 *Assessment of the Overall Priorities for Investment Across Themes.*

Figure 7: Schematic of the Investment Plan Methodology



- ***Identify a set of projects to fulfil the Strategy Management Actions.*** Note the difference between a "Project" and a "Management Action". The latter are simply single sentences (or phrases) against each Matter for Target, and they were classified into four types of action: resource assessment, planning, on-ground works and regional capacity building. On the other hand, "Projects" are proposals for activity undertaken by an identified team, with an outline of objectives, methodology, resource requirements, partnerships, funding sources, milestones, outputs,

outcomes and monitoring/evaluation intentions. Projects may contain one or more management actions e.g. they may include resource assessment, planning, on-ground work and ongoing monitoring/evaluation. Given the scale of NHT2 funds, the Swan Catchment Council decided to concentrate the NHT2 resources into a limited number of projects, fulfilling a sub-set of all the management actions required by the Strategy. Also, rather than making an "open call" for project submissions from stakeholders, the Swan Catchment Council decided to consult with an appropriate range of community and industry stakeholders to derive the preferred project set.

- ***Gap Analysis*** This was done in November-December 2004. Projects were identified through a "Gap Analysis" in seven Delivery Program Workshops held in early December 2004, dealing respectively with (i) Natural Diversity, (ii) Integrated Water Management, (iii) Sustainable Production – Agriculture, (iv) Sustainable Production – Industry, (v) Coastal & Marine, (vi) Cultural Heritage, and (vii) Regional Capacity Building. Each workshop identified all current activities addressing the Strategy's Management Actions in the particular Delivery Program, considered their adequacy, identified areas for expanded or new activity, and identified possible funding sources. Project proposals were then developed to address all activities requiring continued or new funding from NHT. (See Investment Plan Technical Report No 4)
- ***Stakeholder Panels*** were established to make technical assessments of all projects, using a standard template. See Investment Plan Technical Report No 5 *Summaries and Technical Evaluations of Proposed Projects.*
- ***Make a priority ranking of existing projects alongside proposed new projects.*** A Swan Catchment Council Workshop considered the outcomes of the previous workshops and finalised the projects proposed for NHT funding. This Project Funding Priorities Workshop required participants to allocate a fixed indicative budget across competing projects and eliminated some projects as far as a NHT2 Regional Funding proposal was concerned. See Investment plan Technical Report No 7 *Project Funding Priorities Workshop*.
- ***Develop Project Statements for NHT funding***. This was done initially for existing NHT-funded projects using a standard template: see Investment Plan Technical Report No 6 *Project Statements*. These were typically around 10 pages of documentation for each project, covering not only their objectives, methodology, resource requirements, partnerships, funding sources, milestones, outputs, outcomes and monitoring/evaluation intentions, but also, importantly, how they incorporated NHT investment principles in their design and why they should be considered as a priority project. Later, Project Statements were also developed for the new projects proposed for NHT funding following the Project Funding Priorities Workshop. One-page Project Abstracts were also produced for use in the Funding Priorities Workshop.
- ***Identify funding areas for other projects*** The Gap Analysis revealed areas for additional investment and projects that were inappropriate or of

lower priority for NHT funding. Potential funding sources were identified. The Swan Catchment Council will use this "unfunded" projects inventory in its forward marketing strategy.

- ***Develop project management systems at Regional Delivery Program level***. While each project put forward for NHT funding has its own work plan, budgets, milestones, outcomes and monitoring/evaluation provisions, there is a need for a management framework that allows Delivery Program Managers to keep track of progress and report as appropriate. This is an ongoing process that will be developed as part of the Monitoring and Evaluation component of the Investment Plan.
- ***Adjust project budgets and timelines*** to obtain overall consistency with likely availability of NHT funds.
- ***Recommend projects for NHT funding to the Joint Steering Committee in March 2005***.

6. MONITORING AND EVALUATION

6.1 Overview

Perceptive natural resource management requires at least three kinds of information, usually termed "indicators" in State of the Environment reports, namely "Pressure", "State" and "Management Response". Figure 8 illustrates the relationships between these three kinds of indicator. "State" and "Management Response" indicators correspond to the Resource Condition Targets and Management Actions given in the Strategy. The Accredited Strategy specifies output indicators for each Management Action Target. Indicators of the pressures on asset values are derived from an analysis of threats. Pressure indicators will be very important guides to required natural resource management investment in this region given the rapid pace of urban development.

An overall division of responsibilities for indicator development to support the Swan Strategy for Natural Resources Management is as follows:

- State agencies, coordinated by the State's Monitoring and Evaluation Coordination Team will provide much of the data required for resource condition monitoring (State indicators). Some of this work in State Agencies will be given financial support from NHT2 Regional Funds for Swan;
- The Swan Catchment Council will provide Response indicators in the form of its reports on output achievements;
- The Swan Catchment Council will be working on further defining its requirements for Pressure indicators

6.2 Proposed Allocation of M&E Functions

6.2.1 Monitoring

Swan proposes to make the monitoring and evaluation function a responsibility of the Regional Delivery Program Managers. Program managers will be continuously monitoring:

- Management actions & targets
- Output achievement

They will be supported in this by a new position dedicated to the supply and interpretation of monitoring and evaluation data. This officer will also liaise with the State Monitoring and Evaluation Coordinating Team through the Executive Officer of the Swan Catchment Council.

6.2.2 Regional Evaluations

The Swan Catchment Council proposes to perform an annual evaluation of all Regional delivery programs. This will take the form of a Council consideration of

- Presentations and written reports (including output indicators) from the Regional Delivery Program Managers;
- Commissioned technical assessments of the Regional Delivery Program reports.

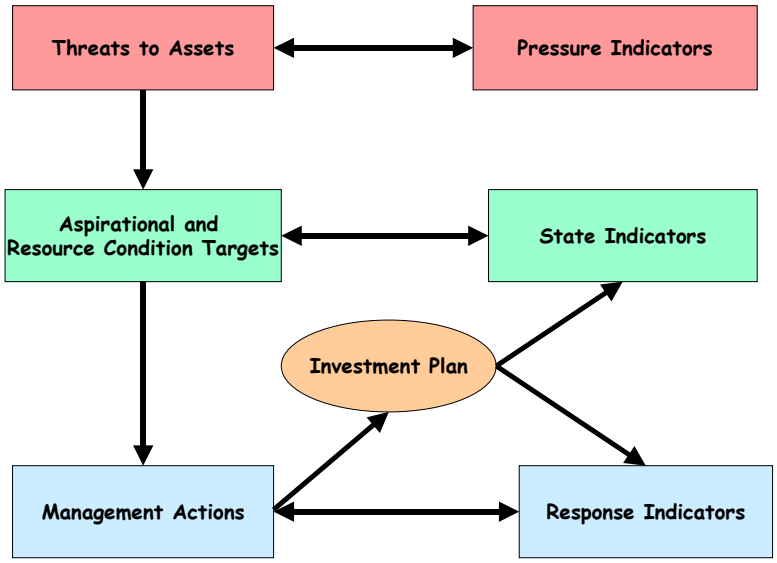
6.3 Resource Condition Targets

Many of the Resource Condition targets set out in the Strategy will be developed during its first year.

As with other WA regions, Swan is highly reliant on state agencies for resource condition monitoring data and expertise. It is anticipated that any gaps between the current state agency resource condition monitoring programs and what regions need will be covered by a large cross-regional/ cross-agency project funded through the NHT2 2004-05 Strategic Reserve for Western Australia. This state-wide project is intended to supply regions the resource condition indicators they need in the most efficient way possible by using a coordinated approach with requirements agreed between each region and state agencies. The Swan Region will provide input about direction of its investments, and resource condition monitoring needs.

However, planning for the state-wide project will be done after the deadline date for submission of this Investment Plan.

Figure 8: Indicators for Monitoring and Evaluation



The following projects having a strong Monitoring and Evaluation component have been included in the NHT2 funding proposal.

- Coastal Condition Evaluation
- Marine Fauna Mapping
- Water Quality Monitoring & Evaluation Framework
- Tracking & Auditing Small to Medium Sized Enterprises

These projects account for $750,000 of NHT2 funds in their first year. If the resource condition monitoring need is to be provided from current State programs or is funded through the Strategic Reserve Project, some of the Regional Investment funds previously allocated to these projects will be used for the next priorities in the Strategy. The projects would not necessarily disappear altogether as they contain activities and outputs that may not be provided by the State-level effort. This will be discussed with the State Monitoring & Evaluation Coordination Team, as their work progresses.

Other aspects of the Strategy will require additional information for monitoring and evaluation, notably the Sustainable Production Delivery program and the Natural Diversity Delivery Program.

During 2005 Regional Delivery Program Managers will be further assessing their monitoring and evaluation data requirements, and interacting with the State Monitoring and Evaluation Coordination Team to define ongoing responsibilities.

6.4 Monitoring and Evaluation Costs

The Investment Plan has budgeted for the following monitoring and evaluation costs in addition to the costs built in to the Regional Delivery program management structure.

- Monitoring and Evaluation Officer
- Costs of transfer of resource condition monitoring data from current state agency programs
- Information requirements covering interests/ gaps specific to the Swan Region, including Pressure indicators
- Reporting costs

The level of the appointment has not yet been determined. It has been assumed that the cost will be $115,000/year, using the standard full time equivalent (FTE) covering salary and superannuation entitlements and including operational and overhead costs associated with the position. This figure has NOT been included in the 100% Indicative NHT2 Funding proposal. It has been assumed that the costs would be covered within the 125% funding proposal that regions have been allowed.

PART C: REGIONAL DELIVERY PROGRAMS

PART C: REGIONAL DELIVERY PROGRAMS

1. OVERVIEW

1.1 Natural Resource Management Challenges for the Swan Region

The Swan Region contains Australia's fourth largest metropolitan area, housing 1.4 million people. This population is growing faster than the Australian average. The State's economy is growing through developments in the minerals and energy industries, agriculture, its diversifying basic processing industries and tourism. Perth is the central place from which enterprises through the State are managed. Fremantle is the principle port of entry for all manner of imported goods and the export of agricultural commodities. The industrial complex at Kwinana on the shore of Cockburn Sound is the State's principle centre of heavy processing industry and export of manufactured commodities.

The Region's environment sets it apart, and makes Perth, still, one of the most liveable cities in the world. But environmental quality is under severe threat on many fronts, and especially for the indigenous Nyoongar people, who know better than most the nature of the land.

The Region covers an area of some 9,100 km^2, of which approximately 20% is sea, 30% is the sandy Swan Coastal Plain and 50% km^2 the dissected western slopes of the Darling Range. The built-up area is approximately 1,300 km^2, extending some 80km north-south along the coast, with corridors spreading up the Swan valley, along the ridge hill shelf and into the Darling Range in places. The Metropolitan Region Scheme extends well beyond the existing built-up area, and covers approximately 54% of the entire region.

Even before the current extensive urbanisation, most of the Coastal Plain, and a significant portion of the Northern Jarrah Forest that covered the Darling Range, was felled, cleared for agriculture, or excavated for mineral uses. The survival of the existing forest can be attributed partly to the unsuitability of much of its terrain for agricultural clearing and also to the closed catchments policy adopted in the early twentieth century for some of the water supply catchment areas. However, pristine remnant vegetation is found in only a few places. Native vegetation has been attacked by dieback spread by human movement, and this affects remaining vegetation complexes not only of the Darling Range, but also of the coastal plain. The clearing of native vegetation for urban and agricultural use in the Darling Range quickly led to hydrological changes and mobilised salts, producing land and stream salinity. Most of the remaining fresh water streams, namely those where the vegetation was retained, have been dammed for water supply, and local groundwater has been drawn down during an extended period of below-average rainfall. Wetlands have been drained and filled, sometimes mobilising the acids in soils following disturbance of areas of organic sediment. The hydrodynamics, shorelines and water quality of the Swan-Canning estuary from the previously closed river mouth at Fremantle; to Kent Street Weir on the Canning River and upstream to Midland on the Swan River have been fundamentally modified. Thus, human occupation has had an enormous impact on the landscape and water systems.

Added to this, the operation of a large and growing city threatens air, biodiversity, rivers, lakes, estuaries, and coastal environments. This occurs through the sheer pressure of activity, materials and fuel consumption, waste products, recreational activities, and wastewater and stormwater discharges. The city's water supply has been restricted for most of the last 15 years, following declining rainfall and runoff, and growth in usage as the population grows. Controlled and uncontrolled burning of the native vegetation plus the use of wood for heating homes creates an issue for air quality. The naturally low nutrient status of the soils has led to high levels of fertiliser use in agriculture, horticulture, urban parks, sporting grounds and household gardens. This has produced very serious impacts on aquatic environments, particularly algal blooms, which are all the more serious given the naturally low nutrient levels of the original riverine, lacustrine, estuarine, coastal and marine aquatic environments. Offshore sediments have been disturbed (e.g. for shipping access to Cockburn Sound), sea grasses upon which much of the aquatic life depends have suffered from pollution. Recreational activities have had widespread impacts on water quality and aquatic biodiversity.

The Swan Region Strategy and its Investment Plan recognise these linkages by (i) presenting a package of management actions that, while they are presented within seven main asset categories, integrate across categories; and (ii) proposing many multiple-purpose management actions.

1.2 Layout of Delivery Program Statements

The following sections provide statements of planned investments within each Regional Delivery Program. The same format is used for each, as follows:

- ***Rationale*** is a short statement of why the particular collection of projects forms a coherent group for management, and briefly describes the threats to assets values that the program addresses.
- ***Targets*** gives the Matters for Target and the Resource Condition targets that have been adopted for the Delivery Program. The targets for the Cultural Heritage Theme and the Regional Capacity Theme have been allocated across the four Regional Delivery Programs. This section also discusses, under each Mater for Target, (i) the asset values at risk, and (ii) the threats that will lead to a decline in asset value if nothing is done. The workshops on which these assessments were based are reported in Investment Plan Technical Report No 2 *Assessment of the relative returns from investment across assets and threats*.
- ***Stakeholder Priorities*** gives a summary of the relative emphasis for investment that stakeholder workshops attached to the Program Theme. Full details are given in Investment Plan Technical Report No 3 *Assessment of overall priorities for investment across themes*.
- ***Total Program Cost*** summarises the ***total*** investment estimated to be required from ***all*** stakeholders in order to address each Matter for Target, broken into four types of action, namely (i) Resource Assessment, (ii) Planning, (iii) On-ground Action and (iv) Regional Capacity Building. The Investment required each year is also shown. Full details are given in Investment Plan Technical Report No 1 *Total Costs of the Strategy*

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- ***NHT2 Funding Proposal*** describes the individual sub-programs and projects that were selected for NHT2 funding by a Swan Catchment Council Workshop. Full details are given in Technical Report No 5 *Project Funding Priorities Workshop,* and Technical Report No 6 Project Statements.
- ***Other Potential Projects*** describes projects that may be funded independently of NHT2, or which may be proposed for support by NHT2 if funds permit. Full details of how these projects were generated are given in Investment Plan Technical Report No 4 *Evaluation of current project activities and gaps against Strategy Management Actions and Future Marketing Strategy*.
- ***Outcomes*** is a statement of the expected natural resource and environmental outcomes that can be expected to occur from the Program.

2. NATURAL DIVERSITY REGIONAL DELIVERY PROGRAM

2.1 Rationale

The Strategy draws attention to the very high level of threat to biodiversity values that exists in the region. In general, many stakeholders feel that fundamental changes are needed to current planning principles if the region is to retain adequate representation of biodiversity. Politically bold actions will be needed if common property natural endowments are to be retained for the future.

Threats to terrestrial biodiversity cluster around prevention of the clearing or loss of threatened native vegetation, biodiversity decline, ecosystem fragmentation and habitat loss. These factors are particularly threatening on the Swan Coastal Plain.

The Natural Diversity Program integrates effort across a number of specialist natural diversity projects, and is presented in four sub-programs, dealing respectively with (i) Local Diversity Management, (ii) Threatened Species and Communities, (iii) Biodiversity Training and (iv) the Program Implementation Framework.

2.2 Targets

2.2.1 Native Vegetation Communities Integrity

Resource Condition Target:

- ***50% of all priority native vegetation complexes in each IBRA sub region identified for inclusion into the conservation reserve system to meet Comprehensive, Adequate and Representative (CAR) criteria, acquired by 2010***

The preservation of an adequate and representative set of reserves will enrich the region by maintaining the full range of endemic landform/soil/vegetation complexes. Ecosystem integrity that is essential to species survival requires the creation of reasonably large inter-linked areas, and not just the protection of small, isolated remnants. There are currently not enough corridor links. Pocket parks are not bio-diversity sustainable.

2.2.2 Significant Species and Ecological Communities

Resource Condition Target:

- ***50% of critical habitat for identified significant species and ecological communities protected by 2014***

Many of the flora and fauna species at risk are endemic to the region, and it is the areas of highest diversity that face the most risk. There is limited understanding of the population dynamics of many threatened species. Table 7 shows the number of species that the Strategy considers to be critically endangered or potentially threatened.

Table 7: Number of terrestrial species that are endangered or potentially threatened.

	Number Critically Endangered	Plus Number Potentially Threatened
Flora	34	110
Invertebrates, insects, spiders	3	9
Birds	8	10
Frogs	n.a.	n.a.
Mammals	6	7
Reptiles	2	3

2.2.3 Ecologically Significant Invasive Species

Resource Condition Target:

- ***Reduction in impact of regionally significant invasive species by 2020, with a quantified target set by December 2005***

The *Phytophthora* dieback disease is a major risk to native vegetation. Invasive exotic plants, which replace native species, alter the structure of ecosystems and increase risks. Feral cats, and foxes are key targets for control programs, and are an essential ingredient in the protection of significant fauna species (see above).

2.2.4 Cultural Heritage

Management Action Targets:

- ***Research, record, and publish Nyoongar history of the Swan Region by 2009.***
- ***Review and identification of opportunities in policy and legislation to include Indigenous cultural heritage by 2009***
- ***Increase Indigenous employment and participation in NRM activities locally and regionally by 2009.***
- ***Achieve 75% per cent increase in the number of community, LGA's and State government agencies involved in NRM incorporating indigenous cultural heritage included as part of their processes by 2009.***
- ***Establish partnerships to further incorporate NRM principles into heritage protection by 2008.***

The Natural Diversity Program's contribution is a 33% share of all target management actions of the Cultural Heritage Theme Strategy.

2.2.5 Regional Capacity Building

Management Action Targets:

- ***Establish a framework for continuous improvement through adaptive management by 2005***
- ***Establish subregional and local consistency and linkages to the Strategy by 2008***
- ***Review and apply a regional governance structure with security of tenure by 2005***
- ***Develop a regional capacity framework supported by an integrated regional management information system by 2006.***

The Natural Diversity Program's contribution is a 25% share of all target management actions of the Regional Capacity Building Theme Strategy.

2.3 Priorities from Stakeholder Workshops

Participants in the workshops produced a considerable list of areas for investment to maintain or enhance the values of terrestrial biodiversity including forest, woodlands, heath lands and wetlands (particularly damp lands) in the region. See Investment Plan Technical Report No 2 *Assessment of the Relative Returns from Investment Across Assets and Threats*.

The Choice Modelling workshops indicated that stakeholders view the Natural Diversity Program, along with the Integrated Water Management Program, as meriting a large part of the total natural resources management budget for the Region. Choice sets containing the full set of Strategy Management Actions in this Program were generally preferred. See Investment Plan Technical Report No 3 *Assessment of the overall priorities for investment across themes.*

Environmental economics research indicates that the community expresses a high willingness to pay for species preservation. See Part B Section 6.

2.4 Total Costs for the Natural Diversity Regional Delivery Program

Matters for Target, the Management Actions proposed for each of them and indicative total costs to all stakeholders are detailed in Investment Plan Technical Report No 1 *Total Costs of the Strategy*.

Estimated total costs of all Management Actions for the Natural Diversity Program, shown in ground actions account for a further 38% of estimated total activity costs.

Table 8, amount to $50.9 million over the first three years of the Strategy. Actions addressing vegetation integrity predominate, accounting for 80% of the total. The Bush Forever Program, with 3-year expenditure in the Swan Region of around $23 million accounts for a major part of this, but on-ground actions in the management of land within and outside of reserves is another major component. Other important parts of the Strategy address Ecological Species and Communities and Invasive Species. Over a half (54%) of all expenditure is for Planning (mainly the Bush Forever Program), while on-ground actions account for a further 38% of estimated total activity costs.

Table 8: Estimated Total Costs for the Natural Diversity Regional Delivery Program

Type of Action	Matter for Target				Total 3-Year Cost ($000s)	%
	Vegetation Integrity	Ecological Species & Communities	Invasive Species	Other Themes		
Resource Assessment	1,553	230	690	192	2,664	5.2%
Planning	25,415	1,553	115	182	27,265	53.5%
On-Ground Action	12,420	3,585	2,118	96	18,218	35.8%
Regional Capacity Building	1,093	748	633	321	2,794	5.5%
Total	40,480	6,115	3,555	791	50,941	100.0%

2.5 NHT2 Regional Funding Proposal Summary

The methodology for project selection and development is given in Investment Plan Technical Report No 4 *Evaluation of Current Project Activities and Gaps Against Strategy Management Actions*; Technical Report No 5 *Project Funding Priorities Workshop;* and Technical Report No 6 *Project Statements*. The NHT2 funding proposal is divided into two parts: Section 2.5.1 gives the recommended project set for 100% Indicative Funding, and Section 2.5.2 gives the additional activities that could be supported with an additional 25% Regional Allocation.

2.5.1 100% Indicative Regional Allocation

Nine projects of this Program's projects were selected for inclusion in the NHT2-funded part of the Investment Plan, assuming 100% Indicative Regional Allocation.

Five of these are currently NHT-funded projects: namely the *Western Swamp Tortoise Recovery Project*; *Threatened Ecological Communities of the Swan Coastal Plain*; *Perth Biodiversity Project*; the *Dieback Working Group*, and *Skills for Nature Conservation.* The Technical Panels assessed these projects as having a high level of past achievement, strong incorporation of NHT principles in project design, and good prospects of future success.

Four new projects are proposed for NHT2 funding. Two of these, namely *Recovery of Threatened Flora of the Swan Coastal Plain* and *Recovery of Threatened Fauna of the Swan Coastal Plain* are responses to the Gap Analysis that clearly indicated deficiencies in current investment levels in dealing with threats to natural diversity within the Region. The other two new projects are forward-looking and represent an attempt to cope better in future with natural diversity protection. The project titled *Predictive Mapping Tool for Threatened Species and Communities* directly addresses the problem of building natural diversity protection into the planning system, by flagging areas of land that are likely to support threatened species or communities. The project *Biodiversity Action Learning Program* is an exciting new approach to regional capacity building. The Technical Panels rated each of these four projects as "high".

Table 9: Projects in the Natural Diversity Program proposed for NHT2 Regional Funding in 2004-05 and 2005-06

Project Title	2004-05	2005-06
Local Diversity Management Sub-Program:		
Perth Biodiversity Project [1]	430,000	417,000
Dieback Working Group [1,2]	0	106,000
Threatened Species and Communities Sub-Program		
Threatened Ecological Communities [1,2]	0	196,000
Predictive Mapping Tool for Threatened Species & Communities		160,000
Threatened Terrestrial Fauna Recovery	0	93,000
Western Swamp Tortoise Recovery Plan [1,2]	0	120,000
Threatened Flora Recovery	100,000	100,000
Biodiversity Training Sub-Program:		
Biodiversity Action Learning Program	0	324,000
Skills for nature Conservation	101,000	101,000
Natural Diversity Implementation Framework:		
Natural Diversity Implementation Framework	587,000	587,000
Total Natural Diversity	1,218,000	2,204,000

Notes:

1. These are existing NHT-funded projects.
2. These projects required zero Regional Allocation funds in 2004/05 as they were funded from other sources.

2.5.2 Plus 25% Regional Allocation

A further five projects have been nominated for supplementary funding against a possible 25% increase in the Regional Allocation. These are shown in Table 10.

Table 10: Supplementary Funding Proposals for the Natural Diversity Program

Priority	Project Title	Funds Required ($/2Yrs)
1.	Perth Biodiversity Project Extension	300,000
2.	Weeds Officer	200,000
3.	Carnaby's Cockatoo Recovery Plan	240,000
4.	Perth Fungi Diversity	438,000
5.	Guidelines for Rural Landscaping	30,000

The projects/project extensions given in Table 10 are described within each Sub-Program Statement.

2.6 Sub-Program - Diversity Management

2.6.1 Features

2.6.1.1 Activity Type

20% resource assessment, 25% planning, 25% on-ground and 30% capacity building.

2.6.1.2 Assets addressed

Regional Capacity and Biodiversity.

2.6.1.3 Threats addressed

Habitat Loss, Ecosystem fragmentation, Native vegetation clearing, Fire Management Regimes, Altered hydrology, Exotic Plants, Feral animals, Plant diseases, Clearing and filling wetlands, Fragmentation of natural resources.

2.6.1.4 Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
	Regional Capacity		RCM1.4
Native Vegetation Communities Integrity.	BR1a - The comprehensiveness, adequateness and representativeness (CAR) of the protected area system (including formal reserves and off-reserves) is improved by 50% by 2015, based on 2005 baseline data BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.3 BM1.5	BM1.1 BM1.2 BM1.4
Significant Species and Ecological Communities	BR2- 50% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005.	**BM2.2** BM2.3	
Ecologically Significant Invasive Species.	BR3- Reduction in impact of regionally significant invasive species by 2020.	**BM3.1** BM3.3	
Estuarine, Coastal and Marine Habitat Integrity	CMR1- Maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites by 2020.		CM1.1
Aquatic Ecosystem Integrity	WR1- Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites by 2020 (rivers / waterways).		WM1.1 WM1.2
Aquatic Ecosystem Integrity	WR2- Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites by 2020 (wetlands).		WM2.1 WM2.2 WM2.4
Land Salinity	LR1- Reduction in the area of land affected by salinity within the Avon Upper Swan National Action Plan Region, by 2020.		LM1.1
Soil Condition	LR2- Maintain and improve soil condition as measured at representative sites, including extent of water erosion, water logging and acid sulfate soils by 2020.		LM2.1 LM2.2 LM2.5

2.6.1.5 *Budget*

Table 11: Proposed budget for the Local Diversity Management Sub-Program

	NHT	State	Other
Year 1	$430,000	$150,000	$83,000
Year 2	$523, 000	$158,000	$95,000
Year 3			

Note that the Dieback Working Group has no demand on NHT2 Regional Funds for 2004-05, as it is funded from another source.

2.6.2 Projects

2.6.2.1 *Perth Biodiversity Project (ND01)*

The Perth Biodiversity Project aims to build the capacity of Local Government to develop local biodiversity plans and strategies, to incorporate these into their Town Planning Schemes, and to professionally manage natural areas under their control, using ecological principles.

The project will give direct assistance and training in biodiversity planning to seven Local Governments, assist managers of natural areas to apply the Natural Area Initial Assessment Template and address threats, and provide training and a CD containing regional native vegetation mapping and information to community groups. It will assist Local Government in planning and implementing on-ground projects under a targeted grants program and trial the use of a natural area database in 2 Local Government areas, before distributing to all 31 Local Governments. The Perth Region Plant Biodiversity project will be implemented in collaboration with DoE and CALM and results from the Birds Australia Bird Surveys on 30 Local Government reserves will be distributed. An incentives program for private land conservation will be implemented across participating Local Governments and administrative support will be given to the Natural Areas Managers' Network. Capacity change will be supported through presentations to councillors, professional forums, assisting in approvals processes with State Government, as well as commentaries on related policies such as the Public Open Space Policy, negotiations about Senior Planner positions in the Department for Planning and Infrastructure and at Local Government level, and production of design guidelines for urban bushland areas.

Technical Assessment: High

2.6.2.2 *Dieback Working Group (ND02)*

The project builds the capacity of Local Governments and the community to address the threat to bushland posed by *Phytophthora* Dieback. The project will continue to determine whether *Phytophthora spp* are present within bushland reserves assessed by local government under Perth Biodiversity Project, and undertake a mapping and prioritisation schedule for high-value bushland. Management Plans will be prepared, and an audit process will be developed to monitor adoption and implementation of appropriate management practices. *Phytophthora*-infested reserves will be treated with phosphite. Local Government officers preparing management plans will be mentored and training workshops and awareness-raising activities will be undertaken. The program will be extended to the remaining 14 Local Governments within the

Swan Region that belong to the Dieback Working Group. Communications activities will be widened with newsletter, meetings, and expansion of the Dieback Working Group membership. The new communications strategy will also be put into effect.

This project has existing SCC funding for 2004-05.

2.6.2.3 *Proposed Extension for +25% - Perth Biodiversity Project*

This proposed extension to Perth Biodiversity Project would employ an officer to provide ecological expertise to assist local governments undertaking ecological assessment utilising the *PBP Natural Area Initial Assessment Template* as part of their development and implementation of their Local Biodiversity Strategy. An additional $50,000 would also be provided to local government under the targeted grants component. This would be used to encourage local government to undertake activities relevant to the development and implementation of Local Biodiversity Strategies.

Technical Assessment: ***High***

2.6.2.4 *Proposed project for +25% funding - Weeds and Pest Officer*

There is a need for overall coordination of information on weeds and pests and their management. There is no 'one stop shop', which makes it easy for Local Government or community to access information on weed and pest species and best management practice for control. There is also a need for a central database of information on spread of pests and weeds to prioritise actions. Weeds and pests are a threatening process to biodiversity in the Swan Region.

A dedicated weeds and pests officer would coordinate the information accumulated in agencies, Local Government and community and provide a two-way flow of information. This position would enable easy access to information and prevent duplication of effort. The officer could inform the Swan Catchment Council and other organizations on how best to target and prioritise management effort. The position would also support implementation of the State Weeds Strategy.

Technical Assessment: ***Medium***

2.6.2.5 *Proposed project for +25% funding – Perth Fungi Project*

The fungi are important components of natural diversity in the Swan Region, and contribute to the health of other species. The species, their spread and importance are poorly known, and there is a need for surveys, mapping and information dissemination.

This project will promote the inclusion of fungi for biodiversity conservation and management of bushland. It will achieve this by building data sets and documenting and disseminating the information to land managers. A particular component involves providing on-line a publicly available illustrated information base of bushland fungi for the first time. The project also aims to involve community groups in further surveys. The project would (i) create accurate data sets of fungi species in Perth urban bushlands; (ii) produce an illustrated on-line information base of the fungi – a *Fungibase* akin to *Florabase*; and (iii) build a permanent reference collection of urban bushland fungi at the WA State Herbarium.

Technical Assessment: ***High***

2.6.3 Outputs

Number of other decision support tools developed.
Number of written products such as brochures, newsletters, posters or fact sheets developed.
Number of training sessions, workshops, seminars or other skills and training events conducted and Number of participants in person-days.
Number of workbooks, course notes or other key materials developed.
Area of coastal native vegetation enhanced / rehabilitated.
Area of wetland native vegetation enhanced / rehabilitated.
Area of riparian native vegetation enhanced / rehabilitated.
Area of terrestrial native vegetation enhanced / rehabilitated.
Area of pest plant control measures implemented.
Area (ha) of pest control (vertebrates) measures implemented.
Area (ha) of plant disease control measures implemented.

2.6.4 Outcomes

The Sub-Program will continue to strengthen the skills of stakeholders, and particularly Local Government, in local natural diversity management and dieback identification and control. This will considerably improve the prospects for retention and conservation of areas of remaining natural vegetation.

2.7 Sub-Program - Threatened Species and Communities

2.7.1 Features

2.7.1.1 *Activity Type*

20% resource assessment, 20% planning, 40%on-ground and 20% capacity building.

2.7.1.2 *Assets addressed*

Biodiversity; Regional Capacity.

2.7.1.3 *Threats addressed*

Habitat Loss, Ecosystem Fragmentation, Native Vegetation Clearing, Fire Management Regimes, Altered Hydrology, Climate Change, Exotic Plants, Feral Animals, Plant Diseases, Clearing and Filling Wetlands, Fragmentation of Natural Resources.

2.7.1.4 *Relationship to Implementation of Strategy*

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Native Vegetation Communities Integrity.	BR1a - The comprehensiveness, adequateness and representativeness (CAR) of the protected area system (including formal reserves and off-reserves) is improved by 50% by 2015, based on 2005 baseline data BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.6	BM1.1 BM1.2 BM1.3 BM1.4
Significant Species and Ecological Communities	BR2- 50% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005.	BM2.1 BM2.2 BM2.3	BM2.5
Ecologically Significant Invasive Species	BR3- Reduction in impact of regionally significant invasive species by 2020.		BM3.3
Aquatic Ecosystem Integrity	WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005).		WM2.1

2.7.1.5 *Sub-Program Budget*

Table 12: Proposed budget for the Threatened Species and Communities Sub-Program

	NHT	State	Other
Year 1	$100,000	$404,000	
Year 2	$473,000	$534,000	$49,500
Year 3			

Note that there is existing funding in 2004-05 for the Threatened Ecological Communities and Western Swamp Tortoise projects, which are funded by NHT through SCC, but through the Regional Allocation.

2.7.2 Projects

2.7.2.1 *Threatened Ecological Communities (ND03)*

This project will prevent further decline and maintain the most endangered (CR and EN) Threatened Ecological Communities (TECs) in the Swan Region by implementing the most urgent actions identified in the Interim Recovery Plans (IRPs) for these Critically Endangered TECs. In addition, other high priority actions identified by the Recovery Teams for these TECs will be pursued. The

implementation of recovery actions for TECs has commenced under a previously funded NHT project.

Actions include, but are not limited to:

- habitat assessment, mapping and monitoring, including identification of new occurrences.
- threatening process assessment, mapping and monitoring
- planning and implementation of habitat management, such as fencing and access control, control of weeds, dieback management and treatment, fire planning and management, rehabilitation.
- systems and programs of investigation, research and adaptive management of TEC occurences.
- captive breeding of significant fauna species, and propagation of significant flora species.
- production and dissemination of interpretive material.
- liaison and coordination with decision making authorities and other stakeholders to promote and enable the achievement of the project outcome.

2.7.2.2 *Predictive Mapping (ND04)*

The project will develop a GIS system that will enable a more coherent prediction of what threatened species, ecological communities and biodiversity values may be located in any particular area. Much of the region's remnant vegetation is subject to development, and advice is currently provided by a reactive, fragmented and time consuming approach. This project will allow better consideration of important biodiversity values in decision-making, and will provide information to better identify and prioritise significant areas. The first stage will develop a GIS tool to interrogate existing datasets based on geographic proximity. Annotation of specialist, species-specific or habitat-specific information will then be provided to assist interpretation. (eg. x species is restricted to x landform). The project will also include provision for update of digital and GIS databases from existing paper based records, and for targeted field assessments to address major gaps in the data. Future predictive modelling will be determined based on the project findings and would include field research and use of indicator species.

Technical Assessment ***High***

2.7.2.3 *Western Swamp Tortoise Recovery (ND05)*

The long-term aim of this project is to decrease the chance of extinction of the critically endangered Western Swamp Tortoise by implementing priority actions of the Recovery Plan. Actions address priority threats to the species (feral predators, changes to hydrology, reduced population size, lack of knowledge) and are carried out on the known remaining, (and possible future) habitat of the species. Actions include management and monitoring of existing habitat, captive breeding, monitoring of wild and captive populations, translocation to new sites, and ongoing research and monitoring.

The Western Swamp Tortoise is one of the world's most endangered tortoise or turtle, with less than 50 mature individuals in existence. The species is listed under State,

National and international lists of threatened species. The implementation of the WST Recovery Actions over the past 10-15 years has made considerable progress towards being able to move the species to 'Endangered' however, the long time to sexual maturity (10-15 years) and large generation time (at least 40 years) means that progress is slow and a long-term commitment is required. The WST Recovery Plan has been funded by the Endangered Species Program since 1998.

Technical Assessment - High

2.7.2.4 *Threatened Flora Recovery (ND06)*

There are 34 species of plant in the Swan Region that are listed in the State list of declared Rare Flora, in addition a further 80 plant species are considered potentially threatened, however insufficient information is available to adequately determine their status. A further 30 species are known to be rare, but not thought to be currently under threat. Together with the rapid rate of clearing of vegetation for development, the status of flora in the Swan Region is declining.

This project will implement priority recovery actions for the most endangered plant species in the region, including seven critically endangered plant species: the Baby blue orchid, Cinnamon Sun Orchid, Curved-leafed Grevillea, Grand Spider Orchid, Split-leaved Grevillea, Swamp Starflower, Narrow Curved-leafed Grevillea (listed in decreasing order of threat), or are at risk of increase in status to Critically Endangered. Priority recovery actions will also be carried out for other threatened flora species in the region where they co-occur with populations of Critically Endangered species. The project deals with threatening processes at the point where those processes are having acute impacts (species extinction). The project is carried out in significant areas of bushland and wetlands. This will provide broad benefits for these areas and provide information and demonstration of management actions that are applicable elsewhere.

Technical Assessment - High

2.7.2.5 *Threatened Terrestrial Fauna Recovery (ND07)*

The most threatened fauna in the Region (in decreasing order) are the Crystal Cave Crangonyctoid, Western Swamp Tortoise, Carnaby's Black-Cockatoo, Graceful sun moth, Native bee *Leioproctus douglasiellus*, Native bee *Neopasiphae simplicior*, Forest Red-Tailed Black Cockatoo, and Quokka. This project relates to the 4th to 8th ranked species highlighted above. The most endangered Crangonyctoid is included in the Ecological Communities project previously described, the 2nd is in the Western Swamp Tortoise project described below, and the 3rd forms the Carnaby Cockatoo project.

The vertebrate species (the Quokka and Forest Black Cockatoos) occur in the region's jarrah forest and will be managed together as multiple threatened species. This project will collate historical information relating to these species, implement high priority recovery actions, assess habitat variables that predict species occurrence and, using this information, produce guidelines to direct future management. Joint recovery plans will be written for the invertebrate species (the Sun Moth and Native Bees) occurring on the coastal plain. Information will be collated and updated, and suitable habitat will be mapped.

Technical Assessment - High

2.7.2.6 *Proposed Extension for +25% allocation - Carnaby's Black Cockatoo Recovery*

Carnaby's Black-Cockatoo, *Calyptorhynchus latirostris*, is endemic to Western Australia, and is listed under State and Commonwealth endangered species lists, and is the second most endangered vertebrate species in the Swan Region (after the Western Swamp Tortoise). The Swan Coastal Plain is recognised as a highly significant feeding area for Carnaby's Black Cockatoo during its non-breeding season. The main threats facing Carnaby's Black-Cockatoo on the Swan Coastal Plain are related to large-scale clearing, particularly for urban and commercial development.

This project aims to utilise comprehensive community based surveys, along with targeted assessments and surveys to identify significant habitat for an endangered Western Australian endemic species, Carnaby's Black-Cockatoo, *Calyptorhynchus latirostris*, on the Swan Coastal Plain. The survey results would be compiled in a database and used to establish how and where Carnaby's Black-Cockatoo uses vegetation on the Swan Coastal Plain. From this information, management guidelines will ultimately be developed and disseminated to relevant stakeholders.

Carnaby's Black-Cockatoo is an iconic, charismatic species: popular, visible, mobile, well known and loved. For this reason it can be used as a flagship for conservation that aims to provide management guidelines for the species and it's habitat. These vegetation communities are not only critical to the survival of this species, but also a range of other species. It also addresses the major threat of land clearing and can provide a model for planning and management for conservation in an urban setting. Therefore, there is an opportunity to use Carnaby's Black-Cockatoo as an iconic species, the recovery of which has multiple benefits for conservation. For more information, see detailed template.

Technical Assessment: Medium

2.7.3 Sub-Program Outputs

Number of studies completed.
Number of information management systems developed.
Number of recovery plans for threatened species or ecological communities completed.
Number of awareness raising events e.g. demonstrations, field days or study tours
Number of written products such as brochures, newsletters, posters or fact sheets developed.
Number of media opportunities resulting in articles in newspapers or radio or television created.
Number of new databases developed.
Area of wetland native vegetation enhanced / rehabilitated.
Area of terrestrial native vegetation enhanced / rehabilitated.
Area (ha) protected by fencing specifically for significant species / TEC protection
Number of breeding programs developed and Number of individuals bred.
Number of translocation programs developed and Number of individuals translocated.
Area of pest plant control measures implemented.
Area (ha) of pest control (vertebrates) measures implemented
Area (ha) of plant disease control measures implemented

2.7.4 Outcomes

This sub-program is the Strategy's "prime mover" in terms of species protection. Without it, there can be very little hope for the protection of several significant species.

The Threatened Ecological Communities Project is the prime mechanism for conservation of vestiges of the original ecosystems of the Swan Coastal Plain. This investment will increase the security of over thirty separate small ecosystems that support significant flora and fauna, and reflect the extraordinarily diverse natural endowment. The Threatened Flora project will protect plant species found outside the defined "ecosystem" areas that are nevertheless critically endangered.

The sub-program will allow the Western Swamp Tortoise Project to continue to build on its success in rescuing the species from extinction, though there is still some way to go before it can be declared to be un-threatened.

Extension of funding to the Carnaby's Cockatoo Project would help to guarantee that this species has suitable habitat over its migratory range.

Sub-Program - Biodiversity Training

2.7.5 Features

2.7.5.1 *Activity Type*

5% resource assessment, 10% planning, 20%on-ground and 65% capacity building.

2.7.5.2 *Assets addressed*

Regional Capacity, Biodiversity, Coastal and Marine, and Water.

2.7.5.3 *Threats addressed*

Habitat Loss, Ecosystem fragmentation, Native vegetation clearing, Fire Management Regimes, Altered hydrology, Exotic Plants, Feral animals, Plant diseases, Clearing and filling wetlands, Fragmentation of natural resources, Recreation, Nutrient enrichment and export

Erosion/sedimentation, Introduced aquatic pests.

2.7.5.4 *Relationship to Implementation of Strategy*

Matter for Target	RCT	Primary MAT's	Secondary MAT's
	RCM1.4- Develop a regional capacity framework supported by an integrated regional management information system by 2006	RCM1.4	
Native Vegetation Communities Integrity.	BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.2 BM1.3 BM1.4 BM1.6	BM1.1 BM1.5
Significant Species and Ecological communities	BR2- 50% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005.		BM2.3 BM2.5
Ecologically Significant Invasive Species	BR3- 30% Increase in the effectiveness of control programs for feral animals, pests and diseases by 2009.	BM3.4	BM3.1 BM3.3
Estuarine, Coastal and Marine Habitat Integrity	CMR1 Maintain and improve the condition for terrestrial coastal habitat in the Region, as measure at representative sites , by 2020 (with qualified target set by 2005)	CMM1.5	
Aquatic Ecosystem Integrity.	WR1& WR2. Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020	WM1.5 WM2.5	
Nutrients in Aquatic Environments.	WR3. Maximum concentrations, for priority waterways , do not exceed 0.1mg/L for total phosphorous and 1.0mg/L for total nitrogen by 2020	WM3.4	
Turbidity / suspended particulate matter in aquatic environments.	WR4. Maintain and improve condition of aquatic environment in the Region, as measure at representative sites by 2020.	WM4.4	

2.7.5.5 *Sub-Program Budget*

Table 13: Proposed Budget for the Biodiversity Training Sub-Program

	NHT	State	Other
Year 1	$101,000	$30,000	
Year 2	$425,000	$30,000	In kind
Year 3			

2.7.6 Projects

2.7.6.1 *Biodiversity Action Learning Program (ND08)*

On-ground management of the Region's bushland and other natural areas requires a high level of skills and knowledge. These skills are held by a limited number of individuals, with few actually employed as bushland managers. The region therefore has a very low capacity to manage significant natural areas. Resources are needed to support the small, but growing network of professional bushland managers to maintain and improve the condition of high priority vegetation in the large areas under their management.

The project aims to develop an action-learning process, which incorporates the management of priority ecological management sites, covering a number of vegetation types in the Swan Region. The managers of these priority areas will then

carry out the highest priority on-ground management actions on site as part of the active learning program. Such "learning by doing" has been shown to be a particularly effective learning technique. Application of skills on a site-specific basis, will allow managers to appreciate the diversity of techniques appropriate to different sites and move away from a potentially counter-productive generic approach. The sites will then be used as learning and demonstration sites for NRM professionals and community throughout the region. The resultant monitoring and evaluation program will link to regional targets and report on progress. The learning network will also continue to exchange knowledge and provide mentoring and support to each other leading to continual improvement of bushland management.

2.7.6.2 *Skills for Nature Conservation (ND09)*

There is an identified need in the community for skills and knowledge to undertake restoration, management and protection of natural areas. The Skills for Nature Conservation training program has been running since 1998 and is delivered through a three-way partnership between Greening Australia Western Australia, Ecoplan (Department of Conservation and Land Management) and the Swan Catchment Centre (Department of Environment). This project addresses the capacity of community volunteers to manage, restore and protect the Swan region's natural areas including bushland, coastal areas, wetlands and waterways. It also equips volunteers with social skills necessary for community conservation groups to continue their involvement in conserving the Swan regions natural environment.

Training events cover topics such as sourcing funding for on-grounds works, Aboriginal heritage, wetland management, ecology and weed management. The program is evaluated each year by community participants, presenters and stakeholders and their feedback is used to develop the topics and improve the program for the next year thus giving scope to evolve the program to meet the changing needs of the target audience.

2.7.6.3 *Proposed project for +25% allocation - Guidelines for Rural Landscaping*

Urban bushlands in the Perth region are vital refuges for regionally significant flora and fauna. Landscaping in rural areas often uses plant species that become weeds in adjacent bushland. Over time, this creates a much larger problem in control of weeds and management of bushland. There has recently been work done on producing guidelines and information for urban landscaping, and there is a need to produce the same level of assistance for rural areas.

The rural landscaping project would produce a model landscaping policy for rural councils, as well as a set of informational brochures for plants suitable for use in landscaping according to soil type. These would then be available for use by rural councils to educate their community and landscape contractors.

Technical Assessment: **Low**

2.7.7 Sub-Program Outputs

Number of other biophysical, economic or socially related plans developed.
Number of awareness raising events such as demonstrations, field days or study tours conducted.
Number of written products such as brochures, newsletters, posters or fact sheets developed.
Number of training sessions, workshops, seminars or other skills and training events conducted and Number of participants in person-days.
Number of workbooks, course notes or other key materials developed.
Area of coastal native vegetation enhanced / rehabilitated.
Area of wetland native vegetation enhanced / rehabilitated.
Area of riparian native vegetation enhanced / rehabilitated.
Area of terrestrial native vegetation enhanced / rehabilitated.
Area of pest plant control measures implemented.
Area (ha) of pest control (vertebrates) measures implemented
Area (ha) of plant disease control measures implemented

2.7.8 Outcomes

The outcome of this sub-Program will be a significant increase in the effectiveness of the community, particularly volunteer groups, private landholders and local government, in bushland management.

2.8 Sub-Program - Natural Diversity Implementation Framework (ND10)

2.8.1 Features

2.8.1.1 Activity Type

25% resource assessment, 25% planning, 25% on-ground and 25% capacity building

2.8.1.2 Assets addressed

Terrestrial and aquatic biodiversity

2.8.1.3 Threats addressed

Habitat loss, ecosystem fragmentation, native vegetation clearing, fire management regimes, altered hydrology, exotic plants, feral animals, plant and animal diseases, clearing and filling of wetlands

2.8.1.4 *Relationship to Implementation of Strategy*

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Native vegetation Communities integrity	BR1a The comprehensiveness, adequateness and representativeness (CAR) of the protected area system (including formal reserves and off- reserves) is improved by 50% by 2015 based on 2005 baseline data BR1b maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020, based on 2005 baseline data	BM 1.1 BM 1.2 BM 1.3 BM 1.4 BM 1.5 BM 1.6	
Significant species and ecological communities	BR2 50% of critical habitat for identified significant species and ecological communities protected by 2014	BM 2.1 BM 2.2 BM 2.3 BM 2.4 BM 2.5	
Ecologically significant invasive species	BR3 reduction in impact of regionally significant invasive species by 2020 (with a quantified target set by Dec 2005)	BM 3.1 BM 3.3 BM 3.4	BM 3.2

2.8.1.5 *Budget*

Table 14: Proposed Budget for the Natural Diversity Implementation Framework Sub-Program

	NHT	State	Other
Year 1	$587,000	$20,000	$25,000
Year 2	$587,000	$20,000	$25,000
Year 3	$587,000	$20,000	$25,000

2.8.1.6 *Description*

This project provides the framework for coordination and delivery of the Natural Diversity Regional Delivery Program. The framework consists of a Natural Diversity Program Manager, a part-time Communications Officer, and pat of the time of a Local Government Officer and Indigenous Officer as well as five regional Natural Diversity Officers. Their role is to:

- Support implementation of the projects within the Natural Diversity Program
- Develop partnerships with key stakeholders to develop and implement Natural Diversity projects
- Coordinate activities within the Natural Diversity Program to maximise efficiency and outcomes
- Implement monitoring and evaluation programs
- Provide support and assistance to community groups to carry out on-ground activities

2.8.2 Sub-Program Outputs

Number of other biophysical, economic or socially related plans developed.
Number of studies completed.
Number of information management systems developed.
Number of recovery plans for threatened species or ecological communities completed.
Number of awareness raising events e.g. demonstrations, field days or study tours
Number of written products such as brochures, newsletters, posters or fact sheets developed.
Number of media opportunities resulting in articles in newspapers or radio or television created.
Number of new databases developed.
Area of wetland native vegetation enhanced / rehabilitated.
Area of terrestrial native vegetation enhanced / rehabilitated.
Area (ha) protected by fencing specifically for significant species / TEC protection
Number of breeding programs developed and Number of individuals bred.
Number of translocation programs developed and Number of individuals translocated.
Area of pest plant control measures implemented.
Area (ha) of pest control (vertebrates) measures implemented
Area (ha) of plant disease control measures implemented

2.9 Other Potential Natural Diversity Projects

Following from the Gap Analysis, which is described in Technical Report No 4, additional activities were suggested for the Natural Diversity Program. Table 15 gives descriptions of these projects, and fuller details are given in Investment Plan Technical Report No 4 *Evaluation of Current Project Activities and Gaps*. New projects that were nominated for NHT2 funding in the Swan Catchment Council's Funding Priorities Workshop are described in Investment Plan Technical Report No 5 *Project Funding Priorities Workshop*, and have been listed in Table 10. The Swan Catchment Council will develop and assess these projects further and will actively pursue funding opportunities for them as appropriate.

Table 15: Projects nominated for development in future in the Natural Diversity Program: all funding sources

	Project Description	Indicative Funding ($000s)
1.	Audit and stock take of existing plans, strategies and NRM documents.	
2.	Gap analysis of NRM legislation and other related legislation.	
3.	Biodiversity Network development (seed money).	$5,000
4.	Increasing skills and knowledge.	
5.	Agreed methodology for natural diversity assessment	
6.	Partnership development.	
7.	General education to raise biodiversity profile.	
8.	On-ground works.	
9.	Regional Biodiversity Strategy.	$250,000
10.	Regional Biodiversity Toolkit (extension of National Biodiversity Toolkit).	$120,000
11.	Biodiversity Network development (matching).	
12.	Perth Fungi Project.	$500,000 over 3 years
13.	Additional support for soil microbiology studies in support of threatened species activities.	$500,000 over 3 years
14.	Support to Local Governments for further ecological assessment of natural areas (ecologists needed).	$150,000 over 5 years
15.	Regional delivery of grants and incentives for private land conservation (on-ground works and protection).	
16.	Reconciliation of WA and Commonwealth Threatened Species and Communities lists.	$300,000
17.	Writing of Recovery Plans for remaining species.	$200,000
18.	Statutory planning protection mechanisms for conservation outcomes.	$300,000
19.	Guidelines for rural landscaping (based on Local Plant package).	
20.	Capacity building for government and community – knowledge (network events, training).	
21.	Dedicated Officer for weeds and pests in the region.	
22.	Discovery Program (desktop) (Threat Abatement Plans).	
23.	Model local law development for weeds and local plant species.	

2.10 Summary of Outcomes – Natural Diversity Program

Under the Strategy as a whole Bush Forever land acquisitions continue, protecting a further 5,000 ha of natural systems. The CAR system will be reviewed, upgraded and extended, with follow-on local biodiversity action plans protecting native vegetation, ecological communities and species, and dealing with invasive pests and plant diseases. Regional capacity for retaining biodiversity values will improve.

The Program will increase the capacity of Local Government and community groups to deliver biodiversity outcomes

It will provide better information and systems to make good decisions about biodiversity protection

The program will provide for on-ground management of on-reserve and off reserve vegetation complexes

Dieback sites will be mapped with adequate information, followed by treatment and further education and planning.

The most urgent Recovery actions will be carried out for the most threatened populations of flora fauna and Threatened Ecological Communities in the Region

If fully funded, the Program will substantially improve the chances for survival of 53 critically endangered species in the region.

3. INTEGRATED WATER MANAGEMENT REGIONAL DELIVERY PROGRAM

3.1 RATIONALE

The Swan Region is not a NAP Region. The main opportunity for access to Commonwealth funding for water quality improvement is via the NAP's Cross-Region Funding Program, through which this region can collaborate with the Avon Region, which provides much of the flows of water, nutrients, particulates and salt into the Upper Swan. Nevertheless, there is still much to be done within the region to return the Swan-Canning estuary, Darling Range streams, wetland ecosystems, groundwater quality and quantity to a condition that supports aquatic biodiversity. Integrated catchment management will address both terrestrial and aquatic systems in a holistic way.

The Region's Mediterranean climate makes water a critical natural resource for both human uses, including recreation, and the natural environment. There has now been almost twenty-five years of "below average" rainfall in the region, which has severely reduced runoff and groundwater recharge. This has had consequences for the reliability of water supplies, and for ecosystems that depend on surface water. The use of water by humans and natural systems is essentially competitive. The Strategy aims to balance this competition through better management of hydrology and contaminant hydrology of the region.

The Strategy identifies three key pressures threatening waterways, wetlands and groundwater in the region:

- Incompatible planning and development;
- Inappropriate land and water management practices; and
- Population growth

These have resulted in eutrophication of wetlands and waterways, biological and chemical pollution, erosion and sedimentation, increased salinity of waterways and wetlands, habitat loss and ecosystem fragmentation, drainage modifications, acidification and over-abstraction of groundwater. All these forms of degradation are documented in detail in the Strategy and in Investment Plan Technical Report No 2 *Assessment of the Relative Returns from Investment Across Assets and Threats*.

3.2 Targets

The Matters for Target and the associated Resource Condition Targets addressed by this Program are as follows.

3.2.1 Aquatic ecosystems integrity

Resource Condition Target:

- ***Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites by 2020, with quantified targets for major rivers and waterways in the Region set by 2005.***

There are serious threats to the ecological health of the Swan-Canning estuary and inland aquatic biodiversity. These include altered water flow, especially in the Helena and Canning Rivers, biodiversity decline; ecosystem fragmentation; native vegetation clearing or loss; and exotic plants invading the riparian zone and waters. The condition of the foreshores of the estuary still leaves much to be desired, and there is a major effort to restore the foreshores to an appropriate condition.

The Swan Coastal Plain has a large number of freshwater lakes generally formed by a groundwater table at inter-dunal depressions. There are three Ramsar-listed wetlands, namely the Becher Point wetlands, Forrestdale Lake and Thompsons Lake. There is also a much larger number of lakes of regional significance. The lakes and wetlands are sites of great biodiversity. During the long hot summers there is little precipitation or runoff, so the lakes and wetlands have special ecological significance.

If Fraser Island is Australia's best-known sand island, the Swan Coastal Plain north of the Swan-Canning Estuary is probably the least known. This area is virtually an island, being hydraulically bounded by the ocean on the west, the estuary to the south, the Swan River and Ellen Brook to the east, and Moore River to the north. Like Fraser Island it contains a large unconfined mound-shaped freshwater sand aquifer. Unlike Fraser Island it supports a large urban population, industries and many horticultural and agricultural activities, supplies the Perth metropolitan area with about a half of its water requirements, and maintains the lakes and wetlands, and cave systems. These are all very highly valued services.

Areas of investment to maintain groundwater values include targeting the abstraction of water; hydrological change; and drainage modification. In addition, investment for this asset category will significantly target biodiversity values, ecosystem fragmentation and habitat loss associated with reduced groundwater levels. There is a cluster of initiatives addressing groundwater contamination, including nutrient export & enrichment, chemical contamination, urban or industrial discharges; and agricultural land management practices.abstraction of water; hydrological change; and chemical contamination.

3.2.2 Nutrients in the aquatic environment

Resource Condition Target:

- ***Maximum concentrations for priority waterways do not exceed 0.1mg/L for total phosphorus and 1.0mg/L for total nitrogen by 2020***

The key targets for investment in water quality of the Swan-Canning Estuary and Swan Coastal Plain Streams cluster around pollutants, most notably nutrients, and include: nutrient export and enrichment; urban and industrial discharges; and drainage modification. Important investment targets relate to agricultural land management practices particularly in the Ellen Brook catchment.

3.2.3 Turbidity/suspended particulate matter in aquatic environments

Resource Condition Target:

- ***Maintain and improve condition of aquatic environments in the Region, as measured at representative sites by 2020, with quantified targets for turbidity/suspended particulate matter set by 2005***

Erosion and sedimentation are a focus for much of the foreshore and riverbank management in the Swan-Canning Estuary, the streams of the coastal plain, and the Darling Range streams, where controls on stock access are prime targets for management.

3.2.4 Surface water salinity in freshwater aquatic environments

Resource Condition Target:

- ***Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region, as measured at representative sites by 2020, with quantified targets to reduce salinity set by 2005***

The Upper Swan-Avon drains a very large catchment that extends well into the wheatbelt. Salinity of the Avon now greatly exceeds pre-European levels.

The other Darling Range Streams arise in the westward-draining dissected margins of the Darling Plateau. Generally, the catchments of these streams are protected from salinity by clearing controls, but notable exceptions occur through the Brockman, Ellen Brook and Helena River catchments. Two of the rivers, the Canning and Helena, have reservoirs that play a vital role in the water supply system for Perth, the Goldfields and stock and domestic supplies in the agricultural areas. The Canning Catchment is closed and well protected, but the Helena (Mundaring Weir), while being mainly forested, does contain some agricultural and urban activities. The other streams, including the Brockman and Southern Rivers, and the Ellen, Susannah, Jane, Bickley, Wooroloo and Yule Brooks, being un-dammed, have both high ecological values and an option value for future small increments to the water supply system. For example, Wooroloo Brook has been mentioned as a supplementary source of water for the Perth system, despite its brackish quality, as shandying or desalination are now serious options.

3.2.5 Estuarine, coastal and marine habitats integrity

Resource Condition Target:

- Maintain and improve condition of marine habitats in the Region, as measured at representative sites by 2020, with a quantified target set by 2005.

The contribution of the Integrated Water Management Program to this resource condition target is in the management of stormwater and groundwater that discharges to the Swan-Canning estuary and to the coastline.

3.2.6 Cultural Heritage

Management Action Targets:

- ***Research, record, and publish Nyoongar history of the Swan Region by 2009.***
- ***Review and identification of opportunities in policy and legislation to include Indigenous cultural heritage by 2009***
- ***Increase Indigenous employment and participation in NRM activities locally and regionally by 2009.***
- ***Achieve 75% per cent increase in the number of community, LGA's and State government agencies involved in NRM incorporating indigenous cultural heritage included as part of their processes by 2009.***
- ***Establish partnerships to further incorporate NRM principles into heritage protection by 2008.***

The Swan-Canning estuary is iconic. The Nyoongar people have inhabited its shores for millennia and it now provides the setting for the City of Perth. The highest residential land values are found along its banks. Travelling upstream it links the city to the historic towns of Guildford and Midland and the wine-growing region of the Swan Valley. It is the focus for many forms of tourism and water-based recreation. It is the major venue for yachting. The cultural value of this asset will be significantly reduced if current threats are not abated.

The Integrated Water Management Program's contribution is a 33% share of all target management actions of the Cultural Heritage Theme Strategy.

3.2.7 Regional Capacity Building

Management Action Targets:

- ***Establish a framework for continuous improvement through adaptive management by 2005***
- ***Establish subregional and local consistency and linkages to the Strategy by 2008***
- ***Review and apply a regional governance structure with security of tenure by 2005***
- ***Develop a regional capacity framework supported by an integrated regional management information system by 2006.***

The Integrated Water Management Program's contribution is a 25% share of all target management actions of the Regional Capacity Building Theme Strategy.

3.3 Priorities from Stakeholder Workshops

Participants in the workshops suggested many areas for NRM investment to maintain or enhance the values of water systems including the surface waters, wetlands and groundwater of the Swan Coastal Plain, the Swan-Canning Estuary, the streams of the Darling Range and the Upper-Swan Avon. See Investment Plan Technical Report No 2 *Assessment of the Relative Returns from Investment Across Assets and Threats*.

The Choice Modelling workshops indicated that stakeholders view the Integrated Water Management Program, along with the Natural Diversity Program, as meriting a large part of the total natural resources management budget for the Region. Choice

sets containing the full set of Strategy Management Actions in this Program were generally preferred.

Environmental economics studies have indicated that Perth's community expresses a high willingness to pay for management of water systems in order to retain asset values.

3.4 Total Program Costs

Matters for Target, the Management Actions proposed for each of them and indicative total costs to all stakeholders are detailed in Investment Plan Technical Report No 1 *Total Costs of the Strategy.* Estimated total costs of all Management Actions for the Integrated Water Management Program, shown in Table 16, amount to $34.43 million over the first three years of the Strategy. Actions addressing nutrients (21.6%) and wetland aquatic ecosystems (30.5%) account for a combined 52% of the total. Some 38% of all expenditure is needed for on-ground actions, and these are spread across all matters for target, with particular emphasis on nutrients.

Table 16: Summary of Total Costs for the Integrated Water Management Program: 3 Years ($000s)

Type of Action	Aquatic Ecosystem Integrity: Steams	Aquatic Ecosystem Integrity: Wetlands	Nutrients in Aquatic Environment	Turbidity & Suspended Particles	Surface Water Salinity	Other Themes	Total 3-Year Cost ($000s)	%
Resource Assessment	1,082	3,090	618	1,185	1,236	172	7,382	21.4%
Planning	1,751	2,575	1,271	259	464	266	6,585	19.1%
On-Ground Action	1,957	2,987	4,635	1,854	618	1,013	13,064	37.9%
Regional Capacity Building	1,796	1,854	927	773	1,288	762	7,399	21.5%
Total	6,585	10,506	7,451	4,070	3,605	2,213	34,430	100.0%
Percent	19.1%	30.5%	21.6%	11.8%	10.5%	6.4%	100.0%	

Note: Excludes an estimated $20m/year for the WA Water Corporation's Infill Sewerage Program.

3.5 NHT2 Funding Proposal

3.5.1 100% Indicative Regional Allocation

Five projects in this Program were selected for NHT2 funding, including both new and existing NHT projects. The methodology for project selection and development is given in Investment Plan Technical Report No 4 *Evaluation of Current Project Activities and Gaps Against Strategy Management Actions*; Technical Report No 5 *Project Funding Priorities Workshop*; and Technical Report No 6 *Project Statements.*

The projects are shown in Table 17. There is a focus on water quality monitoring, flow regulation and riparian zone management of the Canning River, foreshore rehabilitation in the Swan-Canning estuary and provision of education, training and technical support to the community and stakeholders. Two of the projects are already NHT-funded, namely *Canning Environmental Flows* and *Swan-Canning Foreshore Assessment.* Another project, namely *Education, Training & Technical Support – Water*, is an adaptation of the previous NHT projects titled *Ribbons of Blue*, and *Community Education and Training for River Restoration and Groundwater*

Protection, to give sharper focus on the current Strategy objectives. Also, the project titled *Wetland Watch Continuation, plus Incentives through SALP* continues an existing project, with an extension directed towards broader funding and added incentives. The other project shown in Table 17 namely *Water Quality Monitoring & Evaluation Framework* is new. It is a direct response to the monitoring and evaluation requirements of the Strategy. Detailed statements of each project are given in Investment Plan Technical Report No 6 *Project Statements*.

Table 17: Integrated Water Management Projects Proposed for NHT2 Regional Funding in 2004-05 and 2005-06 ($)

Project Title	2004-05	2005-06
Canning Environmental Flows	0	152,000
Swan-Canning Foreshore Assessment	0	150,000
Water Quality Monitoring & Evaluation Framework	350,000	350,000
Wetland Watch Continuation, plus Incentives through the Swan-Alcoa Landcare Program	174,000	208,000
Education, Training & Technical Support - Water	0	165,000
Program Implementation Framework	561,000	561,000
Total	1,085,000	1,586,000

3.5.2 +25% Regional Allocation

Table 18: Supplementary proposal for the Integrated Water Management Program

Project Title	2004-05	2005-06
Wetland Watch Project Extension	370,000	610,000

3.6 Integrated Water Management Projects

3.6.1 Canning Environmental Flows (IWM01)

3.6.1.1 *Activity Type*

On-ground works 100%

3.6.1.2 *Assets addressed*

Water

3.6.1.3 *Threats addressed*

Altered hydrology

3.6.1.4 *Relationship to Implementation of Strategy*

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Inland aquatic ecosystems integrity (rivers and wetlands)	Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005).	WM1.3	

3.6.1.5 Budget

Table 19: Proposed budget for the Canning Environmental Flows Project

	NHT	State	Other
Year 1	36,000		
Year 2	152,000		
Year 3	82,000		

3.6.1.6 Description

This project is being done through a five-year, five-stage process: namely (i) identify social economic and environmental values of water in the Canning River system; (ii) investigate and model the relationship between winter flows, stage heights, ecology and habitat; (iii) trial the recommended environmental flows for effectiveness in terms of water quality river restoration, river connectivity, and management arrangements; (iv) determine an environmental flow allocation and consult with stakeholders; and (v) prepare a final Allocation Plan.

Stage 1 is complete and Stage 2 is currently underway. A total of eight sites have been selected along the Canning and Wungong Rivers. Each will have a monitoring point. Cross sections will be surveyed at these and at other points, including riffles, possible benches, and across a control point to establish stage-to-flow relationships. This will enable relationships to be determined between flow regime and a number of ecological objectives. These include: seed set in fringing vegetation, required flood frequency and level, benefits for fish spawning, fish passage upstream, effects of flushing of pools on sediment storage, and optimal management of pools to avoid stratification and oxygen depletion.

The project is managed by the Department of Environment, with a Technical Working Group and a Steering Committee drawn from 9 formal partner organisations. Substantial links have been formed with a wide range of community stakeholders.

Technical Assessment: High

3.6.1.7 Outputs

Number of biophysical studies completed
Number of reports completed
Number of social/economic studies completed
Number of research and development studies completed
Number of best management practice codes or guidelines completed
Number of catchment or sub-catchment plans or strategies completed
Number of other resource management plans completed
Number of key organisational documents produced
Number of formally documented collaborative arrangements developed
Number of arrangements for effective collaboration negotiated where a formal agreement does not exist

3.6.1.8 Outcomes

This project is the first to address the issue of environmental flow allocation on regulated streams in Western Australia. The first outcome will be an environmental flow allocation regime for the Canning River that enhances what until recently was a severely degraded river system. A second outcome will be that the principles

developed will be directly applicable to near-by streams. It is hoped that they will also be applicable in a more genral way to regulated streams throughout the south west of Western Australia.

3.6.2 Swan-Canning Foreshores Assessment (IWM02)

3.6.2.1 Activity Type

Resource assessment 50%; Planning 25%; On-ground 25%

3.6.2.2 Assets addressed

Water; Biodiversity

3.6.2.3 Threats addressed

Nutrient export and enrichment; Native vegetation clearing; Erosion/sedimentation; Ecosystem fragmentation; Exotic plants and animals; Recreation; Altered hydrology; Fragmentation of natural resource

3.6.2.4 Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Native vegetation communities' integrity Inland aquatic ecosystems integrity (rivers and wetlands) Estuarine, costal and marine habitats integrity Significant native species and ecological communities	Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with qualified targets for major rivers and waterways in the Region set by 2005). 50% of critical habitat for identified significant species and ecological communities protected by 2014	WM1.1 WM1.2 WM1.3 WM1.4	BM2.1

3.6.2.5 Budget

Table 20: Proposed budget for the Swan-Canning Estuary Foreshores project

	NHT	State	Other
Year 1			
Year 2	$150,000		
Year 3			

3.6.2.6 Description

This project considers human, hydrodynamic and atmospheric influences on the foreshores of the Swan-Canning estuary and river systems, particularly the physical structure of banks, beaches, flood ways and flood plains, and riparian vegetation communities. Erosion sources are a particular focus. The study aims to improve decisions on planning and development, design of bank structures (including the

choice between concrete and plants for erosion control), groyne placement where appropriate, restoration actions for vegetation (including that in the Swan River Park), and regulations on river usage. It will be the primary source of information by which to guide investments through the Swan River Trust's *Riverbank Program*.

The study method includes literature review, desktop and field (land and water-based) assessments. The information generated will be geographically referenced at a range of scales to enable both local and regional assessments, leading to preparation of a Foreshore Management Strategy including an investment plan and monitoring and evaluation system.

The project is managed within the Swan River Trust's Environmental Management Section, under the Foreshore Protection and Rehabilitation Program.

3.6.2.7 Outputs

Number of biophysical studies completed
Number of reports completed
Number of information management systems developed
Number of other decision support tools developed
Number of research and development studies completed
Number of catchment or sub-catchment plans or strategies completed
Number of resource management plans completed
Number of written products such as brochures, newsletters, posters or fact sheets developed
Number of key organisational documents produced
Number of governance tools developed
Number of organisational learning reviews completed
Number of new databases developed

3.6.2.8 Outcomes

The most significant outcome is that the results of this project will guide future investment under the Riverbank Program, which has a budget of $1M/yr. Mechanisms for adaptive management will be established. Decision support tools will be developed. Ongoing research needs will be identified. The outcome will be a healthier river with enhanced ecological, cultural and landscape values.

3.6.3 Water Quality Monitoring & Evaluation Framework (IWM03)

3.6.3.1 Activity Type

Resource Assessment 80%; Capacity Building 20%

3.6.3.2 Assets addressed

Water; Regional Capacity

3.6.3.3 Threats addressed

Nutrient export and enrichment; Erosion/sedimentation; Salinity; Acidification; Drainage modification; Industrial discharge; Groundwater and surface water contamination; Stormwater discharge; Chemical and pesticide contamination

3.6.3.4 *Relationship to Implementation of Strategy*

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Inland aquatic ecosystems integrity (rivers and wetlands)	Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	WM1.1	WM1.5
Nutrients in aquatic environments	Maximum concentrations, for priority waterways, do not exceed 0.1mg/L for total phosphorus and 1.0mg/L for total nitrogen, by 2020	WM2.1	WM2.5
Turbidity/suspended particulate matter in aquatic environments Surface water salinity in freshwater aquatic environments	Maintain and improve condition of aquatic environments in the Region, as measured at representative sites, by 2020 (with quantified targets for turbidity / suspended particulate matter set by 2005)	WM3.1 WM4.1	WM3.4 WM4.4
	Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region, as measured at representative sites, by 2020 (with quantified targets to reduce salinity set by 2005)	WM5.1	WM5.4
Estuarine, coastal and marine habitats integrity	Maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	CMM2.4	CMM2.6

3.6.3.5 *Budget*

Table 21: Proposed budget for the Water Quality Monitoring and Evaluation Project

	NHT	State	Other
Year 1	350,000	1,366,525	
Year 2	350,000	1,366,525	
Year 3	350,000		

3.6.3.6 *Description*

The objective of this project is to develop a coherent water quality monitoring and evaluation program across the Swan Region encompassing catchments, the Swan River estuary and the near-shore coastal zone. A current impediment to the setting of resource condition targets for water and marine as outlined in the Swan Region NRM Strategy is the lack of baseline water quality data collected in a coordinated and focused manner. An audit of the non-SCCP water quality monitoring activities has revealed there are considerable gaps, overlaps, considerable variation in data quality and usefulness as well as inconsistency in data storage and reporting methods.

The project will establish baseline water quality monitoring programs as a precursor to setting resource condition targets for water and marine. This will be achieved by coordinating a re-focusing of existing monitoring programs, establishment of new catchment monitoring investigations, training and capacity building for community groups and the standardisation of all data collection, storage and reporting methods. A marine and coastal condition assessment and monitoring program will also be established to identify current condition and potential indicators for the setting of targets.

Technical Assessment: High

3.6.3.7 *Outputs*

Number of studies completed
Number of new monitoring programs established
Number of existing monitoring programs enhanced
Number of biophysical studies completed
Number of reports completed
Number of information management systems developed
Number of other decision support tools developed
Number of research and development studies completed
Number of training sessions, workshops, seminars or other skills and training events conducted
Number of workbooks, course notes, or other key materials developed
Number of key organisational documents produced
Number of formal documented collaborative arrangements developed
Number of arrangements for effective collaboration negotiated where a formal agreement does not exist
Number of community groups or projects assisted

3.6.3.8

3.6.3.9 *Outcomes*

The Water Quality Monitoring and Evaluation project is regarded as a pre-requisite for informed management of aquatic ecosystems throughout the region. Knowledge of the complete water cycle and contaminant flows within the region remains deficient, so science-based evaluation will inform the community of the true state of affairs and lead to more targeted action.

3.6.4 *Wetland Watch plus Incentives through the Swan-Alcoa Landcare Program (IWMO4)*

3.6.4.1 *Activity Type*

Resource assessment 25%; On-ground 25%; Capacity Building 50%

3.6.4.2 *Assets addressed*

Water; Biodiversity; Regional Capacity

3.6.4.3 *Threats addressed*

Native vegetation clearing, salinity, acidification, ecosystem fragmentation, groundwater and surface water contamination, water abstraction, stormwater discharge, altered hydrology, fragmentation of natural resources, habitat loss, exotic plants, climate change.

3.6.4.4 *Relationship to Implementation of Strategy*

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Native Vegetation communities' integrity Inland aquatic ecosystems integrity (rivers and wetlands) Significant native species and ecological communities	WR2 Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with qualified targets for priority wetlands in the Region set by 2005). BR2 50% of critical habitat for identified significant species and ecological communities protected by 2014.	WM2.1, WM2.4, WM2.5	BM2.1

3.6.4.5 *Budget*

Table 22: Proposed budget for the Wetland Watch Project

	NHT	State	Other
Year 1	190,000		
Year 2	190,000		
Year 3			

3.6.4.6 *Description*

It has been estimated that 70-80% of wetlands on the Swan Coastal Plain have been either lost or seriously degraded due to filling, draining or clearing since European settlement. Of those wetlands that remain, only 15% are considered to retain high conservation values and are under threat from urban and rural encroachment. A significant threat to these remaining wetlands is a lack of awareness on the part of landowners and the general community as to the presence and high biodiversity value of many seasonal wetlands.

Wetland Watch is a wetland conservation initiative of the World Wildlife Fund Australia. It was launched in early 2004 and is currently funded until April 2005. It aims to increase the conservation of, and improvement in the management of wetlands on private land. By working directly with landholders, the program raises awareness of the need for wetland conservation, assists landowners to better manage and protect their wetlands and encourages the adoption of long-term wetland conservation measures. Investment is sought to resource personnel to continue the program and also to provide an incentive to landholders to engage in wetland conservation activities. It is proposed this incentive be in the form of additional funds available through SALP specifically for wetland conservation activities.

Technical Assessment: **High**

3.6.4.7 *Outputs*

Number of wetland field days held
Number of Wetland Watch brochures distributed
Editions of Wetland Watch Newsletters developed
Number of wetland information sheets developed
Number of newspaper articles published on projected related activities
Number of community groups formed
Number of landowner wetland management and conservation workshops held
Number of conservation covenants placed on wetlands
Number of voluntary management4 agreements signed
Area of high conservation wetlands protected
Area of wetlands enhanced/rehabilitated
Sets of guidelines prepared on wetland BMP
Number of wetland management plans prepared
Number of wetland sites studied
Number of wetland study sites monitored
Number of vegetation studied conducted
Number of macro-invertebrate studied conducted

3.6.4.8 *Outcomes*

The Wetland Watch project is a much needed extension-type activity that addresses the urgent need for landholders to be better informed about ways to manage wetland and damp land ecosystems.

3.6.5 *Water Education, Training & Technical Support (IWM06)*

Activity Type

	Ribbons of Blue	Rivercare	River Restoration
Resource Assessment			
Planning			
On-Ground	30%	50%	30%
Capacity Building	70%	50%	70%

Assets addressed

Land; Water; Coastal Marine; Regional Capacity

Threats addressed

Lack of technical knowledge in the community; Acidification, Nutrient export and enrichment; Erosion/sedimentation; Ecosystem fragmentation; Degradation of riparian vegetation; Fragmentation of natural resources; Chemical and pesticide contamination; Salinity; Drainage modification; Industrial discharge; Groundwater and surface water contamination; Stormwater discharge, Altered hydrology; Salinity; Water use issues e.g. environmental flows.

3.6.5.1 *Relationship to Implementation of Strategy*

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Inland aquatic ecosystems integrity (rivers and wetlands)	Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005). Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	WM1.5,	
Nutrients in aquatic environments	Maximum concentrations, for priority waterways, do not exceed 0.1mg/L for total phosphorus and 1.0mg/L for total nitrogen, by 2020.	WM2.5,	
Turbidity/suspended particulate matter in aquatic environments	Maintain and improve condition of aquatic environments in the Region, as measured at representative sites, by 2020 (with quantified targets for turbidity/suspended particulate matter set by 2005)	WM3.4, WM4.4,	
Surface water salinity in freshwater aquatic environments	Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region, as measured at representative sites by 2020 (with quantified targets to reduce salinity set by 2005)	WM5.4,	
Estuarine, coastal and marine habitats integrity	Maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005).	CM1.5,	
	Maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	CM2.6	
	Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulfate soils, by 2020 (with a quantified targets set by December 2005).	LM2.5	

3.6.5.2 *Budget*

Table 23: Proposed budget for Education, Training and Technical Support - Water

	NHT	State	Other
Year 1	163,000		
Year 2	163,000		
Year 3			

3.6.5.3 *Description*

(a) Ribbons of Blue/Waterwatch WA in the Swan Region is an environmental education and program that raises awareness and understanding, provides educational opportunities, develops skills, and promotes behaviour change in a whole of catchment context. The scope is now more strategic, aiming at professional development for teachers and educating community groups, such as Bushrangers, Scouts and learning centres to be actively involved in caring for waterways. The Program has moved away from its focus on water quality monitoring. The program aims to encourage local communities to be actively involved in learning about and protecting environmental water quality, and to share responsibility for the management of our waterways (rivers, streams), wetlands, groundwater and stormwater systems. This includes students and adults from schools, community groups (Friends of groups, Scouts, Adult Learning Associations), catchment and sub-regional groups, NRM professionals, local government, metropolitan regional councils, universities and TAFE.

(b) The River Restoration project addresses the need for skills and knowledge in surface water protection, management and restoration in the Swan region for the general community and NRM professionals. Training is often “hands on” to increase skills and confidence, eg in riffle-building and fishway construction. The project has scope to expand to suit the needs of community eg, acid sulphate soils, salinity and cultural heritage. Technical support will be offered for action planning and on-ground activities for ecosystem management of rivers estuaries and wetlands to agencies, local government, community groups and landholders. Strong partnerships have been developed with Department of Environment and sub-regional groups to deliver this project in specific target areas where there is a demand.

The project:

- provides technical support and assistance for action planning and on the ground activities for the ecosystem management of rivers, estuaries and wetlands by agencies, local government, community groups and landholders. This includes supporting the collection of data, design and implementation for coordinator and community owned projects.
- facilitates community understanding and increased knowledge and capacity to undertake restoration projects by developing and conducting river restoration workshops in partnership with the community. Further to this, the project supports the delivery of catchment coordinator and community driven workshops.
- supports coordinator networks including the Catchment Officers Support Network and the Natural Areas Managers Network.

- supports technical working groups including the Canning River Environmental Flows technical working group.
- Supports the delivery and implementation of Enviro Funds and other funding sources.

(c) The Groundwater and River Restoration sub-projects have been operating since July 2003 out of the Swan Catchment Centre. Together they address the need for skills and knowledge in surface and groundwater protection, management and restoration in the Swan region for the general community and NRM professionals. Strong partnerships have been developed with Department of Environment and sub-regional groups to deliver this component of the project in specific target areas where there is a demand for these types of education and training. Although some general training events have been run, the majority of the workshops have been targeted at priority areas within the Swan region, for example the Canning River in Gosnells, the Ellen Brook Catchment and Bannister Creek in Lynwood. This project links to the Environmental Water Provisions project and river restoration projects in the sub-regions. Partnerships are already in place with the Department of Environment, Ribbons of Blue and sub-regional groups.

Technical Assessment: ***High***

Outputs

Number of awareness raising events such as demonstrations, field days or study tours conducted
Number of written products such as brochures, newsletters, posters or fact sheets developed
Number of displays for use at events such as regional meetings developed
Number of media opportunities resulting in articles in newspapers or on radio or television created
Number of websites developed or significantly enhanced
Number of training sessions, workshops, seminars or other skills and training events conducted
Number of community groups or projects assisted

3.6.5.4 Outcomes

There are many "happy" stories about the effectiveness of the constituent sub-projects, but the sheer range of activity and its inevitable linkage with trends in direction amongst community groups makes it difficult to predict outcomes. What can be stated is that the project will in future be much more carefully directed to matters highlighted in the Strategy. A new Commonwealth project has recently commenced to assess ways in which outcomes from community education and training can be better predicted, and programs adapted to achieve the best results. The results of this project are eagerly awaited.

3.6.6 Integrated Water Management Implementation Framework (IWM10)

3.6.6.1 Activity Type

25% resource assessment, 25% planning, 25% on-ground and 25% capacity building

3.6.6.2 Assets addressed

Waterways, wetlands and groundwater

3.6.6.3 Threats addressed

Altered hydology, salinity, acidification, nutrient export and enrichment, erosion/sedimentation, drainage modification, introduced aquatic pests, groundwater and surface water contamination, water abstraction, stormwater discharge, clearing and filling of wetlands.

3.6.6.4 Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Inland aquatic ecosystems integrity	WR1 Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.1 WM1.2 WM 1.3 WM1.4 WM1.5	
Estuarine, coastal and marine habitats integrity	WR2 Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	WM2.1 WM2.2 WM2.3 WM2.4 WM2.5	
Nutrients in aquatic environments	WR3 Maximum concentrations, for priority waterways, do not exceed o.1mg/L for total P and 1.0mg/L for total N by 2020	WM3.1 WM3.2 WM3.3 WM3.4	
Turbidity/suspended particulate matter in aquatic environments	WR4 Maintain and improve condition of aquatic environments in the Region, as measured at representative sites by 2020	WM4.1 WM4.2 WM4.3 WM4.4	
Surface water salinity in freshwater aquatic environments	WR5 Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region as measured at representative sites by 2020	WM5.1 WM5.2 WM5.3 WM5.4	

3.6.6.5 Budget

Table 24: Proposed budget for the Integrated Water Management Program Implementation Framework

	NHT	State	Other
Year 1	$561,000	$20,000	$25,000
Year 2	$561,000	$20,000	$25,000
Year 3	$561,000	$20,000	$25,000

3.6.6.6 Description

This project provides the framework for coordination and delivery of the Integrated Water Management Regional Delivery Program. The framework consists of an Integrated Water Management Program Manager, a part-time Communications Officer, Local Government Officer and Indigenous Officer as well as several regional Integrated Water Management Officers. The role of these officers is to:

- Support implementation of the projects within the Integrated Water Management Program
- Develop partnerships with key stakeholders to develop and implement Integrated Water Management projects
- Coordinate activities within the Integrated Water Management Program to maximise efficiency and outcomes
- Implement monitoring and evaluation programs

3.6.6.7 Outputs

Outputs will often be included in other project outputs. Specific outputs to this project will be across the full range of standard outputs

3.6.6.8 Outcomes

Outcomes will be included in other listed project outcomes. There will also be a major role in liaison with stakeholders and creation of new opportunities.

3.7 Other Potential Projects

Following from the Gap Analysis, a number of new or extended project activities were nominated. The Swan Catchment Council will develop and assess these projects further and will actively pursue funding opportunities for them as appropriate. Table 25 gives descriptions of these projects, and fuller details are given in Investment Plan Technical Report No 4 *Evaluation of Current Project Activities and Gaps*. New projects that were nominated for NHT2 funding in the Swan Catchment Council's Funding Priorities Workshop are described in Investment Plan Technical Report No 7 *Project Funding Priorities Workshop*, and have been listed in Table 17.

Table 25: Projects nominated for development in future in the Integrated Water management Program: all funding sources

	Project Description	Indicative Funding Requirement ($000s)
	Aquatic Ecosystem Integrity: Rivers & Streams	
1.	Appoint staff to implement existing management plans, on-ground works and volunteer coordination.	
2.	Position to investigate and set up environmental service units / arm of sub-regional groups.	
3.	Develop a regional information system for integrated water management.	500 over 3 years.
	Aquatic Ecosystem Integrity Wetlands	
4.	Audit and review of environmental planning process for protection of priority wetlands. Decide on priority wetlands for conservation, restoration and protection at sub-regional level.	
5.	Officer to liaise with developers and consultants and link DoE and WSCD.	
6.	Jandakot groundwater work (WM2.3.1)	
7.	Acid Sulphate Soils mapping.	
	Nutrients in Aquatic Environments	
8.	Study of behavioural change in the household.	100
9.	Review / assessment of existing BMP demonstration sites to a standardised criteria.	
10.	Publish information on design standards for engineers, drainage practitioners and planners.	
11.	Improved groundwater monitoring program.	
12.	Finalize drainage reform.	
13.	Improved legislative controls.	
	Turbidity & Particulate Matter in Aquatic Environments	
14.	Sediment sourcing study	150
15.	Extension to River Bank Program	
16.	Sediment controls in Avon.	See Avon IP
17.	Legislation, policy and code of practice review.	60
	Surface Water Salinity in Fresh Water Aquatic Environments	
18.	Community participation benchmark. 1 Year	20
19.	Scoping educational institutions partnerships. 1 Year	25
20.	Cross sub-regional groundwater monitoring. 2 years	250
21.	Review NRM legislation. 1 year	100
22.	Regional information system. 1 year	250
23.	Large-scale water quality remediation project. 4 – 5 years	2,000

3.8 Program Outcomes

3.8.1 Whole of Strategy

With full funding of the Integrated Water Management Program over the full five years of the Strategy, critical baseline data on aquatic ecology of surface waters will be established. There will also be substantial improvements in our understanding of response processes. Water quality monitoring and modelling data will become more complete. The foreshores of the Swan-Canning estuary will be substantially improved. An environmental flow allocation system will have been designed and applied for the Canning River, and extension to other regional rivers will have started. Essential control mechanisms for groundwater use and allocation will be maintained and improved. There will be a greater understanding within the community of appropriate behaviours for groundwater quality maintenance. There is stronger community involvement and rehabilitation action in dealing with threats to freshwater lakes and wetlands.

With adequate investment from all stakeholders and cross-regional collaboration with the Avon Region there will be a very significant reduction in nutrient and sediment flows into this iconic system. A large-scale initiative in surface water management of Darling Range streams is underway.

4. SUSTAINABLE PRODUCTION REGIONAL DELIVERY PROGRAM

4.1 Rationale

The rationale for the Sustainable Production Program is that a common approach is needed to changing systems and behaviours in productive activities. The Swan Catchment Council provides a suitable framework for government-community linkages for natural resource management improvements. This Program has therefore been given responsibility for addressing issues of change in broad acre and intensive agriculture, forestry, aquaculture, industry and commerce leading to improved natural resource outcomes. The Program is responsible for the Land and Air Themes of the Strategy. It also picks up issues of changed production systems related to the Natural Diversity, Water and Coastal and Marine Themes. It shares responsibility along with the other Regional Delivery Programs for Regional Capacity Building.

4.2 Targets

4.2.1 Land Salinity

Resource Condition Target:

- ***There will be a reduction in the area of salinity-affected land within the Avon Upper Swan NAP region by 2020 (RCT to be set by December 2005)***

Throughout the world, land close to a major metropolitan area attains a high value. While zoning introduces considerable effects on land price, the effect of land degradation on land value *within* a planning zone is approximately proportional to its land price. In other words, salinity will have a larger absolute impact on land value in a high-value area zoned rural, than in a remote area with the same zoning.

The Strategy supports the retention of high quality rural land for agricultural use. Investment in agricultural land protection will have multiple benefits, not just for production but also for the value of water and biodiversity assets.

4.2.2 Soil Condition

Resource Condition Target:

- ***Maintain and improve soil condition, at measured at representative sites, including extent of water erosion, waterlogging and acid sulfate soils by 2020. (RCT to be set by December 2005)***

Erosion, waterlogging and acid soils development are significant threats to natural values in the region, particularly aquatic ecology. Waterlogging is instrumental in sheet erosion and nutrient transport, especially during winter in areas where the groundwater table lies close to the surface. Development of acid sulphate soils can be devastating to both natural systems and the built environment.

4.2.3 Natural Diversity

Resource Condition Target:

- ***Reduction in impact of regionally significant invasive species by 2020 (RCT to be set by December 2005)***

The Program will promote improvements in management to prevent any new introduction of feral/pest animals/plants and diseases. Returns to investment from protection and rehabilitation of natural diversity are described are described in Part B Section 6.

4.2.4 Integrated Water Management

Resource Condition Target:

- ***Implement identified remedial actions to address surface water salinity in the Avon Upper Swan Region by 2009***

The program will play a lead role in implementation of remedial actions for salinity and water quality, with emphasis on opportunities for replanting with indigenous species, perennial pastures, or plantations.

- ***Maintain and improve the condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with a quantified target for major rivers and waterways in the region set by 2005)***

The contribution of the Sustainable Production program will be to collaborate in the Swan-Canning Cleanup Program Action plan, and to develop and implement industry awareness of BMPs. Issues to be addressed include urban or industrial discharges, drainage modification, nutrient export & enrichment, chemical contamination and erosion and sedimentation. Returns to investment from protection and rehabilitation of natural diversity are described are described in Part B Section 6.

4.2.5 Air

Resource Condition Targets:

- ***Continue to progress towards improved air quality, with resource condition target(s) to be set for air quality by 2005.***
- ***Set resource condition target to manage climate risk and reduce risk of major environmental, economic or social outcomes from drought or coastal land impacts***

As the Strategy states, air quality is a function of the geographic formations, population pressure, management practices (particularly burning and soil management), and behaviours (e.g. industrial emissions, vehicle usage and wood burning) within and beyond the Swan Region. Overall, air quality in Perth is unsatisfactory for relatively short periods of time each year. However, management of sources is a priority in order to prevent further degradation.

The Sustainable Production Program will carry out all Strategy Management Actions required in relation to this Theme. It will assist in establishing Agreements between natural resource management groups for management of inter-regional issues, including fire management regimes and agricultural practices. It will undertake an

inventory of emissions from small to medium sized enterprises, and raising wider regional community participation in air quality programs through promotion of active partnerships with key stakeholder groups.

4.2.6 Estuarine, coastal and marine habitats integrity

Resource Condition Target:

- ***Maintain and improve condition of marine fauna in the Region, as measured at representative sites by 2020, with a quantified target set by 2005.***

The contribution of the Sustainable Production program will be to establish a framework for sustainable aquaculture (whether based inland or at the coast).

4.2.7 Regional Capacity Building

Management Action Targets:

- ***Establish a framework for continuous improvement through adaptive management by 2005***
- ***Establish subregional and local consistency and linkages to the Strategy by 2008***
- ***Review and apply a regional governance structure with security of tenure by 2005***
- ***Develop a regional capacity framework supported by an integrated regional management information system by 2006.***

The Sustainable Production Program's contribution is a 25% share of all target management actions of the Regional Capacity Building Theme Strategy.

4.3 Priorities from Stakeholder Workshops

Choice modeling suggests that the Land Theme, which dominates the work program for the Sustainable Production Program, should attract a significant share of natural resource management investment under the Strategy. While the total investment is less than the two largest programs, namely Natural Diversity and Integrated Water Management, this Program has a vital role to play in its own right and as an essential ingredient in the achievement of targets in those other Programs.

4.4 Total Program Costs

Management Actions overseen by the Sustainable Production Program will require an estimated $ 14.6 million over the 3-year period of the Investment Plan, as shown in Table 27. The wide spread of activity crossing into the themes of air, water, natural diversity, coast and marine and regional capacity building is evident from the $5.6 million of required investment in these areas. However, it should be noted that much of the work in all areas of this Program's responsibility is currently unfunded.

Table 26: Summary of Sustainable Production Program 3-Year Costs ($000s)

Type of Action	Matter for Target			Total 3-Year Cost ($000s)	Percent
	Salinity	Soils	Other Themes		
Resource Assessment	748	288	403	1,438	9.9%
Planning	518	345	863	1,725	11.8%
On-Ground Action	3,288	230	2,335	5,852	40.2%
Regional Capacity Building	2,185	1,357	2,013	5,555	38.1%
Total	6,738	2,220	5,612	14,569	100.0%

There is a large concentration of activity in remedial actions and community participation for amelioration of land salinity, which accounts for 34.3% of the total Program investment.

4.5 NHT2 Funding Proposal

4.5.1 100% Regional Allocation

The methodology for project selection and development is given in Investment Plan Technical Report No 4 *Evaluation of Current Project Activities and Gaps Against Strategy Management Actions*; Technical Report No 5 *Summaries and Technical Evaluations of Proposed Projects*; Technical Report No 6 *Project Statements*; and Technical Report No 7 *Project Funding Priorities Workshop*.

Four projects from this Program were selected by the Project Funding Priorities Workshop for inclusion in the NHT2-funded part of the Investment Plan (Regional Funds), both of which would be new NHT projects. The *Multi-User Decision Support Tool for Salinity*, costing $110,000, will provide full access by all stakeholders to relevant information, and is seen as an important strategic initiative. Similarly the project concerned with *Small and Medium Enterprise Tracking & Auditing,* costing $30,000, is an important initial step in establishing effective industry responses and measures to encourage emissions reductions for both water and air contaminants. It is noteworthy that four other relevant projects from this Program, with a combined budget of $850,000 did not get over the cut-off point for selection in the NHT2 bid, given the indicative amounts available. These have therefore been described as “other potential projects” (see next Section).

In addition to these two regionally funded projects there is a new Commonwealth initiative *Behavioural change caused by current programs*. This project was not considered for priority ranking in the Regional Project Funding Priorities Workshop as it is being funded directly by the Commonwealth from other NHT2 funds.

Table 27: Sustainable Production projects proposed for NHT2 Regional Funding in 2004-05 and 2005-06 ($)

Project Title	2004-05	2005-06
Waste Management Survey Benchmarking	60,000	0
Light Industry Emissions Study	0	50,000
Small & Medium Enterprise racking & Auditing – Part A	50,000	0
Multi-User Decision Support Tool for Salinity	65,000	65,000
Linking Best Management Practices with Property Planning	0	120,000
Sustainable Production Delivery Program Implementation Framework	368,000	368,000
Total	543,000	603,000

4.5.2 + 25% Allocation

Table 28: Supplementary NHT2 funding proposal for the Sustainable Production Program ($)

Project Title	2004-05	2005-06
Small & Medium Enterprise Tracking and Auditing – Part B	100,000	100,000
Integrating Best Management Practices with Property Planning	250,000	250,000
Total	350,000	350,000

4.5.3 Waste Management Survey – Benchmarking (SP01)

4.5.3.1 Activity Type

Planning (80%) and Capacity Building (20%).

4.5.3.2 Assets addressed

Land, Water

4.5.3.3 Threats addressed

Inappropriate systems and disposal practices for solid and liquid wastes

4.5.3.4 Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Industry Best Management Practices (BMP's) defined with benchmarks for implementation established by 2009 for eight land use / industry sectors	Define bmp's & support implementation of BMP's for sme's. (LM2.4)	LR2	
30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in the Region by 2009	Develop/implement sme awareness BMP's: stormwater awareness, water efficiency & conservation. (WM1.5)	WR1	

4.5.3.5 *Budget*

Table 29: Proposed Budget for the Waste Management Survey –Benchmarking Project

Year 1	Year 2	Year 3
$60,000		

4.5.3.6 *Description*

Light industry initiatives target point source pollution and deal with the problem before it enters landfill and waterways with the goal of eventually user pays. To achieve this we need to ensure our data is up to date, timely and useful in program development.

Both solid and liquid waste are critical problems, this has been shown via data and anecdotal evidence. Cumulatively light industry has a severe impact on all assets (over 125,000 in the state with majority within the metro area). Even with state strategies in place solid waste is still growing and the illegal dumping of waste to ground & surface water has led to the introduction of Unauthorised Discharge Regulations targeting sme's.

The database is essential to quantify and qualify how much waste is produced, which industries produce what waste, how it is disposed of (eg illegally, contractors, to landfill, etc). This database will be used by industry, State & Local Government to plan initiatives to prioritise, target, and develop solutions to tackle this problem.

Expressions of interest by consultants will be called to design and deliver the audit and compile the results allowing the results to be critically analysed for policy and program development, the project would be a 1 year project.

Technical Assessment: High

4.5.3.7 *Outputs*

Report on survey results. Presentation of results to Local Government and industry.

4.5.3.8 *Outcomes:*

Much improved practices for solid and liquid waste management and disposal, leading to reduced pollution threats to land, groundwater and surface waters.

Light Industry Emission Study (SP02)

4.5.3.9 *Activity Type*

Planning (40%), On-ground (40%) and Capacity Building (20%).

4.5.3.10 *Assets addressed*

Air

4.5.3.11 *Threats addressed*

Fossil fuels consumption and use, industrial pollution and accidents, loss of vegetation, fire management regimes, agriculture management practices, climate change.

4.5.3.12 *Relationship to Implementation of Strategy*

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Improved air quality with RCT's set for air quality by 2005.	Collect/analyse baseline and trend information	AM1.1	
	Work with DoE and associated partners to set RCT's for air quality.	AM1.1	
	Inventory of sme's emissions linked to National Pollution Inventory 2008	AM1.2	
	Partnerships with Air Coordinating Committee	AM1.2	
	Support community/stakeholder participation relating to air quality improvement.	AM1.2	
	Support research risk of climate change to NRM		
	Support research into climate variability.	AM2.1	
Set RCT's to manage climate risk and reduce risk of environmental, economic or social outcomes from drought or coastal impacts.	Support an education program on Climate change and long term climate variability.	AM2.1 AM2.1	

4.5.3.13 Budget

Table 30: Proposed budget for the Light Industry Emission Study

	NHT	State	Other
Year 1			
Year 2	$50,000		
Year 3			

4.5.3.14 Description

There is an urgent need to systematically tackle this problem. This is an area of concern to everyone in the community as we are constantly warned via data and research of the increasing greenhouse effect, leading to global warning and rapid climate change impacting heavily on every aspect of our lives and ecosystems such as biodiversity and water.

There is a need to increase resources in the study of emissions in a collaborative manner including sme's. We have no specific data which has targeted sme's and seeding funding would provide the impetus to develop a joint approach to this pressing problem. The funding would allow data collection and analysis at targeted industrial precincts and provide the data required to develop policy and programs to deal with this issue.

This project is envisaged as a three-way partnership between DoE, industry and the Council.

Technical Assessment: High

4.5.3.15 Outputs

Targeted emission studies within sme industrial precincts in partnership with DoE. Ongoing data collection and analysis in partnership with DoE. Development of targeted educational material for sme's relating to air emissions.

4.5.3.16 Outcomes:

This project is just a first step in a very worthwhile direction. Until the project is completed it will be difficult to predict outcomes.

4.5.4 Small to Medium Enterprises Tracking, Auditing and Benchmarking -Part A (SP03)

4.5.4.1 Activity Type

Planning(40%), On-ground (20%) and Capacity Building(40%).

4.5.4.2 Assets addressed

Land: soil **Water:** waterways, wetlands and groundwater **Biodiversity**: aquatic **Coastal and Marine**: biodiversity and water quality

4.5.4.3 *Threats addressed*

Land: Chemical and pesticide contamination, Development and/or change in land. **Water:** Nutrient export and enrichment, Chemical and pesticide contamination, Drainage modification, Industrial discharge, Groundwater and surface water contamination, Stormwater discharge. **Biodiversity:** Chemical and pesticide contamination. **Coastal and Marine:** Chemical and pesticide contamination, Coastal and marine infrastructure developments, Stormwater discharge, Industrial discharge. **Regional Capacity:** Willingness in the community for change, Inadequate industry involvement NRM, Adoption of NRM principles and processes at State or Local Government levels.

4.5.4.4 *Relationship to Implementation of Strategy*

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Soil Condition, Inland aquatic ecosystems integrity, Estuarine, coastal & marine habitats integrity Nutrients in aquatic environments, Turbidity/suspended particulate matter in aquatic environments.	Maintain & improve soil condition. Maintain & improve condition of inland ecosystem integrity. Maximum concentrations do not exceed 0.1 mg/L for phosphorous &1.0 mg/L nitrogen. Quantified targets for turbidity/suspended particulate matter.	LM2.4, WM1.5	LM2.3, LM2.5, WM2.5, WM3.1, WM3.4, WM4.2, WM4.4, BM2.5 CMM2.4, CMM2.6, RCM1.1, RCM1.

4.5.4.5 *Budget*

Table 31: Proposed budget for the SMEs Tracking and Auditing project

	NHT	State	Other
Year 1	$50,000		
Year 2			
Year 3			

4.5.4.6 *Description*

At present it is difficult to track SME's unless they are the registered land holder. However, this information does not describe the SME activity. If the property is rental there is no record of the SME activity. There is a need to register all SME businesses and activities and enable authorised auditors (eg Local Authorities) to track tenants.

This database would not only contain a description of the SME but include an environmental/waste audit and allow each Local Authority to track the performance of each SME and take appropriate action if required. The database would be designed for use by all Local Authorities giving opportunities to use the database across all Authorities and allow dissemination of information. It will be a useful tool for a number of reasons such as comparative analysis across industrial precincts, supplying data for targeting specific areas of concern and research by industry, Governments and educational institutions.

This concept has been greeted enthusiastically by all Local Authorities visited, who are all concerned about the lack of ability to track and audit their SME's, and to use this tool for future planning. Local Authorities have shown a keen interest in this project.

Technical Assessment: ***High***

4.5.4.7 *Outputs:*

Number of Councils participating in the program.
Number of businesses registered and number of audits carried out.
Quantifiable data on solid/liquid waste produced and how it is disposed of by SME's via series of snapshot surveys across the metropolitan area.

4.5.4.8 *Outcomes:*

The kind of data produced by this project will be invaluable in targeting appropriate measures to improve overall discharge performance.

4.5.5 Small to Medium Enterprises Tracking, Auditing and Benchmarking - Part B: Devolved Grants Scheme for Local Governments

This project will only be undertaken within an additional 25% NHT2 Regional Funding.

To encourage Local Governments to embrace the tracking and auditing program it is envisaged that a grants scheme be established. The grants scheme would offer seeding grants to 1, help set up the database and 2, support these participating Local Governments in their first series of audits and would only be offered as a once off. These Grants would be offered once the tracking and data base has been trialed and any problems sorted out.

The Devolved Grants would be targeted at Local Governments who have been identified with having old, established industrial precincts and/or have major environmental issues associated with industrial precincts. This could be factual or anecdotal evidence based on issues such as non-sewered areas, identified hotspots by State Agencies and impacts on ground and surface water.

These grants would be limited, one-off grants with all participants expected to continue the initiative. The successful Local Governments would be demonstration projects which could be viewed by other Local Governments, and they would be expected to advocate for the program to other local Governments and other key stakeholders.

4.5.6 Multi-User Decision Support Tool for Salinity (SP04)

4.5.6.1 Activity Type

Planning (40%), on-ground (30%) and capacity building(30%).

4.5.6.2 Assets addressed

Land: soil **Water:** waterways and groundwater.

4.5.6.3 Threats addressed

Land: Salinity. **Water:** Salinity, Groundwater and surface water contamination. **Regional Capacity:** Willingness in the community for change, Inadequate funding support for effective community NRM initiatives, Inadequate industry involvement NRM, Adoption of NRM principles and processes at State or Local Government levels.

4.5.6.4 Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Land salinity Soil Condition Surface water salinity in freshwater aquatic environments Inland aquatic ecosystems integrity.	Reduction in the area of land affected by salinity, within the Avon Upper Swan National action Plan, by 2020.	LM1.1 LM1.3	LM1.2, LM1.4

4.5.6.5 Budget

Table 32: Proposed budget for the Multi-User Decision Tool for Salinity

	NHT	State	Other
Year 1(05/06)	$65,000		
Year 2(06/07)	$65,000		
Year 3			

4.5.6.6 *Description*

The Avon Upper Swan is at risk from increasing salinity, and information about remediation actions is spread over many sources, and is time-consuming to access. There is a need for a simple user-friendly planning tool for use by NRM Officers, community and local government.

This project will develop this tool on CD, to support landcare officers, community landholders and Local Government to identify high risk areas and prioritise these areas for remediation. The database can be built with other modules at a later date. The decision support tool has the capacity to be expanded to identify other NRM and farm productivity issues for other areas and projects. The outcome will be a better use of officers' time, better access to information by community and local government and better on-ground outcomes.

The project will provide landholders and land managers with management tools, technical support and financial incentives to establish sustainable farming systems in these high-risk areas.

Technical Assessment: High

4.5.6.7 *Outputs*

Data mapping completed; Decision Making Tool designed; all high-risk areas identified.

4.5.6.8 *Outcomes*

Officers & others referring to the tool when advising landowners/managers on remediation works, thus maximising effective use of current knowledge.

4.5.7 *Linking Best Management Practices with Property Planning in Intensive Agriculture (SP05)*

4.5.7.1 *Activity Type*

Planning (40%), On-ground (20%) and Capacity Building (40%).

4.5.7.2 *Assets addressed*

Land: soil **Water:** waterways, wetlands and groundwater **Biodiversity**: aquatic **Coastal and Marine**: biodiversity and water quality

4.5.7.3 *Threats addressed*

Land: Waterlogging, erosion, Chemical and pesticide contamination, Development and/or change in land. **Water:** Nutrient export and enrichment, Chemical and pesticide contamination, Drainage modification, Industrial discharge, Groundwater and surface water contamination, **Biodiversity:** Chemical and pesticide contamination. **Coastal and Marine:** Chemical and pesticide contamination, **Regional Capacity:** Willingness in the community for change, inadequate industry involvement in NRM.

4.5.7.4 *Relationship to Implementation of Strategy*

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Regional soil health program developed, with implementation of identified remedial and preventative actions in identified priority areas by 2009 Industry Best Management Practices (BMP's) defined with benchmarks for implementation established by 2009 for eight land use / industry sectors 30% increase in land managers, planners and community participation in soil condition education, mitigation and remediation by 2009	Maintain & improve soil condition via; Identifying areas of land affected by water erosion, water logging, areas for remedial actions based on risk assessment, support & integrate development of monitoring systems to set information for land condition parameters, implementing BMP's. Define industry BMP's & support implementation of sustainable BMP programs.	LM2.3, LM2.4 LM2.5	WM3.3 WM3.4 WM4.3 WM4.4

Budget

Table 33: Proposed budget for Linking BMPs with Property Planning in Intensive Agriculture

	NHT	State	Other
Year 1	0		
Year 2	120,000		
Year 3	320,000		

The budget for Year 2 (2005-06) covers the initial development of the program (see description below). Investment should be earmarked in year 3 (2006-07) to:

- Develop an extension program ($150,000).
- Fund implementation of best management property plans through an incentive scheme ($150,000); and
- Undertake an evaluation process to test the framework for adoption in other irrigated agriculture industry sectors ($20,000).

4.5.7.5 *Description*

The Vegetable Growers Association has access to substantial industry funds collected through a levy. There is an opportunity for the Catchment Council to invest in a program that adds value to a current industry funded project that has as its main aim a greater water use efficiency in the vegetable industry through best management irrigation.

Auditors are employed to work with the top 20% of vegetable growers to implement water use efficiency measures. Investment through the Council could broaden the scope of the industry project to (i) compile the range of best management practice measures applicable to the vegetable industry; (ii) prepare property management plans with key landholders identified through the industry program; (ii) establish best practice farms in conjunction with an extension/eduction program; and (iv)implement best management property plans through a joint landholder/NHT incentive program.

The framework established for this intensive agriculture sector could be evaluated for adoption in the other irrigated agriculture sector (fruit, nuts, grapes, turf etc.)

4.5.7.6 *Outputs*

Compilation of BMPs for vegetable growers

Property Management Plans developed by vegetable growers

Property management plans implemented by vegetable growers

4.5.7.7 *Outcomes*

Improved application of natural resource management principles in property planning and management throughout the vegetable growing industry on the Swan Coastal Plain.

4.5.8 *Sustainable Production Implementation Framework (SP10)*

4.5.8.1 *Activity Type*

25% resource assessment, 25% planning, 25% on-ground and 25% capacity building

4.5.8.2 *Assets addressed*

Land, Water, Aquatic Biodiversity, Coastal and Marine, Air

4.5.8.3 *Threats addressed*

Chemical and pesticide contamination, development and/or change in land use, nutrient export and enrichment, drainage modification, industrial discharge, groundwater and surface contamination, water abstraction, stormwater discharge, agricultural management practices, inadequate industry involvement in NRM

4.5.8.4 Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Land salinity	LR1 Reduction in the area of land affected by salinity, within the Avon Upper Swan NAP Region by 2020	LM 1.3 LM1.4	LM1.1 LM 1.2
Soil Condition	LR2 Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulphate soils by 2020	LM2.1 LM2.3 LM2.4 LM2.5	LM2.2
Inland aquatic ecosystems integrity	WR1 Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.4 WM1.5	WM1.2 WM 1.3
Estuarine, coastal and marine habitats integrity	WR2 Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005) CMR2 maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020	WM2.3 WM2.4 WM2.5 CMM2.3 CMM2.4 CMM2.5 CMM2.6	WM2.1 WM2.2
Nutrients in aquatic environments	WR3 Maximum concentrations, for priority waterways, do not exceed o.1mg/L for total P and 1.0mg/L for total N by 2020	WM3.1 WM3.2 WM3.3 WM3.4	
Turbidity/suspended particulate matter in aquatic environments	WR4 Maintain and improve condition of aquatic environments in the Region, as measured at representative sites by 2020	WM4.2 WM4.3 WM4.4	WM4.1
Surface water salinity in freshwater aquatic environments	Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region as measured at representative sites by 2020	WM5.3 WM5.4	WM5.1 WM5.2
AR1	Continue to progress towards improved air quality, with RCT's to be set by 2005	AM1.2	

4.5.8.5 Budget

Table 34: Proposed budget for the Sustainable Production Program Implementation Framework

	NHT	State	Other
Year 1	$368,000	$20,000	$25,000
Year 2	$368,000	$20,000	$25,000
Year 3	$368,000	$20,000	$25,000

4.5.8.6 Description

This project provides the framework for coordination and delivery of the Sustainable Production Regional Delivery Program, which covers Light Industry and Agriculture. The framework consists of a Sustainable Production Program Manager, a part-time Communications Officer, Local Government Officer and Indigenous Officer as well as several regional Sustainable Production Officers. The role of these officers is to:

- Support implementation of the projects within the Sustainable Production Program
- Develop partnerships with key stakeholders to develop and implement Sustainable production projects
- Coordinate activities within the Sustainable Production Program to maximise efficiency and outcomes
- Implement monitoring and evaluation programs

4.5.8.7 *Outputs*

Outputs will often be included in other project outputs. Specific outputs to this project will be across the full range of standard outputs

4.5.8.8 *Outcomes*

Outcomes will often be included in other listed project outcomes. There is also a major role in liaising with stakeholders and generation of new initiatives

4.6 Other Potential Projects

Following from the Gap Analysis, a total of 32 new or extended project activities were nominated for the Sustainable Production Delivery Program. Table 35 gives descriptions of these projects, and details are given in Investment Plan Technical Report No 4 *Evaluation of Current Project Activities and Gaps*. New projects that were nominated for NHT2 funding in the Swan Catchment Council's Funding Priorities Workshop are described in Investment Plan Technical Report No 7 *Project Funding Priorities Workshop*, and have been listed in Table 27. The Swan Catchment Council will develop and assess these projects further and will actively pursue funding opportunities for them as appropriate.

Table 35: Projects nominated for development in future in the Sustainable Production Program: all funding sources

	Project Description	Indicative Cost ($)
	Land Salinity	
1.	Risk Mapping in Eastern Hills.	150,000
2.	Alternative revegetation method for workshops and other issues (information sharing).	60,000
3.	BMPs for Bush Foods, Sandalwood.	10,000
4.	Baseline data collation to monitor 30% increase (benchmarking).	5,000
5.	"Big project" multifaceted approach to a recovery catchment [1]	2,000,000
6.	Resources to work with stakeholders.	
	SOIL CONDITION (FARMS)	
7.	Information coordination. (One Stop Shop for business, farmers and industry sector.)	
8.	Onsite farm / business audits.	
9.	Business demonstration sites.	
10.	Incentive scheme for business to purchase monitoring equipment.	
11.	Regional baseline data for groundwater.	
12.	Economic assessment for productivity.	
13.	BMP Nutrient Management Plans for farmers.	
	Aquatic Ecosystem Integrity	
14.	Assessment gaps – comparison, "what, who, where is happening now". (Survey audit.)	
15.	Co-ordination gaps – One Stop Shop (can also be SCC Program Manager).	
16.	Unauthorised Discharge Regulations training and resourcing (investigate way that this can occur).	
17.	Develop a program for Local Government to ensure that owners provide tenants with proper facilities that relate to the industry involved.	
	Nutrients in Aquatic Environments	
18.	Promote NRM Manual for Local Government to Local Governments.	
19.	Industry to continue and increase Information Sheets.	
20.	Industry change – Technology Officers and expanded Greenstamp program.	
	Soil Condition (Light Industry)	
21.	Benchmark survey to establish sustainable light industry attitudes about best management practices. (Sustainable light industry to assess knowledge and attitudes, to help promote behaviour change.)	Budget very dependent upon scope 20,000 to 50,000
22.	Establish environmental values for existing coastal environments that have not yet been identified. (CMR1 and CMR2.)	50,000
	Air	
23.	Education and awareness raising project.	100,000/yr
24.	Stakeholder engagement workshops to progress issue.	50,000/yr
	Coastal and Marine	
25.	Benchmark survey to establish sustainable light industry attitudes about best management practices. (Sustainable light industry to assess knowledge and attitudes, to help promote behaviour change.)	Budget very dependent upon scope $20,000 to 50,000
26.	Establish environmental values for existing coastal environments that have not yet been identified. (CMR1 and CMR2.)	$50,000
27.	Education and awareness raising project.	$100,000/yr
28.	Stakeholder engagement workshops to progress issue.	50,000/yr

4.7 Summary of Program Outcomes

4.7.1 Land

The proposed Decision Tool for salinity management will lead to enhanced on-ground actions for salinity remediation with improved information accessibility and information/decision support.

Strengthened regulatory systems and encouragement of best management practices in small and medium enterprise will eventually lead to an improvement in pollutant discharges to land.

4.7.2 Air

The emissions study will assist in identifying industries and practices that need to be targeted for improved emissions levels.

4.7.3 Water

More medium sized industries will be adopting best management practices for controlling the quality and destination of drainage waters. More widespread adoption of storm water management principles will be found in local government.

There will be an improvement in the natural resource management practices of intensive agricultural enterprises, especially in the areas of agricultural pollution of groundwater, and in the conservation of remnant vegetation.

5. COASTAL AND MARINE REGIONAL DELIVERY PROGRAM

5.1 Rationale

Perth's coastline and offshore waters are the playground for a large part of the growing population. The brilliant colours and clarity of the water, and the rich diversity of sea life attract thousands of recreational users throughout the year. Power boating, yachting, surfing, sailing, fishing, snorkelling and beach usage are at their height in summer. The beach shacks are no longer, but the intensity of use is much higher. Four large marinas have been built between Fremantle and Yanchep, and two further marinas are proposed in Cockburn Sound. Gage Roads provides the entry route for the vastly increased amount of commercial shipping coming to Fremantle and Cockburn Sound. Rottnest Island remains a premier recreational and environmental focus for many Perth residents and tourists. Therefore, protection of estuarine, coastal and marine habitats integrity, and the cultural values associated with the marine environment must be a high priority for the Swan region

5.2 Targets

5.2.1 Estuarine, Coastal and Marine Habitats Integrity

Resource Condition Targets:

- ***Maintain and improve condition of terrestrial coastal habitats in the Region, as measured at representative sites by 2020, with a quantified target set by 2005***
- ***Maintain and improve condition of marine habitats in the Region, as measured at representative sites by 2020, with a quantified target set by 2005***
- ***Maintain and improve condition of marine fauna in the Region, as measured at representative sites by 2020, with a quantified target set by 2005***

Symptoms of degradation of the region's coastal and marine environment, which creates a need for new investment, are biodiversity decline exotic marine species; ecosystem fragmentation; exotic plants and habitat loss. Prominent causes are recreational activities, urban or industrial discharges, erosion and sedimentation, nutrient export and enrichment (which are a major factor in sea grass death and which can create monocultures elsewhere), process disruption, infrastructure development, and chemical contamination. Beach access is an ongoing issue for dune preservation. There is generally inadequate recognition of the long-term effects of usage and development along the coastal strip.

Investment aims: (i) to change community attitudes to use of the coast and marine environment, particularly with regard to recreational boating, and to increase community involvement and awareness; (ii) to improve knowledge of the biodiversity and ecosystem functions of the coast and offshore waters; and (iii) to promote better understanding of impacts from the recreational taking of fish, molluscs and crustaceans.

5.2.2 Cultural Heritage

Management Action Targets:

- ***Research, record, and publish Nyoongar history of the Swan Region by 2009.***
- ***Review and identification of opportunities in policy and legislation to include Indigenous cultural heritage by 2009***
- ***Increase Indigenous employment and participation in NRM activities locally and regionally by 2009.***
- ***Achieve 75% per cent increase in the number of community, LGA's and State government agencies involved in NRM incorporating indigenous cultural heritage included as part of their processes by 2009.***
- ***Establish partnerships to further incorporate NRM principles into heritage protection by 2008.***

The Coastal and Marine Program's contribution is a 33% share of all target management actions of the Cultural Heritage Theme Strategy.

5.2.3 Regional Capacity Building

Management Action Targets:

- ***Establish a framework for continuous improvement through adaptive management by 2005***
- ***Establish subregional and local consistency and linkages to the Strategy by 2008***
- ***Review and apply a regional governance structure with security of tenure by 2005***
- ***Develop a regional capacity framework supported by an integrated regional management information system by 2006.***

The Coastal and Marine Program's contribution is a 25% share of all target management actions of the Regional Capacity Building Theme Strategy.

5.3 Priorities from Stakeholder Workshops

Choice modeling suggests that the Coastal and Marine Theme should attract a significant share of natural resource management investment under the Strategy, though smaller than the programs dealing with (terrestrial) Natural Diversity and Integrated Water Management. Total program costs are commensurate with the relative investment level indicated in the Choice Modeling workshops.

5.4 Total Program Costs

A total 3-year investment required of $16.3 million is required to fulfil the Coastal and Marine Program. Table 36 shows that approximately 34% of the budget addresses beaches and frontal dunes, 38% marine habitats, 17% is for targeting the protection of marine fauna, and 10% is the cost of this program's contribution to the Cultural Heritage and Regional Capacity Building Themes.

Table 36: Summary of total investment required by the Coast & Marine Program 3-Year Costs ($000s)

Type of Action	Matter for Target				Total 3-Year Cost ($000s)	Percent
	Terrestrial Coastal Habitats	Marine Habitats	Marine Fauna Protection	Other Themes		
Resource Assessment	2,070	1,955	1668	192	5,884	36.1%
Planning	1,265	1,898	1208	182	4,552	27.9%
On-Ground Action	1,035	1,150	0	96	2,281	14.0%
Regional Capacity Building	1,208	1,208	0	1,169	3,584	22.0%
Total	5,578	6,210	2875	1,639	16,301	100.0%
Percent	34.2%	38.1%	17.6%	10.1%	100.0%	

"On-ground" actions form a smaller proportion of the total budget than in other Programs, largely because of the pressing need to establish better management information and the fact that most management actions are behavioural and usage-related.

5.5 NHT2 Funding Proposal

5.5.1 100% Indicative Funding

The methodology for project selection and development is given in Investment Plan Technical Report No 4 *Evaluation of Current Project Activities and Gaps Against Strategy Management Actions*; Technical Report No 5 *Summaries and Technical Evaluations of Proposed Projects*; Technical Report No 6 *Project Statements*; and Technical Report No 7 *Project Funding Priorities Workshop*. Projects selected for proposed NHT2 funding are given in Table 37.

Table 37: Coast and Marine projects proposed for NHT2 Regional Funding in 2004-05 and 2005-06

Project Title	2004-05	2005-06
Coastal Condition Evaluation	100,000	0
Marine Fauna Mapping	250,000	128,000
Coastal & Marine Delivery Program Implementation Framework	284,000	284,000
Total	634,000	412,000

5.5.2 +25% Regional Allocation

Table 38: Supplementary NHT2 funding proposal Coastal and Marine Program

Project Title	2004-05	2005-06
Coastal Targets	100,000	100,000

5.5.3 Ecological assessment and management of Coastal Natural Areas in the Swan Region -Stage 1 & Stage 2 (C&M01)

5.5.3.1 Activity Type

	Stage 1	Stage 2
Resource assessment	70%	0%
Planning	15%	15%
On-ground	0%	60%
Capacity building	15%	25%

5.5.3.2 Assets addressed

Unique coastal habitat; Coastal nesting sites for birds; Unique geomorphology and variety of habitats; Dune stability; Tourism; Coastal real estate values; Access to iconic beaches; Education; Bird watching; Recreation; Spiritual values; Aesthetic values

The Quindalup and Spearwood dune systems have the highest number of reptile species.

5.5.3.3 Threats addressed

Habitat loss/fragmentation; weeds; feral animals; recreational use; erosion and development pressures.

5.5.3.4 Relationship to Implementation of Strategy

MAT	RCT	Primary MAT's	Secondary MAT's
Estuarine, Coastal and Marine Habitat Integrity	Maintain and improve terrestrial coastal habitats condition in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	CMM1.1 CMM1.2	CMM 1.4

5.5.3.5 Budget

Table 39: Proposed budget for the Coastal Condition Project

	NHT	Other
Year 1	100,000	23,130
Year 2	0	33,500
Year 3		

Description

The Project aims to evaluate and identify priority coastal areas in the Swan Region for management.

Stage 1 - Coastal Condition Evaluation

- Undertake desktop assessment of coastal natural areas using natural area initial assessment desktop template to identify extent of coastal natural areas, tenure, agency responsible for management.
- Apply the natural area initial assessment field and summary templates to coastal natural areas to identify the ecological values and management requirements of these areas.
- Integration of information collected from natural area initial assessment templates into a regional database (database is currently being developed by the Perth Biodiversity Project).

Stage 2 – Coastal Targets & On-ground management.

- Utilise the database to prepare maps, summary statistics and reports highlighting the ecological values, management needs and priorities for action of all natural areas surveyed.
- Distribute funds to undertake management actions within priority coastal natural areas.

5.5.4 Outputs

Number of studies completed
Number of new monitoring programs established
Number of biophysical studies completed & area (ha) surveyed
Number of reports completed
Number of other resource management plans completed
Number of formally documented collaborative arrangements developed
Number of arrangements for effective collaboration negotiated where a formal agreement does not exist
Number of new databases developed
Number of community groups or projects assisted
Area (ha) of coastal native vegetation protected by fencing
Area (ha) of coastal native vegetation enhanced/rehabilitated
Area (ha) planted to coastal native species
Area (ha) of pest plan control measures implemented
Area (ha) of pest animal control (vertebrates) measures implemented

5.5.5 Outcomes

This is a target-setting project that is firmly focused on on-ground action later.

5.5.6 Identifying Key Indicators: Develop and implement a scientific methodology to identify key indicator species for the protection and conservation of viable populations of marine fauna (C&M03)

5.5.6.1 Activity Type

Resource assessment	95%
Planning	0%
On-ground	0%
Capacity building	5%

5.5.6.2 Assets addressed

Diverse and unique reef system species; Diverse marine fauna; Diverse marine fish population; Water quality; Leeuwin current provides for unique tropical species; Fishing industry; Marine industry; Recreation

5.5.6.3 Threats addressed

Biodiversity loss – water quality (stormwater, chemical and pesticide contamination), recreation use, commercial fishing, marine pests. Disruption to marine processes

5.5.6.4 Relationship to Implementation of Strategy

Matter for Target	**RCT**	**Primary MAT's**	**Secondary MAT's**
Estuarine, Coastal and Marine Habitat Integrity	Maintain and improve the condition of marine fauna in the Region, as measured at representative sites, by 2020 (with a quantified target for key indicator species set by 2005)	CMM 3.1	

5.5.6.5 Budget

Table 40: Proposed budget for the Marine Fauna Mapping project

	NHT	Other
Year 1	$250,000	$2,500+
Year 2	$128,000	$2,500+
Year 3		

5.5.6.6 Description

Through gap analyses, workshops and conceptual modelling this project will identify sensitive or vulnerable species that are critical to, or indicators of, the status of key marine ecosystem components or processes within the Swan Region.

Selected marine taxa will be representative of the range of marine habitats within the Region and will be able to take into account of direct and indirect human pressures. After this initial phase of the project sampling design and data collection methods will be developed and tested. Sampling will include a seasonal component in order to ensure that the indicators can detect change as a result of pressures other than natural variation. These programs will then be implemented to provide a full two years of baseline data within the timeframe of this project.

A further outcome of the project will be an analysis of the sampling to refine and initial methods and sampling design to provide the best possible basis for establishing a long-term indicatory program.

5.5.6.7 Outputs

Number of studies completed
Number of new monitoring programs established
Number of biophysical studies completed & area (ha) surveyed
Number of reports completed
Number of other decision support tools developed.
Number of research and development studies completed
Number of formally documented collaborative arrangements developed
Number of organisational learning reviews completed
Number of new databases developed
Number of community groups or projects assisted
Area (ha) of coastal native vegetation protected by fencing
Area (ha) of coastal native vegetation enhanced/rehabilitated
Area (ha) planted to coastal native species
Area (ha) of pest plan control measures implemented
Area (ha) of pest animal control (vertebrates) measures implemented

5.5.6.8 Outcome

Long-term indicatory program for monitoring marine fauna

5.5.7 Coastal and Marine Implementation Framework

5.5.7.1 Activity Type

25% resource assessment, 25% planning, 25% on-ground and 25% capacity building

5.5.7.2 Assets addressed

Coastal and marine Biodiversity, Water quality

5.5.7.3 Threats addressed

Chemical and pesticide contamination, development and/or change in land use, groundwater and surface contamination, stormwater discharge, recreation, native vegetation clearing, exotic plants, feral animals, plant diseases, animal diseases, fragmentation of natural resources, erosion/sedimentation, introduced aquatic pests, habitat loss

5.5.7.4 Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Estuarine, coastal and marine habitats integrity	CMR1 maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites by 2020 CMR2 maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020 CMR3 maintain and improve the condition of marine fauna in the region, as measured at representative sites by 2020	CMM1.1 CMM1.2 CMM1.3 CMM1.4 CMM1.5 CMM2.1 CMM2.2 CMM2.3 CMM2.4 CMM2.5 CMM2.6 CMM3.1 CMM3.2 CMM3.3 CMM3.4	

5.5.7.5 Budget

Table 41: Proposed budget for the Coastal and Marine Program Implementation Framework

	NHT	State	Other
Year 1	$284,000	$20,000	$25,000
Year 2	$284,000	$20,000	$25,000
Year 3	$284,000	$20,000	$25,000

5.5.7.6 Description

This project provides the framework for coordination and delivery of the Coastal and Marine Regional Delivery Program. The framework consists of a Coastal and Marine Program Manager, a part-time Communications Officer, Local Government Officer and Indigenous Officer as well as several regional Coastal and Marine Officers. The role of these officers is to:

- Support implementation of the projects within the Coastal and Marine Program
- Develop partnerships with key stakeholders to develop and Coastal and Marine projects
- Coordinate activities within the Coastal and Marine Program to maximise efficiency and outcomes
- Implement monitoring and evaluation programs

5.5.7.7 Outputs

Outputs will often be included in other project outputs. Specific outputs to this project will be across the full range of standard outputs

5.5.7.8 Outcomes

Outcomes will often be included in other projects. There is a significant role in liaising with stakeholders and generating new opportunities for improved coastal and marine management

5.6 Other Potential Projects

Following from the Gap Analysis, a number of new or extended project activities were nominated. The Swan Catchment Council will develop and assess these projects further and will actively pursue funding opportunities for them as appropriate.

Table 42 gives descriptions of these projects, and fuller details are given in Investment Plan Technical Report No 4 *Evaluation of Current Project Activities and Gaps*. New projects that were nominated for NHT2 funding in the Swan Catchment Council's Funding Priorities Workshop are described in Investment Plan Technical Report No 7 *Project Funding Priorities Workshop*, and have been listed in Table 37.

Table 42: Projects nominated for development in future in the Coastal and Marine Program: all funding sources

	Project Description	Indicative Funding Requirement ($)
	Estuarine, Coastal and Marine Habitat Integrity: terrestrial	
1.	Protection and restoration targets for coastal areas.	100,000
2.	Framework for sustainable aquaculture.	
	Estuarine, Coastal and Marine Habitat Integrity: marine habitats	
3.	Monitoring and information systems projects (systems part).	80,000
4.	Monitoring and information systems project	100,000
5.	Situational analysis of marine habitats	100,000
6.	Key indicator species	
7.	Listing of threatened species	
8.	Collaborative research on the impacts of recreational fishing.	
	Maintain and improve the condition of marine fauna:	
9.	Develop maps of existing information on marine fauna.	
10.	Key indicator species (highest priority)	
11.	Collaborative research on impacts of recreational fishing	
12.	Framework for sustainable aquaculture (lowest priority)	
13.	Listing of threatened species (highest priority)	

5.7 Summary of Program Outcomes

Full funding of the Investment Plan will enable significant progress with source controls for marine pollution targeting wastewater, stormwater, by-products of recreation, local government planning and management, and aquaculture developments. A much better understanding of recreational fishing impacts on marine fauna will enable equitable and sustainable management practices. There will be an improved detection and response system for marine pests. The marine ecology of offshore islands will be better protected through a more effective wildlife monitoring and management program.

As a result of the two projects proposed for NHT2 funding, our understanding of the marine environment will be substantially increased through new monitoring and analysis. The knowledge base for protecting coastal development from future sea level rise will be enhanced. Beach and frontal dune ecosystems will be better protected.

6. BENEFITS OF THE PLANNED INVESTMENTS

Indicative estimates of the benefits of successful implementation of the Strategy have been developed using relatively recent studies undertaken by environmental economists. These refer to both "Priced" and "Unpriced" outcomes, which are discussed below.

6.1 Priced Outcomes

Priced environmental values refer to situations where the value of an environmental outcome can be estimated using market prices. Examples of market price estimates include the value of agricultural land saved, the averted additional costs of water supply, the monetary costs incurred by households from degraded resources (e.g. water quality).

The Swan Region contains a number of surface water and groundwater resources that are of interest for future water supplies. Resource Economics Unit has estimated values for damages occurring as a result of degraded surface water used for water supply purposes. The costs of degradation from salinity, nutrients and turbidity were estimated.

6.2 Unpriced Outcomes

Unpriced values refer to situations where the willingness of society to pay for environmental outcomes is not revealed in a market. Typical unpriced benefits include public goods such as biodiversity, surface waters that are suitable for swimming or fishing, and visual landscape features.

In order to provide an indicative value for the policies enunciated in the Strategy, environmental economic research undertaken on behalf of the National Land and Water Resources Audit has been used to provide a "benefit transfer" estimate of unpriced outcomes. "Benefit transfer" refers to the use of results from research in one area to provide an indicative estimate of household willingness to pay for improved environmental outcomes in another.

The National Land and Water Resources Audit undertook a national sample of 3,200 households, and a separate Perth Metropolitan Area sample of 1,400 households. The authors noted that the proportions of respondents supporting "Green Groups" in this survey were higher than reported by the Australian Bureau of Statistics, suggesting that the unadjusted results may have an upward bias in terms of willingness to pay. This bias was taken into account in development of benefit transfer estimates.

The survey results suggested that Perth households have a similar willingness to pay for environmental improvement as Brisbane residents. Selected results are given in Table 43. In the words of the authors, the estimates are suitable for establishing the impacts of management decisions that affect major regions, and that can be described in terms of changes in (i) the number of species protected, (ii) the hectares of farmland or bush protected, (iii) the kilometres of river restored for recreation, and (iv) the size of the rural population.

Table 43: Estimated average household willingness to pay for environmental improvements ($/household per year)

Environmental Attribute	Perth Sample (n=217)	Brisbane Sample (n=170)
Species protection ($/species protected)	1.27	N.S.
Landscape Aesthetics ($/10,000 ha protected or repaired)	1.40	1.3
Waterway Health: ($/10km of waterway restored)	0.91	0.79
Social Impact ($/10 persons leaving rural areas each year	-0.71	-1.03

Source: CSIRO, UniSearch, PPK, URS and Resource Economics Unit (2001)

6.3 Indicative Benefits of the Strategy

The estimates of Perth households' average willingness to pay for unpriced environmental improvements, given in Table 43, were used to estimate the benefits of Swan Region NRM Strategy actions. The estimates are shown in Table 44.

Indicative estimates of the benefits of the strategy over a twenty-year period discounted at 3.5% are estimated at $1,065M. This may be compared with total costs over a five-year program of $202 M, giving a benefit to cost ratio of more than 5:1. It should be noted that the set of items used for this preliminary estimate excludes benefits to water quality in Darling Range streams other than Wooroloo Brook. Also, the estimated benefits of the Strategy's coastal and marine initiatives have been limited to species preserved (i.e. recreational benefits have not been included). Benefits and costs for air quality improvement and cultural heritage preservation have been excluded. However, the costs of regional capacity building have been included. Even if the total estimated NRM expenditure in the Region of $120M/year is used as a cost estimate, giving 5-year costs of $600M, the benefit to cost ratio is still nearly 1.8:1, which is very healthy.

It is concluded that the Strategy and the Investment Plan will generate a high level of environmental, social and economic returns. The Strategy and Investment Plan are therefore recommended to the Commonwealth and to the Government of Western Australia.

Table 44: Estimated Strategy benefits and costs compared

Themes	Indicator Units	No of units protected by the Strategy	Willingness to pay ($/payer/ unit/year)	Volume per Payer (kL)	Number of payers (M)	Annual Benefit Value ($M)	Benefits Amortised at 3.5% over 20 years ($M)	Cost of Strategy (5 Years) ($M)	Indicative Benefit to Cost Ratio
Land:									
Agricultural land protected	Th Ha	20	70			1.4	19.9	13.2	1.5
Biodiversity (incl Bush Forever)									
Species Protected	Number of species	44	0.5715		0.66	16.6	235.8	16.0	14.7
Landscape Aesthetics	Every 10,000 ha of bush protected	52	0.63		0.66	21.6	307.2	15.0	20.5
Water									
Inland Waterway Health	Every 10 km of waterway protected	26	0.4095		0.66	7.0	99.9	47.2	2.1
Freshwater Lakes & Wetlands Protected	Every 10 km of lake perimeter protected	8	0.4095		0.66	2.2	30.7	15.7	2.0
Groundwater Protected	M Kl of Aquifer Water Supply Protected	8	1.00	12.12	0.66	8.0	113.7	4.0	28.4
Darling Range Streams Improved	Improvement in mg/L TDS in Wooroloo Brk	300	0.00125	39.39	0.66	9.8	139.0	12.1	11.5
Air Quality Improved	Not Assessed								
Coast & Marine Species protected	Number of species	10.00	1.27		0.66	8.4	119.1	24.0	5.0
Cultural Heritage	Not Assessed				0.66				
Regional Capacity Building	Not Assessed							2.3	
TOTAL						75.0	1,065.3	149.5	7.1

APPENDIX A: SUMMARY OF PROPOSED ACTIVITIES FOR NHT FUNDING, BY THEIR PRINCIPLE RESOURCE CONDITION TARGETS AND MATTERS FOR ACTION

This appendix gives of a list of projects with their relevant RCTs, MATs and funding budgets. Management Actions addressed in a particular project are highlighted in bold.

(A1) Integrated Water Management Delivery Program Projects by RCTs and MATs with Budgets

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
IWM01	Canning Environmental Flows	WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	Implementation of Environmental Water Provision (EWP) projects in the Canning, Helena and Brockman River catchments by 2007	• Continue to develop and implement sub-regional and local action plans. • Continue Canning River EWP project. • Establish and implement project for Helena River EWP • Establish and implement project for Brockman River EWP	0	152,000	0	0
IWM02	Swan-Canning Foreshore Assessment	WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	100% of priority rivers and waterways in the Region identified for protection by 2005	• Consolidate baseline data and analyse priority rivers and waterways condition • Continue Foreshore Condition assessment project • Investigate extent and impact of marine pests in the Swan-Canning estuary and develop appropriate management response mechanisms • Determine water and flow dependency for surface and groundwater ecosystems • Establish baseline and consolidate ecosystem integrity condition • Consolidate and analyse water quality monitoring baseline and trend data for priority rivers and waterways • Develop and implement catchment report card program to monitor changes in resource condition over time	0	37,500	0	37,500
IWM02	Swan-Canning Foreshore Assessment	WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's major rivers and waterways by 2006	• Support the review of the policy and legislation, including Environmental Protection Policies and, Statements of Planning Policy • Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts	0	37,500	0	37,500

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				• Continue to develop and implement subregional and local action plans • Assess and establish need for additional EWPs • Continue the implementation of Riverplan				
IWM02	Swan-Canning Foreshore Assessment	WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	Implementation of Environmental Water Provision (EWP) projects in the Canning, Helena and Brockman River catchments by 2007	• Continue to develop and implement sub-regional and local action plans. • Continue Canning River EWP project. • Establish and implement project for Helena River EWP • Establish and implement project for Brockman River EWP	0	37,500	0	37,500
IWM02	Swan-Canning Foreshore Assessment	WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	Develop and implement management and restoration programs for the Region's major rivers and waterways by 2007	• Implement strategic programs in areas identified in WM1.1 to manage and restore priority rivers and waterways • Continue the implementation of the Swan-Canning Cleanup Program Action Plan • Implement prioritised actions from Swan River Trust Foreshore Condition project • Continue large scale implementation of Riverbank and Swan Alcoa Landcare Program foreshore projects	0	37,500	0	37,500
IWM03	Water Quality Monitoring & Evaluation Framework	WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	100% of priority rivers and waterways in the Region identified for protection by 2005	• **Consolidate baseline data and analyse priority rivers and waterways condition** • Continue Foreshore Condition assessment project • Investigate extent and impact of marine pests in the Swan-Canning estuary and develop appropriate management response mechanisms • Determine water and flow dependency for surface and groundwater ecosystems • Establish baseline and consolidate ecosystem integrity condition	63,000	63,000	246,060	246,060

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				• Consolidate and analyse water quality monitoring baseline and trend data for priority rivers and waterways • Develop and implement catchment report card program to monitor changes in resource condition over time				
IWM03	Water Quality Monitoring & Evaluation Framework	WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	100% of priority wetlands in the Region identified for protection by 2005	• **Consolidate baseline data and analyse priority wetland condition** • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation • Continue to update the Dept of Environment's Geomorphic Wetland Mapping data set for classification and evaluation of wetland resource condition • Survey priority groundwater dependent ecosystems of the Region • Conduct research into acid sulfate soil risk potential and existing groundwater contamination plumes • Support the further development of groundwater-modelling programs for priority areas	63,000	63,000	246,060	246,060
IWM03	Water Quality Monitoring & Evaluation Framework	WR3 - Maximum concentrations, for priority waterways, do not exceed 0.1mg/L for total phosphorus and 1.0mg/L for total nitrogen, by 2020	100% of the 1-5 year actions of the reviewed Swan-Canning Cleanup Program (SCCP) implemented by 2010	• Continue implementation of SCCP including priority actions related to resource assessment, research and monitoring and evaluation • **Support identification of point-source nutrient export in priority areas to identify existing and potential sources of nutrients**	63,000	63,000	246,060	246,060
IWM03	Water Quality Monitoring & Evaluation Framework	WR4 - Maintain and improve condition of aquatic environments in the Region, as measured at representative sites, by 2020	Establish monitoring systems to develop Resource Condition Targets for turbidity/ suspended particulate matter by 2005	• Establish baseline and trends and set targets • **Facilitate the integration of water quality monitoring programs** • **Support the inclusion of biological**	63,000	63,000	246,060	246,060

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
		(with quantified targets for turbidity / suspended particulate matter set by 2005)		**indicators and an index of river condition in the development of monitoring systems** • Support undertaking of a sediment sourcing study to identify and assess active erosion areas and their impact on the Swan-Canning River system				
IWM03	Water Quality Monitoring & Evaluation Framework	WR5 - Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region, as measured at representative sites, by 2020 (with quantified targets to reduce salinity set by 2005)	Establish monitoring systems to develop Resource Condition Targets for surface water salinity in the Avon Upper Swan Region by 2005	• **Evaluate and coordinate available data and establish adequate monitoring systems** • Evaluate extent of rising water tables, salinisation of currently freshwater bodies, area affected by secondary salinity, and the risk of further salinity in the Ellen Brook, Brockman River, Wooroloo Brook and Helena River catchments • Identify, map and develop management plans for all salinity risk areas	63,000	63,000	246,060	246,060
IWM03	Water Quality Monitoring & Evaluation Framework	Maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	100% of Local Governments with ocean outfalls have stormwater action plans established by 2008	• Facilitate the development of a Memorandum of Understanding (MoU) between Local Governments to ensure stormwater is managed collaboratively • Implementation of existing stormwater management plans (including the WESROC's Strategy) • Establish partnerships with Agencies and Local Government for implementation of the Beach Watch program				

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
IWM04	Wetland Watch Continuation, plus Incentives through SALP	WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	100% of priority wetlands in the Region identified for protection by 2005	• **Consolidate baseline data and analyse priority wetland condition** • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation • Continue to update the Dept of Environment's Geomorphic Wetland Mapping data set for classification and evaluation of wetland resource condition • Survey priority groundwater dependent ecosystems of the Region • Conduct research into acid sulfate soil risk potential and existing groundwater contamination plumes • Support the further development of groundwater-modelling programs for priority areas				
IWM04	Wetland Watch Continuation, plus Incentives through SALP	WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	Develop and implement management restoration plans for priority wetlands by 2008	• Implement strategic programs in areas identified in WM2.1 to protect, manage and restore priority wetlands • Further development and implementation of Wetland Watch program • Compliance surveys of licenses in priority groundwater areas • Metering implementation in priority groundwater areas	87,000	104,000	0	0
IWM05	Education, Training & Technical Support - Water	WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	Develop and implement management and restoration programs for the Region's major rivers and waterways by 2007	• Implement strategic programs in areas identified in WM1.1 to manage and restore priority rivers and waterways • Continue the implementation of the Swan-Canning Cleanup Program Action Plan • Implement prioritised actions from Swan River Trust Foreshore Condition project • **Continue large scale implementation of Riverbank and Swan Alcoa Landcare**	0	20,625	0	0

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				Program foreshore projects				
IWM05	Education, Training & Technical Support - Water	WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in the Region by 2009	• **Coordinate, facilitate, support and motivate community groups** • **Support development, resourcing and implementation of restoration plans to protect major rivers** • **Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program** • **Continue existing strategic community training programs such as SCCP Education program, Ribbons of Blue, Waterwise, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program** • Develop and implement industry awareness BMP's for priority sectors of small-medium sized industries (SME's) • **Support water resources restoration and management training through tertiary institutions and TAFE's** • **Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of the waterways** • Develop a Memorandum of Understanding between the Council and Swan River Trust to implement Riverplan	0	20,625	0	0
IWM05	Education, Training & Technical Support - Water	WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with	20% increase in community participation in wetlands education, restoration, protection and management activities by 2009	• Facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to conserve and protect wetlands	0	20,625	0	0

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
		quantified targets for priority wetlands in the Region set by 2005)		• Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program • Continue and expand existing community-training programs such as Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • Support wetland restoration and management training through tertiary institutions and TAFE's • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of wetlands • Implement a framework for incentive schemes and revolving funds for protection and conservation of priority wetlands by 2005				
IWM05	Education, Training & Technical Support - Water	WR3 - Maximum concentrations, for priority waterways, do not exceed 0.1mg/L for total phosphorus and 1.0mg/L for total nitrogen, by 2020	20% increase in community participation in nutrient intervention education, restoration, protection and management activities by 2009	• **Facilitate, coordinate, support and motivate community groups** • Develop and implement industry awareness BMP's for priority sectors of small-medium sized industries (SME's) • Continue implementation of rural landholder education and support programs such as Heavenly Hectares, property planning to address nutrient export in high risk areas • **Include stormwater education, water use efficiency and water conservation into the regional training and education program** • **Continue and expand existing community training programs such as Swan-Canning Cleanup Program education initiatives,**	0	20,625	0	0

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				Great Gardens workshops, Ribbons of Blue, Wetland Watch and Skills for Nature Conservation, through the integrated regional education and training program • Continue to provide incentives for landholders and land managers such as the Swan Alcoa Landcare Program • **Support wetland restoration and management training through tertiary institutions and TAFE's**				
IWM05	Education, Training & Technical Support - Water	WR4 - Maintain and improve condition of aquatic environments in the Region, as measured at representative sites, by 2020 (with quantified targets for turbidity / suspended particulate matter set by 2005)	20% increase in community participation in education, restoration, protection and management activities for managing turbidity / particulate matter by 2009	• **Coordinate, facilitate and support community groups** • Develop and implement restoration plans to conserve and protect waterways and wetlands • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation. • **Continue and expand existing community training programs such as River Restoration training, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program** • **Support waterways and wetland restoration and management training through tertiary institutions and TAFE's** • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for best practice management	0	20,625	0	0
IWM05	Education, Training & Technical Support	WR5 - Maintain and improve condition of surface waters in priority	20% increase in community participation in salinity education, mitigation and	• **Coordinate, facilitate and support community groups** • Develop and implement restoration plans to	0	20,625	0	0

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
	- Water	catchments in the Avon Upper Swan Region, as measured at representative sites, by 2020 (with quantified targets to reduce salinity set by 2005)	remediation activities by 2009	address surface water salinity • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation. • **Continue and expand existing community training programs such as River Restoration training, Ribbons of Blue, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program** • **Support land management, waterways and wetland restoration and management training through tertiary institutions and TAFE's**				
IWM05	Education, Training & Technical Support - Water	CMM1.5 - Maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	30% increase in community participation in biodiversity education, mitigation and remediation actions by 2009	• Coordinate, facilitate and support community and stakeholder involvement • Training and capacity building for Local Government Authorities and community on coastal biodiversity/ecology • Include stormwater education, water use efficiency and water conservation into the regional training and education program • Continue and expand existing community training programs such as Swan-Canning Cleanup Program education initiatives, Great Gardens workshops, Ribbons of Blue, Wetland Watch and Skills for Nature Conservation, through the integrated regional education and training program • Continue to provide incentives for landholders and land managers such as the Swan Alcoa Landcare Program	0	20,625	0	0

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
IWM10	IWM Implementation Framework				368,000	543,000	45,000	45,000
	PROGRAM TOTAL				892,000	1,568,000	1,412,000	1,562,000

(A2) Natural Diversity Delivery Program Projects by RCTs and MATs with Budgets

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
LOCAL DIVERSITY MANAGEMENT SUB-PROGRAM								
ND01	Perth Biodiversity Project	BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.3 - 100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's natural diversity by 2006	Establish and gain agreement on an urban growth boundary • Review land planning process and identify cleared land suitable for development • Review design codes for new urban areas • Develop recommendations for local and regional structure planning processes • Develop mechanisms to preferentially locate new developments on previously cleared land • Develop area management plans • Prepare local natural diversity strategies and action plans in accordance with Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region	172,000	166,800		
ND01	Perth Biodiversity Project	BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.5 - 10 local natural diversity strategies for priority areas outside the CAR reserve system implemented by 2006	• Develop and implement local natural diversity strategies for priority areas • Complete implementation of Bush Forever Phase I	129,000	125,100		
ND01	Perth Biodiversity Project	BR2- 50% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005.	BM2.2 - 100% of all relevant NRM legislation and policy in State and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006	• Prepare local natural diversity strategies and action plans in accordance with Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region • Review and prioritise existing conservation management actions for significant species and threatened ecological communities, and threat abatement plans	43,000	41,700		

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				• Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority significant species and ecological communities				
ND01	Perth Biodiversity Project	BR2- 50% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005.	100% of all relevant NRM legislation and policy in State and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006	• Prepare local natural diversity strategies and action plans in accordance with Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region • Review and prioritise existing conservation management actions for significant species and threatened ecological communities, and threat abatement plans • Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority significant species and ecological communities	43,000	41,700		
ND02	Dieback Working Group	BR3- Reduction in impact of regionally significant invasive species by 2020.	BM3.1 - Identify, prioritise and set targets for the management of significant threatening species to natural diversity by 2005	• Identify priority weed species and determine percentage elimination, reduction and containment targets for priority weed populations • **Determine percentage elimination, reduction and containment targets for Phytophthora cinnamomi (dieback)** • Identify priority pest/feral species • Determine of percentage elimination, reduction, containment targets for priority ferals and pests	0	53,000		
ND02	Dieback Working Group	BR3- Reduction in impact of regionally significant invasive species by 2020.	BM3.3 - 15% reduction in the use of exotic species in urban landscaping by 2008	• Develop and implement guidelines for rural landscapers • Support implementation of *Local Plants Landscaping Policy and Landscaping with local plants guidelines for Local Government*	0	53,000		

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				• Implement priority programs for feral animal control by State and Local Government and other stakeholders (eg western shield, and identified priority local and site feral animal control) • Regional implementation of State Weed Plan and Environmental Weed Strategy for Western Australia • **Continued implementation of Dieback management programs in the Region at Local regional, and State Government levels**				
THREATENED SPECIES SUB-PROGRAM								
ND03	Threatened Ecological Communities	BR2 - 50% of critical habitat for identified significant species and ecological communities protected by 2014	BM2.3 - 25% of all significant indigenous species have viable linkages established between populations over their original geographical extent by 2009	• **Establish a regional ecological linkage program** • **Establish mechanisms to protect areas required for ecological linkages** • **Revegetate cleared areas designated as ecological linkages** • **Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority species and ecological communities** • Implement local natural diversity strategies and action plans prepared in accordance with *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region*	0	196,000		
ND04	Predictive Mapping Tool for Threatened Species & Communities	BR2 -50% of critical habitat for identified significant species and ecological communities protected by 2014	BM2.1-100% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005	• **Develop methodology to identify significant species populations for monitoring, protection and habitat management** • Initiate program for prioritisation of significant species and their conservation and management , including	0	160,000		

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				- all vegetation complexes with less than 10% of original extent; - Threatened Ecological Communities (TECs); - habitats of threatened species; - list of wetlands of international importance, ie Ramsar Convention; and - migratory bird habitat.				
ND5	Western Swamp Tortoise Recovery Plan	BR2 - 50% of critical habitat for identified significant species and ecological communities protected by 2014	BM2.3 -25% of all significant indigenous species have viable linkages established between populations over their original geographical extent by 2009	• Establish a regional ecological linkage program • Establish mechanisms to protect areas required for ecological linkages • Revegetate cleared areas designated as ecological linkages • **Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority species and ecological communities** • Implement local natural diversity strategies and action plans prepared in accordance with *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region*	0	120,000		
ND07	Threatened Terrestrial Fauna recovery	BR2 - 50% of critical habitat for identified significant species and ecological communities protected by 2014	BM2.1 - 100% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005	• Develop methodology to identify significant species populations for monitoring, protection and habitat management • **Initiate program for prioritisation of significant species and their conservation and management, including** **- all vegetation complexes with less than 10% of original extent;** - Threatened Ecological Communities (TECs);	0	93,000		

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				- habitats of threatened species; - list of wetlands of international importance, ie Ramsar Convention; and **- migratory bird habitat.**				
BIODIVERSITY TRAINING SUB-PROGRAM								
ND08	Biodiversity Action Learning Project	BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.4 - 100% of priority protected areas have an active conservation management response by 2006	• **Preparation and implementation of management plans and/or threat abatement plans where required**	0	106,920		
ND08	Biodiversity Action Learning Project	BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.5 - 10 local natural diversity strategies for priority areas outside the CAR reserve system implemented by 2006	• **Develop and implement local natural diversity strategies for priority areas** • Complete implementation of Bush Forever Phase I	0	110,160		
ND08	Biodiversity Action Learning Project	BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.6 - 0% increase in community participation in education, restoration, protection and management activities high priority native vegetation in the Region by 2009	• Develop and implement incentive mechanisms for private landholders to protect natural diversity (including formal mechanisms, such as conservation covenants, and informal agreements, such as Land for Wildlife) • Develop regional information system to enhance natural diversity planning, management, monitoring and evaluation • **Continue and expand community natural diversity training programs (e.g. *Skills for Nature Conservation, Urban Nature, Land for Wildlife, Greater Gardens, Grow Us A Home*)** • **Promote inclusion of natural diversity restoration and management training through tertiary institutions and TAFE's** • **Develop natural diversity management**	0	106,920		

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				operational policy and training programs for Local Government Authorities and State agencies with bushland management responsibilities				
ND09	Skills for Nature Conservation	BR1.b - Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020, based on 2005 baseline data	BM1.2 - 25% of priority areas in each IBRA sub-region have natural diversity conservation plans developed by 2006	• Review and prioritise existing conservation management actions for natural diversity areas, significant species populations, and threatened ecological communities • Identify new reserves for locally and regionally significant natural diversity areas based on biodiversity values and principles of ecological viability • Review area management plans and threat abatement plans and practices for the reserve system (including formal reserves and off-reserves) • Develop guidelines and plans for sustainable natural diversity management • Commence Bush Forever Phase II	12,120	12,120		
ND09	Skills for Nature Conservation	BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.3 - 100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's natural diversity by 2006	• Establish and gain agreement on an urban growth boundary • Review land planning process and identify cleared land suitable for development • Review design codes for new urban areas • Develop recommendations for local and regional structure planning processes • Develop mechanisms to preferentially locate new developments on previously cleared land • Develop area management plans • Prepare local natural diversity strategies and action plans in accordance with *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region*	11,110	11,110		

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
ND09	Skills for Nature Conservation	BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.4 - 100% of priority protected areas have an active conservation management response by 2006	• Preparation and implementation of management plans and/or threat abatement plans where required	11,110	11,110		
ND09	Skills for Nature Conservation	BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.6 - 30% increase in community participation in education, restoration, protection and management activities high priority native vegetation in the Region by 2009	• Develop and implement incentive mechanisms for private landholders to protect natural diversity (including formal mechanisms, such as conservation covenants, and informal agreements, such as Land for Wildlife) • Develop regional information system to enhance natural diversity planning, management, monitoring and evaluation • Continue and expand community natural diversity training programs (e.g. *Skills for Nature Conservation, Urban Nature, Land for Wildlife, Greater Gardens, Grow Us A Home*) • Promote inclusion of natural diversity restoration and management training through tertiary institutions and TAFE's • Develop natural diversity management operational policy and training programs for Local Government Authorities and State agencies with bushland management responsibilities	11,110	11,110		
ND09	Skills for Nature Conservation	BR3 - Reduction in impact of regionally significant invasive species by 2020 (with a quantified target set by December 2005)	BM3.4 - Identify, prioritise and set targets for the management of significant threatening species to natural diversity by 2005	• Identify priority weed species and determine percentage elimination, reduction and containment targets for priority weed populations • Determine percentage elimination, reduction and containment targets for Phytophthora cinnamomi (dieback) • Identify priority pest/feral species	11,110	11,110		

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				• Determine of percentage elimination, reduction, containment targets for priority ferals and pests				
ND09	Skills for Nature Conservation	WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.5 - 30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in the Region by 2009	• Coordinate, facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to protect major rivers • Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program • Continue existing strategic community training programs such as SCCP Education program, Ribbons of Blue, Waterwise, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • Develop and implement industry awareness BMP's for priority sectors of small-medium sized industries (SME's) • Support water resources restoration and management training through tertiary institutions and TAFE's • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of the waterways • Develop a Memorandum of Understanding between the Council and Swan River Trust to implement Riverplan	11,110	11,110		

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
ND09	Skills for Nature Conservation	WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	WM2.5 - 20% increase in community participation in wetlands education, restoration, protection and management activities by 2009	• Facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to conserve and protect wetlands • Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program • Continue and expand existing community-training programs such as Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • Support wetland restoration and management training through tertiary institutions and TAFE's • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of wetlands • Implement a framework for incentive schemes and revolving funds for protection and conservation of priority wetlands by 2005	11,110	11,110		
ND09	Skills for Nature Conservation	W4 - Maintain and improve condition of aquatic environments in the Region, as measured at representative sites, by 2020 (with quantified targets for turbidity / suspended particulate matter set by 2005)	WM4.4 - 20% increase in community participation in education, restoration, protection and management activities for managing turbidity / particulate matter by 2009	• Coordinate, facilitate and support community groups • Develop and implement restoration plans to conserve and protect waterways and wetlands • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation. • Continue and expand existing community	11,110	11,110		

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				training programs such as River Restoration training, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • Support waterways and wetland restoration and management training through tertiary institutions and TAFE's • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for best practice management				
		RC	RCM1.4 - Develop a regional capacity framework supported by an integrated regional management information system by 2006	• Coordinate, support and motivate community and stakeholders through the regional Coordinators and Facilitators Network • Develop and implement communications and engagement strategies for key stakeholder groups for implementation and investment phases of NRM Strategy • Coordinate an integrated regional education and training program addressing land, water and biodiversity and cultural heritage themes • Develop sponsorship and partnership strategy for major corporate bodies to invest in Government and community based NRM initiatives	11,110	11,110		
ND10	Program Implementation Framework				587,000	587,000	45,000	45,000
	PROGRAM TOTAL				1,218,000	2,204,000	517,000	710,000

(A3) Sustainable Production Delivery Program Projects by RCTs and MATs with Budgets

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
SP1	Waste Management Survey Benchmarking	WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in the Region by 2009	• Coordinate, facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to protect major rivers • Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program • Continue existing strategic community training programs such as SCCP Education program, Ribbons of Blue, Waterwise, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • **Develop and implement industry awareness BMP's for priority sectors of small-medium sized industries (SME's)** • Support water resources restoration and management training through tertiary institutions and TAFE's • **Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of the waterways** • Develop a Memorandum of Understanding between the Council and Swan River Trust to implement Riverplan	30,000	0	0	0
SP1	Waste Management Survey Benchmarking	WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by	Develop and implement management restoration plans for priority wetlands by 2008	• **Implement strategic programs in areas identified in WM2.1 to protect, manage and restore priority wetlands** • Further development and implementation	30,000	0	0	0

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
		2020 (with quantified targets for priority wetlands in the Region set by 2005)		of Wetland Watch program • Compliance surveys of licenses in priority groundwater areas • Metering implementation in priority groundwater areas				
SP2	Light Industry Emission Study	AR1 - Continue to progress towards improved air quality, with Resource Condition Target(s) to be set for air quality by 2005	Establish a partnership framework to assist in the implementation of the Air Quality Management Plan 1–5 year actions by 2008	• **Initiate inventory of small-medium sized enterprise emissions linked to the National Pollution Inventory by 2008** • **Establish partnership linkages with Air Quality Coordinating Committee (AQCC) Working Group for information transfer and progress reporting** • **Support wider regional community and stakeholder participation in programs relating to air quality improvement**	0	50,000	0	0
SP3	SME Tracking & Auditing	CMR1 - Maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	20% increase in on-ground community environmental restoration programs addressing coastal dune wind erosion in priority areas by 2007	• **Develop and implement local natural diversity strategies and revegetation works for priority areas**	50,000	0	0	0
SP4	Multi-User Decision Support Tool for Salinity	LR1 - Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December 2005)	Priority areas for salinity risk management established in the Avon Upper Swan Region by 2005	• **Facilitate salinity risk mapping, integrated surface and groundwater water quality** monitoring and establishing salinity trends • **Assist interpretation of results and ground-truthing with land managers** • **Identify priority areas for protection and remedial actions based on risk assessment, including areas of high biodiversity value, high value water resources, and land of high value for primary production** • **1-5 year priority Salinity Actions from**	16,250	16,250	0	0

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
				the WA State Salinity Strategy (2000) implemented by 2009 • **Develop and implement an integrated regional information system to enhance planning, implementation, monitoring and evaluation**				
SP4	Multi-User Decision Support Tool for Salinity	LR1 - Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December 2005)	All Local and State Government planning agencies using local area land capability and suitability information by 2009	• **Facilitate the inclusion of land salinity risk assessments as a component of the planning approval process** • Support the review of the policy and legislation, including Environmental Protection Policies and, Statements of Planning Policy • **Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts**	16,250	16,250	0	0
SP4	Multi-User Decision Support Tool for Salinity	LR1 - Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December 2005)	All Local and State Government planning agencies using local area land capability and suitability information by 2009	• **Facilitate the inclusion of land salinity risk assessments as a component of the planning approval process** • Support the review of the policy and legislation, including Environmental Protection Policies and, Statements of Planning Policy • **Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts**	16,250	16,250	0	0
SP4	Multi-User Decision Support Tool for Salinity	LR1 - Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December	Implementation of actions to address land salinity in priority areas of the Avon Upper Swan NAP Region by 2009	• Implementation of large scale land salinity remedial actions in priority areas identified in LM1 • **Implement land use and management support programs (e.g. planning decision support tools, best practice**	16,250	16,250	0	0

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
		2005)		**guidelines, workshops, education and training, demonstrations) addressing land salinity and restoration.** • **Assist development and implementation of management strategies for saline sites or those at risk, including property and catchment planning**				
SP4	Multi-User Decision Support Tool for Salinity	LR1 - Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December 2005)	30% increase in community participation in land salinity education, mitigation and remediation actions by 2009	• **Facilitate, support and motivate community and stakeholder involvement in land salinity actions** • Facilitate best practice training in land salinity management, through community-training programs such as Property Planning and Heavenly Hectares through the integrated regional education and training program • **Develop a landholder information service on sustainable land management** • Develop and implement two new sector specific primary and secondary industry best management practice	16,250	16,250	0	0
SP5	Linking Best Management Practices with Property planning in intensive Agriculture	LR2 - Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulfate soils, by 2020 (with a quantified targets set by December 2005)	100% of all relevant current NRM policy and legislation reviewed and recommended amendments to minimise risk of water erosion, waterlogging and acid sulfate soils made by 2006	• Support the review of the policy and legislation, and recommend changes to Environmental Protection Policies, Statements of Planning Policy local planning policies to address water erosion, waterlogging and acid sulfate soils risk • Facilitate the inclusion of ASS risk assessments as a component of the Local and State Government agencies planning approval process • **Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts**	0	48,000	0	0

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
SP5	Linking Best Management Practices with Property planning in intensive Agriculture	LR2 - Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulfate soils, by 2020 (with a quantified targets set by December 2005)	Regional soil health program developed, with implementation of identified remedial and preventative actions in identified priority areas by 2009	• Develop and implement programs for priority areas for water erosion control, waterlogging remediation and management of acid sulfate soils risk, including implementing industry best practice guidelines • Implementation of State Weed Strategy (2001)	0	24,000	0	0
SP5	Linking best Management Practices with Property Planning in Intensive Agriculture	LR2 - Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulfate soils, by 2020 (with a quantified targets set by December 2005)	Industry Best Management Practices (BMP's) defined with benchmarks for implementation established by 2009 for eight land use / industry sectors	• Define current industry BMP's and support implementation of sustainable BMP programs for primary industry and small-medium enterprise sectors • Define current industry BMP's and support implementation of sustainable BMP programs for secondary industry sectors	0	48,000	0	0
SP10	SP Implementation Framework				368,000	543,000	45,000	45,000
	PROGRAM TOTAL				543,000	778,000	45,000	45,000

(A4) Coastal & Marine Delivery Program: Projects by RCTs and MATs with Budgets

					NHT		Other	
ID	**Project Title**	**RCT**	**MAT**	**MAs**	**2004-05**	**2005-06**	**2004-05**	**2005-06**
CM1	Coastal Condition Evaluation	CMR1 - Maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	100% of priority natural coastal areas identified and assessed by 2005	• **Establish monitoring systems to collect/analyse baseline and trend data** • **Identify adequate buffer zones to protect coastal biodiversity from predicted sea level rise** • Identify areas requiring wide setbacks, where ecosystem processes may be impaired by sea level rise • Compile, document and forecast current and predicted human usage of coastal resources • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation	100,000	0	23,000	34,000
CM2	Marine Fauna Mapping	CMR3 - Maintain and improve the condition of marine fauna in the Region, as measured at representative sites, by 2020 (with a quantified target for key indicator species set by 2005).	Determine key indicator species to protect and conserve viable populations of marine fauna by 2006	• **Develop scientific methodology to identify key indicator species** • **Develop marine fauna mapping project, including significant species and fish, for use as a decision-making support tool** • **Develop and implement integrated marine wildlife management and monitoring program including threatened species** • Develop regional information system to enhance planning, management, monitoring and evaluation	250,000	128,000	3,000	3,000
CM10	C&M Implementation Framework				350,000	128,000	45,000	45,000
	Total Coastal & Marine				700,000	256,000	71,000	82,000

APPENDIX B: SUMMARY OF RESOURCE CONDITION TARGETS BY CONTRIBUTING ACTIVITIES

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
LR1	**RCT**	**Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December 2005)**	
LR1 - Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December 2005)	LM1.1 - Priority areas for salinity risk management established in the Avon Upper Swan Region by 2005	• **Facilitate salinity risk mapping, integrated surface and groundwater water quality monitoring and establishing salinity trends** • **Assist interpretation of results and ground-truthing with land managers** • **Identify priority areas for protection and remedial actions based on risk assessment, including areas of high biodiversity value, high value water resources, and land of high value for primary production** • 1-5 year priority Salinity Actions from the WA State Salinity Strategy (2000) implemented by 2009 • **Develop and implement an integrated regional information system to enhance planning, implementation, monitoring and evaluation**	SP04 - Multi-User Decision Support Tool for Salinity
LR1 - Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December 2005)	LM1.2 - All Local and State Government planning agencies using local area land capability and suitability information by 2009	• **Facilitate the inclusion of land salinity risk assessments as a component of the planning approval process** • Support the review of the policy and legislation, including Environmental Protection Policies and, Statements of Planning Policy • Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts	SP04 - Multi-User Decision Support Tool for Salinity
LR1 - Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December 2005)	LM1.3 - All Local and State Government planning agencies using local area land capability and suitability information by 2009	• **Facilitate the inclusion of land salinity risk assessments as a component of the planning approval process** • Support the review of the policy and legislation, including Environmental Protection Policies and, Statements of Planning Policy • **Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts**	SP04 - Multi-User Decision Support Tool for Salinity
LR1 - Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December 2005)	LM1.4 - Implementation of actions to address land salinity in priority areas of the Avon Upper Swan NAP Region by 2009	• Implementation of large scale land salinity remedial actions in priority areas identified in LM1 • **Implement land use and management support programs (e.g. planning decision support tools, best practice guidelines, workshops, education and training, demonstrations) addressing land salinity and restoration.** • **Assist development and implementation of management strategies for saline sites or those at risk, including property and catchment planning**	SP04 - Multi-User Decision Support Tool for Salinity

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
LM1.4 - Reduction in the area of land affected by salinity, within the Avon Upper Swan National Action Plan Region, by 2020 (with a quantified target set by December 2005)	LM1.4 - 30% increase in community participation in land salinity education, mitigation and remediation actions by 2009	• **Facilitate, support and motivate community and stakeholder involvement in land salinity actions** • **Facilitate best practice training in land salinity management, through community-training programs such as Property Planning and Heavenly Hectares through the integrated regional education and training program** • **Develop a landholder information service on sustainable land management** • **Develop and implement two new sector specific primary and secondary industry best management practice**	IWM05 - Education, Training & Technical Support - Water
LR2	**RCT**	**Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulfate soils, by 2020 (with a quantified targets set by December 2005)**	
LR2 - Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulfate soils, by 2020 (with a quantified targets set by December 2005)	LM2.2 - 100% of all relevant current NRM policy and legislation reviewed and recommended amendments to minimise risk of water erosion, waterlogging and acid sulfate soils made by 2006	• Support the review of the policy and legislation, and recommend changes to Environmental Protection Policies, Statements of Planning Policy local planning policies to address water erosion, waterlogging and acid sulfate soils risk • Facilitate the inclusion of ASS risk assessments as a component of the Local and State Government agencies planning approval process • **Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts**	SP05 - Linking Best Management Practices with Property Planning in Intensive Agriculture
LR2 - Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulfate soils, by 2020 (with a quantified targets set by December 2005)	LM2.3 - Regional soil health program developed, with implementation of identified remedial and preventative actions in identified priority areas by 2009	• **Develop and implement programs for priority areas for water erosion control, waterlogging remediation and management of acid sulfate soils risk, including implementing industry best practice guidelines** • Implementation of State Weed Strategy (2001)	SP05 - Linking Best Management Practices with Property Planning in Intensive Agriculture
LR2 - Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulfate soils, by 2020 (with a quantified targets set by December 2005)	LM2.4 - Industry Best Management Practices (BMP's) defined with benchmarks for implementation established by 2009 for eight land use / industry sectors	• **Define current industry BMP's and support implementation of sustainable BMP programs for primary industry and small-medium enterprise sectors** • **Define current industry BMP's and support implementation of sustainable BMP programs for secondary industry sectors**	SP05 - Linking Best Management Practices with Property Planning in Intensive Agriculture

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
RCT		**Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)**	
WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.1 - 100% of priority rivers and waterways in the Region identified for protection by 2005	• Consolidate baseline data and analyse priority rivers and waterways condition • **Continue Foreshore Condition assessment project** • Investigate extent and impact of marine pests in the Swan-Canning estuary and develop appropriate management response mechanisms • Determine water and flow dependency for surface and groundwater ecosystems • Establish baseline and consolidate ecosystem integrity condition • Consolidate and analyse water quality monitoring baseline and trend data for priority rivers and waterways • Develop and implement catchment report card program to monitor changes in resource condition over time	IWM02 - Swan-Canning Foreshore Assessment
WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.1 - 100% of priority rivers and waterways in the Region identified for protection by 2005	• **Consolidate baseline data and analyse priority rivers and waterways condition** • Continue Foreshore Condition assessment project • Investigate extent and impact of marine pests in the Swan-Canning estuary and develop appropriate management response mechanisms • Determine water and flow dependency for surface and groundwater ecosystems • Establish baseline and consolidate ecosystem integrity condition • **Consolidate and analyse water quality monitoring baseline and trend data for priority rivers and waterways** • **Develop and implement catchment report card program to monitor changes in resource condition over time**	IWM03 - Water Quality Monitoring & Evaluation Framework
WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.2 - 100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's major rivers and waterways by 2006	• Support the review of the policy and legislation, including Environmental Protection Policies and, Statements of Planning Policy • Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts • **Continue to develop and implement subregional and local action plans** • Assess and establish need for additional EWPs • Continue the implementation of Riverplan	IWM02 - Swan-Canning Foreshore Assessment

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WR1.3 - Implementation of Environmental Water Provision (EWP) projects in the Canning, Helena and Brockman River catchments by 2007	• Continue to develop and implement sub-regional and local action plans. • **Continue Canning River EWP project.** • Establish and implement project for Helena River EWP • Establish and implement project for Brockman River EWP	IWM01 - Canning Environmental Flows
WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.4 - Develop and implement management and restoration programs for the Region's major rivers and waterways by 2007	• Implement strategic programs in areas identified in WM1.1 to manage and restore priority rivers and waterways • Continue the implementation of the Swan-Canning Cleanup Program Action Plan • **Implement prioritised actions from Swan River Trust Foreshore Condition project** • **Continue large scale implementation of Riverbank and Swan Alcoa Landcare Program foreshore projects**	IWM02 - Swan-Canning Foreshore Assessment
WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.4 - Develop and implement management and restoration programs for the Region's major rivers and waterways by 2007	• **Implement strategic programs in areas identified in WM1.1 to manage and restore priority rivers and waterways** • **Continue the implementation of the Swan-Canning Cleanup Program Action Plan** • Implement prioritised actions from Swan River Trust Foreshore Condition project • **Continue large scale implementation of Riverbank and Swan Alcoa Landcare Program foreshore projects**	IWM05 - Education, Training & Technical Support - Water
WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.5 - 30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in the Region by 2009	• **Coordinate, facilitate, support and motivate community groups** • **Support development, resourcing and implementation of restoration plans to protect major rivers** • **Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program** • **Continue existing strategic community training programs such as SCCP Education program, Ribbons of Blue, Waterwise, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program** • Develop and implement industry awareness BMP's for priority sectors of small-medium sized industries (SME's) • **Support water resources restoration and management training through tertiary institutions and TAFE's**	IWM05 - Education, Training & Technical Support - Water

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
		• Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of the waterways • Develop a Memorandum of Understanding between the Council and Swan River Trust to implement Riverplan	
WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.5 - 30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in the Region by 2009	• **Coordinate, facilitate, support and motivate community groups** • Support development, resourcing and implementation of restoration plans to protect major rivers • Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program • **Continue existing strategic community training programs such as SCCP Education program, Ribbons of Blue, Waterwise, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program** • Develop and implement industry awareness BMP's for priority sectors of small-medium sized industries (SME's) • Support water resources restoration and management training through tertiary institutions and TAFE's • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of the waterways • Develop a Memorandum of Understanding between the Council and Swan River Trust to implement Riverplan	ND09 - Skills for Nature Conservation
WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.3 - Implementation of Environmental Water Provision (EWP) projects in the Canning, Helena and Brockman River catchments by 2007	• Continue to develop and implement sub-regional and local action plans. • **Continue Canning River EWP project.** • Establish and implement project for Helena River EWP • Establish and implement project for Brockman River EWP	IWM01 - Swan-Canning Foreshore Assessment
WR1 - Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set	WM1.5 - 30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in the Region by 2009	• Coordinate, facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to protect major rivers • Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program	SP1 - Waste Management Survey Benchmarking

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
by 2005)		• Continue existing strategic community training programs such as SCCP Education program, Ribbons of Blue, Waterwise, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • **Develop and implement industry awareness BMP's for priority sectors of small-medium sized industries (SME's)** • Support water resources restoration and management training through tertiary institutions and TAFE's • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of the waterways • Develop a Memorandum of Understanding between the Council and Swan River Trust to implement Riverplan	
WR2	**RCT**	**Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)**	
WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	WM2.1 - 100% of priority wetlands in the Region identified for protection by 2005	• **Consolidate baseline data and analyse priority wetland condition** • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation • Continue to update the Dept of Environment's Geomorphic Wetland Mapping data set for classification and evaluation of wetland resource condition • Survey priority groundwater dependent ecosystems of the Region • Conduct research into acid sulfate soil risk potential and existing groundwater contamination plumes • Support the further development of groundwater-modelling programs for priority areas	IWM03 - Water Quality Monitoring & Evaluation Framework
WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	WM2.1 - 100% of priority wetlands in the Region identified for protection by 2005	• **Consolidate baseline data and analyse priority wetland condition** • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation • Continue to update the Dept of Environment's Geomorphic Wetland Mapping data set for classification and evaluation of wetland resource condition • Survey priority groundwater dependent ecosystems of the Region • Conduct research into acid sulfate soil risk potential and existing groundwater contamination plumes • Support the further development of groundwater-modelling programs for priority areas	IWM04 - Wetland Watch Continuation, plus Incentives through SALP

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	WM2.4 - Develop and implement management restoration plans for priority wetlands by 2008	• **Implement strategic programs in areas identified in WM2.1 to protect, manage and restore priority wetlands** • **Further development and implementation of Wetland Watch program** • Compliance surveys of licenses in priority groundwater areas • Metering implementation in priority groundwater areas	IWM04 - Wetland Watch Continuation, plus Incentives through SALP
WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	WM2.5 - 20% increase in community participation in wetlands education, restoration, protection and management activities by 2009	• **Facilitate, support and motivate community groups** • **Support development, resourcing and implementation of restoration plans to conserve and protect wetlands** • **Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program** • **Continue and expand existing community-training programs such as Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program** • **Support wetland restoration and management training through tertiary institutions and TAFE's** • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of wetlands • Implement a framework for incentive schemes and revolving funds for protection and conservation of priority wetlands by 2005	IWM05 - Education, Training & Technical Support - Water
WR3	**RCT**	**Maximum concentrations, for priority waterways, do not exceed 0.1mg/L for total phosphorus and 1.0mg/L for total nitrogen, by 2020**	
WR3 - Maximum concentrations, for priority waterways, do not exceed 0.1mg/L for total phosphorus and 1.0mg/L for total nitrogen, by 2020	WM3.1 - 100% of the 1-5 year actions of the reviewed Swan-Canning Cleanup Program (SCCP) implemented by 2010	• **Continue implementation of SCCP including priority actions related to resource assessment, research and monitoring and evaluation** • **Support identification of point-source nutrient export in priority areas to identify existing and potential sources of nutrients**	IWM03 - Water Quality Monitoring & Evaluation Framework
W4	**RCT**	Maintain and improve condition of aquatic environments in the Region, as measured at representative sites, by 2020 (with quantified targets for turbidity / suspended particulate matter set by 2005)	
WR4 - Maintain and improve condition of aquatic environments in the Region, as measured at representative	WM4.1 - Establish monitoring systems to develop Resource Condition Targets for turbidity/ suspended particulate matter by 2005	• **Establish baseline and trends and set targets** • **Facilitate the integration of water quality monitoring programs** • **Support the inclusion of biological indicators and an index of river condition in the**	IWM03 - Water Quality Monitoring & Evaluation Framework

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
sites, by 2020 (with quantified targets for turbidity / suspended particulate matter set by 2005)		**development of monitoring systems** • Support undertaking of a sediment sourcing study to identify and assess active erosion areas and their impact on the Swan-Canning River system	
W4 - Maintain and improve condition of aquatic environments in the Region, as measured at representative sites, by 2020 (with quantified targets for turbidity / suspended particulate matter set by 2005)	WM4.4 - 20% increase in community participation in education, restoration, protection and management activities for managing turbidity / particulate matter by 2009	• Coor**dinate, facilitate and support community groups** • Develop and implement restoration plans to conserve and protect waterways and wetlands • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation. • **Continue and expand existing community training programs such as River Restoration training, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program** • Support waterways and wetland restoration and management training through tertiary institutions and TAFE's • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for best practice management	ND09 - Skills for Nature Conservation
WR4 - Maintain and improve condition of aquatic environments in the Region, as measured at representative sites, by 2020 (with quantified targets for turbidity / suspended particulate matter set by 2005)	WM4.4 - 20% increase in community participation in education, restoration, protection and management activities for managing turbidity / particulate matter by 2009	• **Coordinate, facilitate and support community groups** • **Develop and implement restoration plans to conserve and protect waterways and wetlands** • **Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation.** • **Continue and expand existing community training programs such as River Restoration training, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program** • **Support waterways and wetland restoration and management training through tertiary institutions and TAFE's** • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for best practice management	IWM05 - Education, Training & Technical Support - Water

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
W5	**RCT**	Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region, as measured at representative sites, by 2020 (with quantified targets to reduce salinity set by 2005)	
WR5 - Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region, as measured at representative sites, by 2020 (with quantified targets to reduce salinity set by 2005)	WM5.1 - Establish monitoring systems to develop Resource Condition Targets for surface water salinity in the Avon Upper Swan Region by 2005	• **Evaluate and coordinate available data and establish adequate monitoring systems** • Evaluate extent of rising water tables, salinisation of currently freshwater bodies, area affected by secondary salinity, and the risk of further salinity in the Ellen Brook, Brockman River, Wooroloo Brook and Helena River catchments • Identify, map and develop management plans for all salinity risk areas	IWM03 - Water Quality Monitoring & Evaluation Framework
WR5 - Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region, as measured at representative sites, by 2020 (with quantified targets to reduce salinity set by 2005)	WM5.4 - 20% increase in community participation in salinity education, mitigation and remediation activities by 2009	• **Coordinate, facilitate and support community groups** • Develop and implement restoration plans to address surface water salinity • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation. • **Continue and expand existing community training programs such as River Restoration training, Ribbons of Blue, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program** • **Support land management, waterways and wetland restoration and management training through tertiary institutions and TAFE's**	IWM05 - Education, Training & Technical Support - Water
BR1a **BR1b**	**RCT** **RCT**	**The comprehensiveness, adequateness and representativeness (CAR) of the protected area system (including formal reserves and off-reserves) is improved by 50% by 2015, based on 2005 baseline data** **Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020, based on 2005 baseline data**	
BR1.b - Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020, based on 2005 baseline data	BM1.2 - 25% of priority areas in each IBRA sub-region have natural diversity conservation plans developed by 2006	• Review and prioritise existing conservation management actions for natural diversity areas, significant species populations, and threatened ecological communities • **Identify new reserves for locally and regionally significant natural diversity areas based on biodiversity values and principles of ecological viability** • Review area management plans and threat abatement plans and practices for the reserve system (including formal reserves and off-reserves) • Develop guidelines and plans for sustainable natural diversity management • Commence Bush Forever Phase II	ND09 - Skills for Nature Conservation

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.3 - 100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's natural diversity by 2006	• Establish and gain agreement on an urban growth boundary • Review land planning process and identify cleared land suitable for development • **Review design codes for new urban areas** • **Develop recommendations for local and regional structure planning processes** • **Develop mechanisms to preferentially locate new developments on previously cleared land** • **Develop area management plans** • **Prepare local natural diversity strategies and action plans in accordance with Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region**	ND01 - Perth Biodiversity Project
BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.3 - 100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's natural diversity by 2006	• Establish and gain agreement on an urban growth boundary • Review land planning process and identify cleared land suitable for development • Review design codes for new urban areas • Develop recommendations for local and regional structure planning processes • Develop mechanisms to preferentially locate new developments on previously cleared land • Develop area management plans • **Prepare local natural diversity strategies and action plans in accordance with Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region**	ND09 - Skills for Nature Conservation
BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.4 - 100% of priority protected areas have an active conservation management response by 2006	• **Preparation and implementation of management plans and/or threat abatement plans where required**	ND08 - Biodiversity Action Learning Project
BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.4 - 100% of priority protected areas have an active conservation management response by 2006	• **Preparation and implementation of management plans and/or threat abatement plans where required**	ND09 - Skills for Nature Conservation

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.5 - 10 local natural diversity strategies for priority areas outside the CAR reserve system implemented by 2006	• **Develop and implement local natural diversity strategies for priority areas** • Complete implementation of Bush Forever Phase I	ND08 - Biodiversity Action Learning Project
BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.5 - 10 local natural diversity strategies for priority areas outside the CAR reserve system implemented by 2006	• **Develop and implement local natural diversity strategies for priority areas** • Complete implementation of Bush Forever Phase I	ND01 - Perth Biodiversity Project
BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.6 - 30% increase in community participation in education, restoration, protection and management activities high priority native vegetation in the Region by 2009	• Develop and implement incentive mechanisms for private landholders to protect natural diversity (including formal mechanisms, such as conservation covenants, and informal agreements, such as Land for Wildlife) • Develop regional information system to enhance natural diversity planning, management, monitoring and evaluation • **Continue and expand community natural diversity training programs (e.g. Skills for Nature Conservation, Urban Nature, Land for Wildlife, Greater Gardens, Grow Us A Home)** • Promote inclusion of natural diversity restoration and management training through tertiary institutions and TAFE's • Develop natural diversity management operational policy and training programs for Local Government Authorities and State agencies with bushland management responsibilities	ND09 - Skills for Nature Conservation
BR1b- Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.	BM1.6 - 0% increase in community participation in education, restoration, protection and management activities high priority native vegetation in the Region by 2009	• **Develop and implement incentive mechanisms for private landholders to protect natural diversity (including formal mechanisms, such as conservation covenants, and informal agreements, such as Land for Wildlife)** • Develop regional information system to enhance natural diversity planning, management, monitoring and evaluation • **Continue and expand community natural diversity training programs (e.g. Skills for Nature Conservation, Urban Nature, Land for Wildlife, Greater Gardens, Grow Us A Home)** • Promote inclusion of natural diversity restoration and management training through tertiary institutions and TAFE's	ND08 - Biodiversity Action Learning Project

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
		• Develop natural diversity management operational policy and training programs for Local Government Authorities and State agencies with bushland management responsibilities	
BR2	**RCT**	**50% of critical habitat for identified significant species and ecological communities protected by 2014**	
BR2 -50% of critical habitat for identified significant species and ecological communities protected by 2014	BM2.1-100% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005	• **Develop methodology to identify significant species populations for monitoring, protection and habitat management** • Initiate program for prioritisation of significant species and their conservation and management , including ✓ all vegetation complexes with less than 10% of original extent; ✓ threatened Ecological Communities (TECs); ✓ habitats of threatened species; ✓ list of wetlands of international importance, ie Ramsar Convention; and ✓ - migratory bird habitat.	ND04 - Predictive Mapping Tool for Threatened Species & Communities
BR2 - 50% of critical habitat for identified significant species and ecological communities protected by 2014	BM2.1 - 100% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005	• Develop methodology to identify significant species populations for monitoring, protection and habitat management • Initiate program for prioritisation of significant species and their conservation and management , including ✓ all vegetation complexes with less than 10% of original extent; ✓ Threatened Ecological Communities (TECs); ✓ habitats of threatened species; ✓ list of wetlands of international importance, ie Ramsar Convention; and ✓ migratory bird habitat.	ND06 - Threatened Flora Recovery
BR2 - 50% of critical habitat for identified significant species and ecological communities protected by 2014	BM2.1 - 100% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005	• **Develop methodology to identify significant species populations for monitoring, protection and habitat management** • **Initiate program for prioritisation of significant species and their conservation and management , including** ✓ **all vegetation complexes with less than 10% of original extent;** ✓ **Threatened Ecological Communities (TECs);** ✓ **habitats of threatened species;** ✓ **list of wetlands of international importance, ie Ramsar Convention; and** ✓ **migratory bird habitat.**	ND07 Threatened Terrestrial Fauna recovery

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
BR2 - 50% of critical habitat for identified significant species and ecological communities protected by 2014	BM2.1 - 100% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005	• **Develop methodology to identify significant species populations for monitoring, protection and habitat management** • **Initiate program for prioritisation of significant species and their conservation and management , including** ✓ **all vegetation complexes with less than 10% of original extent;** ✓ **Threatened Ecological Communities (TECs);** ✓ **habitats of threatened species;** ✓ **list of wetlands of international importance, ie Ramsar Convention; and** • **migratory bird habitat.**	ND04 – Predictive Mapping Tool fro Threatened Species and Communities
BR2- 50% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005.	BM2.2 - 100% of all relevant NRM legislation and policy in State and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006	• **Prepare local natural diversity strategies and action plans in accordance with Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region** • Review and prioritise existing conservation management actions for significant species and threatened ecological communities, and threat abatement plans • Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority significant species and ecological communities	ND01 - Perth Biodiversity Project
BR2 - 50% of critical habitat for identified significant species and ecological communities protected by 2014	BM2.3 - 25% of all significant indigenous species have viable linkages established between populations over their original geographical extent by 2009	• Establish a regional ecological linkage program • Establish mechanisms to protect areas required for ecological linkages • Revegetate cleared areas designated as ecological linkages • **Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority species and ecological communities** • Implement local natural diversity strategies and action plans prepared in accordance with Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region	ND03 - Threatened Ecological Communities
BR2 - 50% of critical habitat for identified significant species and ecological communities protected by 2014	BM2.3 -25% of all significant indigenous species have viable linkages established between populations over their original geographical extent by 2009	• Establish a regional ecological linkage program • Establish mechanisms to protect areas required for ecological linkages • Revegetate cleared areas designated as ecological linkages • **Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority species and ecological communities** • Implement local natural diversity strategies and action plans prepared in accordance with Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region	ND05 - Western Swamp Tortoise Recovery Plan

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
WR2 - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)	WM2.5 - 20% increase in community participation in wetlands education, restoration, protection and management activities by 2009	• **Facilitate, support and motivate community groups** • **Support development, resourcing and implementation of restoration plans to conserve and protect wetlands** • Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program • **Continue and expand existing community-training programs such as Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program** • Support wetland restoration and management training through tertiary institutions and TAFE's • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of wetlands • Implement a framework for incentive schemes and revolving funds for protection and conservation of priority wetlands by 2005	ND09 - Skills for Nature Conservation
BR3	**RCT**	**Reduction in impact of regionally significant invasive species by 2020 (with a quantified target set by December 2005)**	
BR3- Reduction in impact of regionally significant invasive species by 2020.	BM3.1 - Identify, prioritise and set targets for the management of significant threatening species to natural diversity by 2005	• Identify priority weed species and determine percentage elimination, reduction and containment targets for priority weed populations • **Determine percentage elimination, reduction and containment targets for Phytophthora cinnamomi (dieback)** • Identify priority pest/feral species • Determine of percentage elimination, reduction, containment targets for priority ferals and pests	ND02 - Dieback Working Group
BR3- Reduction in impact of regionally significant invasive species by 2020.	BM3.3 - 15% reduction in the use of exotic species in urban landscaping by 2008	• Develop and implement guidelines for rural landscapers • Support implementation of Local Plants Landscaping Policy and Landscaping with local plants guidelines for Local Government • Implement priority programs for feral animal control by State and Local Government and other stakeholders (eg western shield, and identified priority local and site feral animal control) • Regional implementation of State Weed Plan and Environmental Weed Strategy for Western Australia • **Continued implementation of Dieback management programs in the Region at Local regional, and State Government levels**	ND01 - Dieback Working Group

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
BR3 - Reduction in impact of regionally significant invasive species by 2020 (with a quantified target set by December 2005)	BM3.4 - Identify, prioritise and set targets for the management of significant threatening species to natural diversity by 2005	• Identify priority weed species and determine percentage elimination, reduction and containment targets for priority weed populations • Determine percentage elimination, reduction and containment targets for Phytophthora cinnamomi (dieback) • Identify priority pest/feral species • Determine of percentage elimination, reduction, containment targets for priority ferals and pests	ND09 - Skills for Nature Conservation
CMR1	**RCT**	**Maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)**	
CMR1 - Maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	100% of priority natural coastal areas identified and assessed by 2005	• Establish monitoring systems to collect/analyse baseline and trend data • Identify adequate buffer zones to protect coastal biodiversity from predicted sea level rise • Identify areas requiring wide setbacks, where ecosystem processes may be impaired by sea level rise • Compile, document and forecast current and predicted human usage of coastal resources • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation	C&M01 - Coastal Condition Evaluation
CMR1 - Maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	CMM1.4 - 20% increase in on-ground community environmental restoration programs addressing coastal dune wind erosion in priority areas by 2007	• Develop and implement local natural diversity strategies and revegetation works for priority areas	SP03 - SME Tracking & Auditing
CMR1 - Maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	CMM1.5 - 30% increase in community participation in biodiversity education, mitigation and remediation actions by 2009	• Coordinate, facilitate and support community and stakeholder involvement • Training and capacity building for Local Government Authorities and community on coastal biodiversity/ecology • Include stormwater education, water use efficiency and water conservation into the regional training and education program • Continue and expand existing community training programs such as Swan-Canning Cleanup Program education initiatives, Great Gardens workshops, Ribbons of Blue, Wetland Watch and Skills for Nature Conservation, through the integrated regional education and training program • Continue to provide incentives for landholders and land managers such as the Swan Alcoa Landcare Program	IWM05 - Education, Training & Technical Support - Water

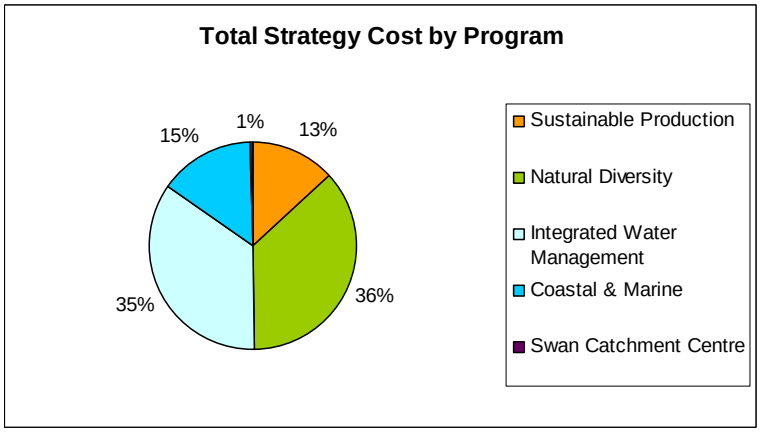
RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
CMR2	**RCT**	**Maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)**	
CMR2 - Maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)	100% of Local Governments with ocean outfalls have stormwater action plans established by 2008	• Facilitate the development of a Memorandum of Understanding (MoU) between Local Governments to ensure stormwater is managed collaboratively • Implementation of existing stormwater management plans (including the WESROC's Strategy) • Establish partnerships with Agencies and Local Government for implementation of the Beach Watch program	IWM03 - Water Quality Monitoring & Evaluation Framework
CMR3	**RCT**	**Maintain and improve the condition of marine fauna in the Region, as measured at representative sites, by 2020 (with a quantified target for key indicator species set by 2005).**	
CMR3 - Maintain and improve the condition of marine fauna in the Region, as measured at representative sites, by 2020 (with a quantified target for key indicator species set by 2005).	Determine key indicator species to protect and conserve viable populations of marine fauna by 2006	• Develop scientific methodology to identify key indicator species • Develop marine fauna mapping project, including significant species and fish, for use as a decision-making support tool • Develop and implement integrated marine wildlife management and monitoring program including threatened species • Develop regional information system to enhance planning, management, monitoring and evaluation	C&M 03 - Marine Fauna Mapping
AR1	**RCT**	**Continue to progress towards improved air quality, with Resource Condition Target(s) to be set for air quality by 2005**	
AR1 - Continue to progress towards improved air quality, with Resource Condition Target(s) to be set for air quality by 2005	AM1.2 - Establish a partnership framework to assist in the implementation of the Air Quality Management Plan 1–5 year actions by 2008	• Initiate inventory of small-medium sized enterprise emissions linked to the National Pollution Inventory by 2008 • Establish partnership linkages with Air Quality Coordinating Committee (AQCC) Working Group for information transfer and progress reporting • Support wider regional community and stakeholder participation in programs relating to air quality improvement	SP02 - Light Industry Emission Study

RCT	Matter for Action Target	Management Actions	Contributing Activity (Project)
AR2	**RCT**	**Set Resource Condition Targets to manage climate risk and reduce risk of major environmental, economic or social outcomes from drought or coastal land impacts**	
RC	RCM1.4 - Develop a regional capacity framework supported by an integrated regional management information system by 2006	• Coordinate, support and motivate community and stakeholders through the regional Coordinators and Facilitators Network • Develop and implement communications and engagement strategies for key stakeholder groups for implementation and investment phases of NRM Strategy • Coordinate an integrated regional education and training program addressing land, water and biodiversity and cultural heritage themes • Develop sponsorship and partnership strategy for major corporate bodies to invest in Government and community based NRM initiatives	

Swan Region Strategy for Natural Resource Management

INVESTMENT PLAN TECHNICAL REPORT NO 1

TOTAL STRATEGY COST



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TABLES

TOTAL STRATEGY COSTS

1. OVERVIEW

A prime purpose in making estimates of the Total Costs of the Strategy is to relate NHT-funded activities to the wider picture of everything that needs to be done if the Strategy is to be a success.

The Swan Catchment Council operates within a complex institutional framework for natural resource management at State and Regional level. This includes:

- State Government Departments: Department of Land Administration (DoLA); Environment (DoE) which covers environmental protection, pollution control, water allocation and licensing; Conservation and Land Management (CALM) with responsibilities spanning the management of reserves, biodiversity, State Salinity Plan, and the coast and marine environment including marine reserves; Agriculture (Agwest), Fisheries (DoF), Planning and Infrastructure (DPI), and Industry and Resources (DIR).
- Swan River Trust, which is the principal agency for regulation and management of the Swan-Canning estuary.
- Other State Agencies: including the Water Corporation of Western Australia and the Forest Products Commission.
- Commonwealth Departments, notably the Department of Defence, which is the holder and manager of several areas of conservation significance.
- Local Government, which expends considerable amounts of ratepayers' money on natural resources and environmental management.
- Private land holders.
- Community Groups and Associations, which undertake a very large amount of environmental restoration work, operating in dialogue with government.

In developing the Investment Plan estimates of costs were developed at three levels:

- Firstly, an account was developed for expenditure on natural resource management by all stakeholders in the Swan Region in 2004-05, termed *Natural Resource Management Expenditures*;
- Secondly, an estimate was made of the costs of undertaking each Management Action that is specified in the Strategy, termed *Total Strategy Costs*; and
- Thirdly, the project set proposed for NHT2 funding was subject to detailed costing.

The difference between the first two of these accounts is that there are many operational, planning, regulatory and management activities undertaken by agencies at all levels of government and by the private sector that are not specifically included in the Strategy, though they certainly have an impact in terms of maintaining natural resources and environmental quality. Thus, there is a rather fuzzy boundary between what can be termed "investment" and what is operational. The Strategy focuses on actions that are directed to changed natural resource condition, but if efforts on normal operations, maintenance, planning and regulation were relaxed, then natural resource condition would undoubtedly worsen.

Total Strategy Costs are significantly larger than the NHT2-funded component of the Strategy. This is because many items mentioned in the Strategy are not NHT2-funded. Obvious examples are the State Government's Bush Forever land purchase scheme, the Water Corporation's Infill Sewerage Program and drainage improvements, the Riverbank and Rivercare Programs administered by the Swan River Trust, and certain initiatives regarding cultural heritage and air quality: none of which is NHT2-funded, though they are mentioned in the Strategy. Less obvious are a myriad of activities

that will need to be undertaken by local governments, community groups and the private sector independently of NHT2 funding. This volume may be usefully read alongside Technical Report No 4 *Evaluation of current project activities and gaps against Strategy Management Actions,* which gives a good impression of the activities that are being undertaken outside of the NHT2 project set. This helps to explain the apparently large differences in cost between the NHT2 investment portfolio and the estimated Total Strategy Cost.

2. NATURAL RESOURCE MANAGEMENT EXPENDITURES

Indicative estimates were made of expenditure on natural resource management by all departments, agencies and stakeholders within the region in 2004-05.

Sources of information used in compiling these financial estimates included:

- State Budget Papers Vols 1-3 (2004-05);
- Data on all operations supplied by Swan River Trust;
- State Salinity Action Plan;
- Annual Report of the Water Corporation;
- Australian Bureau of Statistics data on Local Government expenditure on natural resources management and environmental protection;
- State-held data on NHT1 grants and matching funds, and NHT2 data on Foundation Funding, Priority Projects and Indicative Funding levels for 2004-05;
- Envirofund project data from the Environment Australia website;
- Information supplied by Western Australian departments, including CALM, Agriculture, Environment, and Fisheries; and
- Indicative project cost estimates provided by *R*esource *E*conomics *U*nit.

Table 1 shows that approximately $112 million is being spent annually by all stakeholders. Of this, around $87 million is being spent by State Government departments or agencies. Members of the Western Australian Local Government Association spend a further $19 million. It is emphasized that while every effort has been made to be accurate, the estimates are indicative and are presented in order to give some idea of how the Investment Plan relates to this total effort.

Table 1: Indicative estimate of expenditure on natural resource management in the Swan Region in 2004-05 ($000s)

Theme	State Government Departments & Agencies	Local Government	Community & Stakeholders	Common-wealth [5]	Research Organ-isations [6]	Total	%
NHT Foundation Funding & Coordinators				2,070		2,070	1.8%
NHT -Other (not yet allocated)				2,430		2,430	2.2%
Land	4,251	8,267	0	0		12,518	11.1%
Biodiversity [1]	23,072	2,745	158	85		26,059	23.1%
Water:							
Swan-Canning Estuary & Coastal Plain Streams [4]	10,064	2,645	411	106		13,226	11.7%
Freshwater Lakes	4,041	1,183	33	29		5,287	4.7%
Groundwater	820	0	0	0		820	0.7%
Darling Range Streams	703	350	0	350		1,403	1.2%
Water -General [2]	35,307	0	0	0		35,307	31.3%
Coast & Marine	5,702	605	106	28		6,441	5.7%
Air [3]	2,879	0	0	0		2,879	2.6%
Cultural Heritage	595	2,729	300	755		4,379	3.9%
Total	87,433	18,524	1,009	5,852	7,000	112,819	100.0%

Notes:
1. Includes (i) $10M for land acquisition for the Bush Forever Program; and (ii) $12.5M nrm expenditure of State Government Departments. The Local Government figure is for the Perth Biodiversity Project.
2. Includes (i) $30M for the Water Corporation Sewerage Infill program; and (ii) $4.6M representing the Swan Region's share of expenditure of DoE on policy, education and advice; environmental impact services; pollution regulation, waste management, and environmental systems.
3. Includes 8% of statewide expenditure of the DoE on: policy education & advice; environmental impact services; pollution regulation ; waste management); and environmental systems expenditure.
4. Includes all expenditure of the Swan River Trust plus Envirofund projects in 2003-04
5. (i) Excludes expenditure of the Department of Defence; (ii) includes selected NHT2 investments (ii) total NHT2 and Envirofund allocations for 2004-05 are likely to be in the region of $4.5M
6. Notional estimate for tertiary education departments and CSIRO.

3. TOTAL STRATEGY COSTS 2004-05 TO 2006-07

3.1 Method

In developing the Investment Plan an indicative estimate was made of the "Total Cost" of each Management Action given in the Strategy at 2004 prices. For this purpose, "Total Strategy Cost" is defined in the same way as "Total Cost of Services" in the Western Australian State Government Budget Papers. It includes employee expenses, superannuation, administration, supplies and services, accommodation, and also a number of capital items including capital user charge, depreciation/amortisation, and costs of disposal of non-current assets.

The method used was to estimate (i) the length of time required to implement the Management Action, (ii) the cost of human resources required in terms of Full Time Equivalent staffing (FTEs) at each stage, (iii) the likely operational costs for items such as land vehicles, boats, measurement and recording equipment, fencing, re-vegetation, other works, utility services, costs of meetings, communication/educational materials, computing, mapping, site investigation, sub-contractors, chemicals and so on.

Likely human resource costs were based on Average Gross Earnings of Western Australian State Government employees, from the Australian Bureau of Statistics Cat No 6248.0 March 2004, which provides a figure of $48,237 on an annual basis for 2003-04. Inflating this figure to 2004-05 values suggests a realistic figure of $50,650/staff member.

Likely operational costs were estimated using a standard allowance per staff member based on the ratio of the "Total Cost of Services" to "Employee Expenses" in (i) the Swan River Trust, (ii) Department of Conservation and Land Management and (iii) Department of Environmental Protection, using the 2004-05 Budget Estimate given in the 2004 State Budget Papers.

The breakdown of costs for the three selected agencies was as follows.

Employee expenses excl superannuation	45%
Superannuation, Supplies, Services and Accommodation	42%
Capital items	13%
Total	100%

The financial aggregates were as shown in Table 2 . It is seen that the total cost of services over these three agencies was 2.24 times their employee expenses before superannuation payments. This ratio was used in combination with the assumed average cost per staff member to estimate total cost from the estimated human resource input for each Management Action. This gave a figure of $50,650 x 2.24 = $113,453/FTE. This was rounded to $115,000/FTE.

For Management Actions involving re-vegetation or pest eradication, the estimates were based on an assumed $150/ha for revegetation and $300/ha for pest eradication.

Table 2: Relationship of Total Cost to Employee Cost in selected WA Government Agencies

Agency	Employee Expenses ($000s) (1)	Total Cost of Services ($000s) (2)	Ratio (1)/(2)
Swan River Trust	1,356	6,455	4.76
CALM	74,872	163,206	2.18
Environmental Protection	16,290	37,583	2.31
Total	92,518	207,244	2.24

3.2 Spreadsheet Model

A spreadsheet model was developed, which contains:

- 7 "Theme" sheets, listing all Management Actions
- 7 "Theme Data" sheets, containing the information gathered to estimate total NRM expenditures (see Section 2)
- 4 "Regional Delivery Program" sheets also listing all Management Actions, and generated by formulae from the Theme Sheets
- 1 "Control Sheet" containing cost factors ($/FTE, $/Ha Revegetated, $/ha for pest eradication)
- 4 "Results" sheets one for each type of Management Action (Resource Assessment, Planning, On-ground and Regional Capacity Building) each containing the relevant list of Management Actions in each Delivery Program and their costs
- 3 "Results" sheets containing report tables, some of which appear in the Investment Plan Main Report, and others in this volume. .

The spreadsheet model was developed to make the varying of assumptions easy. This was done by listing all Management Actions for each Delivery Program, then specifying (i) a start year and a finish year for each Management Action, and (ii) the number of FTE's (or in the case of re-vegetation or pest eradication hectares to be treated). The program then calculated cost as a function of FTEs or Ha, allocated the expenditure to years and summed over the three years considered in this Investment Plan. No use was made of discounting.

Finally the costs of each Management Action were allocated to the responsible Regional Delivery Program. In the case of the Cultural Heritage Theme the costs were shared equally between the Integrated Water Management, Natural Diversity and Coastal & Marine Programs. Regional Capacity Building costs were shared equally across all four Regional Delivery programs.

Summaries of total costs were then calculated for e.g. all actions to be undertaken for a Regional Delivery Program, a particular Matter for Target, or the amount to be spent on resource assessment, planning, on-ground work or capacity building activities.

3.3 Total Strategy Cost 2004-5 to 2006-07

The estimated Total Strategy Cost for the three years 2004-05 to 2006-07 is shown in Table 3. The total cost of all Management Actions to all stakeholders over the 3-year period 2004-05 to 2006-07, is estimated to be $121.4 million, excluding the Infill Sewerage Program. Many of the Management Actions to be undertaken during the next three years will need to continue beyond 2006-07.

Table 3: Estimated total investment required from 2004-05 to 2006-07

Notes:

Delivery Program	Total 3-Year Cost ($000s)	Percent
Sustainable Production	14,569	12.0%
Natural Diversity (1)	50,941	42.0%
Integrated Water Management (2)	38,853	32.0%
Coastal & Marine (3)	16,301	13.4%
Swan Catchment Centre	690	0.6%
Total	121,354	100.0%

(1) Includes Bush Forever ($10M/yr for 3 years)
(2) Excludes Infill Sewerage Program ($20M/Yr for 3 yrs)
(3) Excludes Beach Health Project (not funded from Regional Budget)

As is shown in Table 4, the Investment Plan emphasises planning and on-ground activities relative to resource assessment and capacity building.

Table 4: Total Investment by type of Management Action 2004-05 to 2006-07

Type of Action	Total 3-Year Cost ($000s)	Percent
Resource Assessment	18,342	15.1%
Planning	41,239	34.0%
On-Ground Action	41,167	33.9%
Regional Capacity Building	20,605	17.0%
Total	121,354	100.0%

4. NATURAL DIVERSITY PROGRAM

The Total Cost of all Management Actions associated with the Natural Diversity Theme is estimated to be $50.9 million over the three-year period, of which $34 million is estimated for land acquisition under the Bush Forever Scheme. The investment directly accounted by the Strategy is therefore $16.9 million. Approximately a half of this is needed for on-ground actions to protect ecological species and communities.

Table 5: Total Strategy Costs Relevant to the Natural Diversity Program 2004-05 to 2006-07

Type of Action	Matter for Target				Total 3-Year Cost ($000s)	Percent
	Vegetation Integrity	Ecological Species & Communities	Invasive Species	Other Themes		
Resource Assessment	1,553	230	690	192	2,664	5.2%
Planning	25,415	1,553	115	182	27,265	53.5%
On-Ground Action	12,420	3,585	2117.5	96	18,218	35.8%
Regional Capacity Building	1,093	748	632.5	321	2,794	5.5%
Total	40,480	6,115	3555	791	50,941	100.0%

The summary of Management Actions shown in Table 6 shows that, in addition to the major expenditure under the Bush Forever Scheme, substantial investments are required for extension of the CAR system (BM1.1: 3.0%), a review of legislation and policy (BM1.3 and BM2.2: 6.4%), establishment of viable land linkages for indigenous species (BM2.3: 6.2%), and initiatives to reduce the use of exotic species (BM3.3: 4.2%).

Table 6: Costs of Management Actions required by the Natural Diversity Program ($000s)

Code	Description	3-Year Cost ($000s)	%
	Native Vegetation Communities Integrity:		
BM1.1	100% of priority areas in each IBRA sub region identified for inclusion into CAR system by 2005	1,553	3.0%
BM1.2	25% of priority areas in each IBRA sub region have natural diversity conservation plans developed by 2006	690	1.4%
	Commence Bush Forever, Phase II	23,000	45.2%
BM1.3	100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's natural diversity by 2006.	1,725	3.4%
BM1.4	100% of priority protected areas have an active conservation management response by 2006	460	0.9%
BM1.5	Develop and implement local natural diversity strategies for priority areas regional information system to enhance natural diversity planning, management, monitoring and evaluation.	460	0.9%
	Complete implementation of Bush Forever Phase 1	11,500	22.6%
BM1.6	30% increase in community participation in education, restoration, protection and management activities for high priority native vegetation in the region by 2009.	1,093	2.1%
	Significant Species and Ecological Communities:		
BM2.1	100% of critical habitat for significant species and ecological communities identified by 2005	230	0.5%
BM2.2	100% of all relevant NRM legislation and policy in State and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006	1,553	3.0%
BM2.3	25% of all significant indigenous species have viable linkages established between their populations over their original geographical extent by 2009	3,135	6.2%
BM2.4	100% of priority areas to be reconstructed as buffers to threatened ecological communities and vegetation complexes determined by 2006	450	0.9%
BM2.5	30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008	748	1.5%
	Ecologically Significant Invasive Species:		
BM3.1	Identify, prioritize and set targets for the management of significant threatening species to natural diversity	690	1.4%
BM3.2	100% of all priority feral pests and diseases have threat abatement plans established by 2006	115	0.2%
BM3.3	15% reduction in the use of exotic species in urban landscaping by 2008	2,118	4.2%
BM3.4	30% increase in the effectiveness of control programs for feral animals, pests and diseases by 2009	633	1.2%
	Elements of the Cultural Heritage Theme:		
CHM1.1	Research, record, and publish Nyoongar history of the Swan region by 2009.	192	0.4%
CHM1.2	Review and identification of opportunities in policy and legislation to include Indigenous cultural heritage by 2009.	153	0.3%
CHM1.3	Increase Indigenous employment and participation in NRM activities locally and regionally by 2009.	96	0.2%

Code	Description	3-Year Cost ($000s)	%
CHM1.5	Establish partnerships to further incorporate NRM principles into heritage protection by 2008.	249	0.5%
	Elements of the Regional Capacity Building Theme:		
RCM1.2	Establish sub-regional and local consistency and linkages to the Strategy by 2008.	29	0.1%
RCM1.4	Develop a regional capacity framework supported by an integrated regional management information system by 2006.	72	0.1%
	TOTAL PROGRAM	50,941	100.0%

5. INTEGRATED WATER MANAGEMENT PROGRAM

Total Strategy Costs for items falling within the ambit of the Integrated Water Management Program, shown in Table 7, amount to $38.9 million over the three years2004-5 to 2006-07. Actions addressing nutrients (21.4%) and wetland aquatic ecosystems (30.2%) account for a combined 52% of the total. Some 37% of all relevant expenditure is for on-ground actions, and these are spread across all matters for target, with particular emphasis on nutrients.

Table 7: Total Strategy Costs Relevant to the Integrated Water Management Program 2004-05 to 2006-07

Type of Action	Matter for Target						Total 3-Year Cost ($000s)	Percent
	Aquatic Ecosystem Integrity: Steams	Aquatic Ecosystem Integrity: Wetlands	Nutrients in Aquatic Environment	Turbidity & Suspended Particles	Surface Water Salinity	Other Themes		
Resource Assessment	1,208	3,450	690	1323	1380	192	8,242	21.2%
Planning	1,955	2,875	1419	289	518	297	7,352	18.9%
On-Ground Action	2,185	3,335	5175	2070	690	1,131	14,586	37.5%
Regional Capacity Building	2,099	2,070	1035	863	1438	1,169	8,673	22.3%
Total	7,446	11,730	8319	4544	4025	2,789	38,853	100.0%
Percent	19.2%	30.2%	21.4%	11.7%	10.4%	7.2%	100.0%	

Table 8: Total Costs of All Management Actions Required by the Integrated Water Management Program 2004-05 to 2006-07 ($000s)

MAT	Matter for Target/Management Action Target	3-Year Cost ($000s)	%
	Aquatic Ecosystem Integrity: Rivers & Streams		
WM1.1	100% of priority rivers and waterways in Region identified for protection by 2005	1,208	3.1%
WM1.2	100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's major rivers and waterways by 2006	1,955	5.0%
WM1.3	Implementation of Environmental Water Provision Projects in the Canning, Helena and Brockman River catchments by 2007	437	1.1%
WM1.4	Develop and implement management and restoration programs for the Region's major rivers and waterways by 2007	1,748	4.5%
WM1.5	30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in Region by 2009	2,099	5.4%
	Aquatic Ecosystem Integrity Wetlands		
WM2.1	100% of priority wetlands in Region identified for protection by 2005	3,450	8.9%
WM2.2	100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's priority wetlands by 2006	1,265	3.3%
WM2.3	Develop, adapt and/or review allocation limits and management plans for groundwater areas by 2008	1,610	4.1%
WM2.4	Develop and implement management restoration plans for priority wetlands by 2008	3,335	8.6%
WM2.5	20% increase in community participation in wetlands education, restoration, protection and management activities by 2009	2,070	5.3%
	Nutrients in Aquatic Environments		
WM3.1	100% of the 1-5 year actions of the reviewed Swan Canning Cleanup Program (SCCP) implemented by 2010	690	1.8%
WM3.2	100% of all relevant NRM legislation and policy reviewed and amendments recommended to address nutrient enrichment by 2006	1,419	3.7%
WM3.3	Implement identified remedial actions to address nutrient enrichment by 2007	5,175	13.3%
WM3.4	20% increase in community participation in nutrient intervention education, restoration, protection and management activities by 2009	1,035	2.7%
	Turbidity & Particulate Matter in Aquatic Environments		
WM4.1	Establish monitoring systems to develop resource condition targets for turbidity/ suspended particulate matter by 2005	1,323	3.4%
WM4.2	100% of all relevant NRM legislation and policy reviewed and amendments recommended to address turbidity / suspended particulate matter by 2006	289	0.7%

MAT	Matter for Target/Management Action Target	3-Year Cost ($000s)	%
WM4.3	Implement identified remedial actions to address turbidity / particulate matter by 2007	2,070	5.3%
WM4.4	20% increase in community participation in managing turbidity / particulate matter by 2009	863	2.2%
	Surface Water Salinity in Fresh Water Aquatic Environments		
WM5.1	Establish monitoring systems to develop resource condition targets for surface water salinity in the Avon Upper Swan Region by 2005	1,380	3.6%
WM5.2	100% of all relevant NRM legislation and policy reviewed and amendments recommended to address surface water salinity in the Avon Upper Swan Region by 2006	518	1.3%
WM5.3	Implement identified remedial actions to address surface water salinity in the Avon Upper Swan Region by 2009	690	1.8%
WM5.4	20% increase in community participation in salinity education, mitigation and remediation activities by 2009	1,438	3.7%
	Elements of the Coastal & Marine Theme		0.0%
CMM2.4	100% of Local Governments with ocean outfalls have storm water action plans established by 2008	115	0.3%
CMM2.5	20% increase in marine habitat restoration programs by 2007	1,035	2.7%
	Elements of the Cultural Heritage Theme		
CHM1.1	Research, record, and publish Nyoongar history of the Swan region by 2009.	192	0.5%
CH1.2	Review and identification of opportunities in policy and legislation to include Indigenous cultural heritage by 2009.	153	0.4%
CH1.3	Increase Indigenous employment and participation in NRM activities locally and regionally by 2009.	96	0.2%
CH1.4	Achieve 75% per cent increase in the number of community, LGA's and State government agencies involved in NRM incorporating indigenous cultural heritage included as part of their processes by 2009.	115	0.3%
CH1.5	Establish partnerships to further incorporate NRM principles into heritage protection by 2008.	249	0.6%
	Elements of the Regional Capacity Change Theme		
RCM1.2	Establish subregional and local consistency and linkages to the Strategy by 2008.	29	0.1%
RCM1.4	Develop a regional capacity framework supported by an integrated regional management information system by 2006.	805	2.1%
	TOTAL PROGRAM	38,853	100.0%

6. SUSTAINABLE PRODUCTION PROGRAM

The Total Strategy Cost of Management Activities falling within the ambit of the Sustainable Production Program will require an estimated $14.6 million over the first three years of the Strategy. The bulk of the costs would be associated with major on-ground actions particularly in implementing best management practices in catchments of the Darling Range and on the Swan Coastal Plain; and in regional capacity building, including the Program Implementation Framework.

Table 9: Total Strategy Costs Relevant to the Sustainable Production Program 2004-05 to 2006-07 ($000s)

Type of Action	Matter for Target			Total 3-Year Cost ($000s)	Percent
	Salinity	Soils	Other Themes		
Resource Assessment	748	288	403	1,438	9.0%
Planning	518	345	2,214	3,076	19.3%
On-Ground Action	3,288	230	2,335	5,852	36.8%
Regional Capacity Building	2,185	1,357	2,013	5,555	34.9%
Total	6,738	2,220	6,963	15,920	100.0%

Table 10 gives a breakdown of Total Strategy Costs by Management Action.

Table 10: Total Costs of All Management Actions Required by the Sustainable Production Program Program 2004-05 to 2006-07 ($000s)

MAT	Matter for Target/Management Action Target	3-Year Cost ($000s)	%
	Salinity:		
LM1.1	Priority areas for salinity risk management established in the Avon Upper Swan Region by 2005.	748	4.7%
LM1.2	All local and State government planning agencies using local area land capability and suitability information by 2009.	518	3.3%
LM1.3	Implementation of remedial actions to address land salinity in priority areas the Avon Upper Swan NAP region by 2009	3,288	20.6%
LM1.4	20% increase in community participation in land salinity education, mitigation and remediation actions by 2009	2,185	13.7%
	Water erosion, waterlogging and acid sulphate soils:		
LM2.1	Establish benchmarks and monitoring at representative sites for water erosion, waterlogging and acid sulfate soils by 2005.	288	1.8%
LM2.2	100% of all relevant current NRM policy and legislation reviewed and recommended amendments to minimise risk of ASS made by 2006	345	2.2%
LM2.3	Regional soil health program developed, with implementation of identified remedial actions in identified priority areas by 2009.	115	0.7%
LM2.4	Industry BMPs sets defined with benchmarks for implementation established by 2009 for eight industry sectors.	115	0.7%
LM2.5	30% increase in land managers, planners and community participation in soil condition education, mitigation and remediation acitivities by 2009.	1,357	8.5%
	Water Theme:		
WM1.4	Continue the implementation of the Swan-Canning Cleanup Program (20%)	207	1.3%

MAT	Matter for Target/Management Action Target	3-Year Cost ($000s)	%
WM1.5	30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in Region by 2009	173	1.1%
WM3.4	20% increase in community participation in nutrient intervention education, restoration, protection and management activities by 2009	1,035	6.5%
WM5.3	Implement identified remedial actions to address surface water salinity in the Avon Upper Swan Region by 2009	2,070	13.0%
	Natural Diversity Theme:		
BM3.2	100% of all priority feral pests and diseases have threat abatement plans established by 2006	230	1.4%
	Coastal & Marine Theme:		
CMM3.3	Establish a framework for sustainable aquaculture by 2007.	288	1.8%
	Air Theme		
AM1.1	Establish set of monitoring systems to collect/analyse baseline and trend information, to enable setting of resource condition targets for air quality by 2005.	115	0.7%
AM1.2	Establish a partnership framework to assist in the implementation of the Air Quality Management Plan 1–5 year actions by 2008.	1,208	7.6%
AM2.1	Undertake risk assessment of impacts and develop priority actions for climate change impacts on NRM by 2009.	633	4.0%
	Regional Capacity Building Theme:		
RCM1.2	Establish sub-regional and local consistency and linkages to the Strategy by 2008.	144	0.9%
RCM1.3	Review and apply a regional governance structure with security of tenure by 2005.	58	0.4%
RCM1.4	Develop a regional capacity framework supported by an integrated regional management information system by 2006.	805	5.1%
	TOTAL PROGRAM	15,920	100.0%

7. COASTAL AND MARINE PROGRAM

A total 3-year expenditure of $16.3 million is required to undertake all the management Actions set out in the Coastal and Marine Program. Some 38% of the budget addresses marine habitats, 34% the shores, beaches and frontal dunes, and 18% is for targeting the protection of marine fauna.

Table 11: Total Strategy Costs Relevant to the Coastal and Marine Program 2004-05 to 2006-07

Type of Action	Matter for Target				Total 3-Year Cost ($000s)	Percent
	Terrestrial Coastal Habitats	Marine Habitats	Marine Fauna protection	Other Themes		
Resource Assessment	2,070	1,955	1668	192	5,884	36.1%
Planning	1,265	1,898	1208	182	4,552	27.9%
On-Ground Action	1,035	1,150	0	96	2,281	14.0%
Regional Capacity Building	1,208	1,208	0	1,169	3,584	22.0%
Total	5,578	6,210	2875	1,639	16,301	100.0%
	34.2%	38.1%	17.6%	10.1%	100.0%	

Table 12 gives a breakdown of the Total Strategy Costs by Matter for Target

Table 12: Costs of Management Actions required by the Coast and Marine Program ($000s)

Code	Matter for Target/Management Action Target	3-Year Cost ($000s)	%
	Estuarine, Coastal & Marine Habitat Integrity (Terrestrial Coastal Habitats)		
CMM1.1	100% of priority natural coastal areas identified and assessed by 2005	2,070	12.7%
CMM1.2	100% of priority coastal areas have five-year protection and restoration target defined for wind erosion by 2005	230	1.4%
CMM1.3	100% of Councils adopting or updating local coastal plans and policies by 2009	1,035	6.3%
CMM1.4	20% increase in on-ground community environmental restoration programs addressing coastal dune wind erosion in priority areas by 2007	1,035	6.3%
CMM1.5	30% increase in community participation in biodiversity education, mitigation and remediation actions by 2009	1,208	7.4%
	Estuarine, Coastal & Marine Habitat Integrity Marine Habitats		
CMM2.1	100% of priority marine habitats identified for protection by 2006	690	4.2%
CMM2.2	100% of all marine habitat areas affected by introduced marine pests in 'at risk' areas identified by 2007	1,265	7.8%
CMM2.3	Action Plan developed to manage the impacts on marine water quality and monitor and evaluate remediation programs by 2006	1,035	6.3%
CMM2.4	100% of Local Governments with ocean outfalls have storm water action plans established by 2008	863	5.3%
CMM2.5	20% increase in marine habitat restoration programs by 2007	1,150	7.1%

Code	Matter for Target/Management Action Target	3-Year Cost ($000s)	%
CMM2.6	30% increase in community and stakeholder participation in education, mitigation and remediation activities related to marine habitat protection by 2008	1,208	7.4%
	Marine Fauna		
CMM3.1	Determine key indicator species to protect and conserve viable populations of marine fauna by 2006.	805	4.9%
CMM3.2	Determine level and impact of recreational fishing catch by 2007.	805	4.9%
CMM3.3	Establish a framework for sustainable aquaculture by 2007.	58	0.4%
CMM3.4	100% of marine threatened species identified with recovery plans established by 2009	1,208	7.4%
	Elements of the Cultural Heritage Theme		0.0%
CHM1.1	Research, record, and publish Nyoongar history of the Swan region by 2009.	192	1.2%
CH1.2	Review and identification of opportunities in policy and legislation to include Indigenous cultural heritage by 2009.	153	0.9%
CH1.3	Increase Indigenous employment and participation in NRM activities locally and regionally by 2009.	96	0.6%
CH1.4	Achieve 75% per cent increase in the number of community, LGA's and State government agencies involved in NRM incorporating indigenous cultural heritage included as part of their processes by 2009.	115	0.7%
CH1.5	Establish partnerships to further incorporate NRM principles into heritage protection by 2008.	249	1.5%
	Elements of the Regional Capacity Change Theme		0.0%
RCM1.2	Establish subregional and local consistency and linkages to the Strategy by 2008.	29	0.2%
RCM1.4	Develop a regional capacity framework supported by an integrated regional management information system by 2006.	805	4.9%
	TOTAL PROGRAM	16,301	100.0%

Swan Region Strategy for Natural Resource Management

INVESTMENT PLAN TECHNICAL REPORT No 2

ASSESSMENT OF THE RELATIVE TRIPLE BOTTOM LINE RETURNS FROM INVESTMENT ACROSS ASSETS AND THREATS

DRAFT 09/02/05

CONTENTS

TABLES

SWAN REGION STRATEGY FOR NATURAL RESOURCE MANAGEMENT INVESTMENT FRAMEWORK AND INVESTMENT PLAN

Report on Workshop "A"

Priority Assets for Investment

1. BACKGROUND

The Swan Catchment Council is developing a Strategy for Natural Resource Management (the Strategy). Under a Bilateral Agreement with the Commonwealth the Council is required to develop an Investment Framework and Plan for effective and efficient implementation of the Strategy.

This requires a consistent framework for assessing action priorities within and across Asset Categories, based on a form of "triple bottom line" assessment. The Strategy identifies six broad "Asset Categories": respectively land, water, biodiversity, coastal/marine, air and cultural heritage.

The Consultancy Brief indicates that selection of assets for investment should be based on the:

- Value of and target for the asset
- Impact of threats on the asset
- Capacity of the wider regional community to take effective action

2. METHODOLOGY

2.1 Developing the Investment Framework

Key steps in the methodology for developing the Investment Framework and Plan are as follows:

- Contacts with the Council's team to establish progress made in identifying and valuing assets under threat, proposed targets, management options, indicators of performance and monitoring and evaluation system;
- Desk research into all asset categories and program financial cost estimates;
- Determine current State and Commonwealth governments' latest thinking about their requirements/preferences for the format of investment frameworks and plans, leading to a decision about the appropriate format for the Swan Catchment Investment Framework and Plan;
- A short but intensive program of workshops designed to elicit stakeholder views on an appropriate Investment Framework including targets and management practices; and
- Development of an Excel-based forward Investment Plan linking targets with required investments and cost shares.

2.2 Workshop Design

There are two levels at which prioritisation of NRM investments needs to be done: namely at the levels of (i) asset values, threats and capacity to deal with the issue, and (ii) management actions.

The workshops were therefore divided into two sessions, namely:

- Selecting assets for investment, and
- Getting the best mix of management actions

This report deals with the first session.

2.3 Workshop Format

Three separate workshops were held to discuss and score the level of threat to asset values and the capacity of the region to address the threat. Each followed the same format, and was attended by twenty to thirty participants.

Careful attention was given to the way in which the discussion would be planned.

The workshop began with introductory statements by the Swan Catchment Council representative, Resource Economics Unit, and the Facilitator.

The first task for participants was to re-cap on the contents of the Swan Region Strategy for Natural Resource Management. Participants discussed and described key asset values, and then rated the degree to which asset values could be changed by NRM investment (either to avert a future decline in value or to enhance a currently degraded value).

For the second task participants discussed factors affecting the region's capacity to address NRM issues. They separately considered (i) current technical know-how, knowledge, capacity to innovate (ii) human resources (iii) degree of stakeholder involvement, (iv) funding levels, (v) the time factor, (vi) organisation and coordination, and (vii) the adequacy of governance, legal and institutional arrangements, and capacity to change policies. This would help to build up to an overall estimate of capacity to address problems within each Asset and Threat Category.

Participants were next presented with a large wall-mounted matrix of assets and threats, measuring approximately 3.5m x 1.5m, and asked to allocate 25 dots to the cells where, in their individual opinion, the greatest return to NRM investment could be achieved. A maximum of three dots per cell was allowed, to reflect especially high returns to investment. Participants were also asked to select three cells and write down their reasons for scoring return to investment and capacity the way they had. This was done in order to provide qualitative as well as quantitative outcomes from the workshop.

Finally a selection of resulting "plots" of return x capacity obtained from the previous exercise, were presented and discussed, by placing labelled cards on a large space indicating four quadrants (HH, HL, LL, LH).

Appendix A gives the results of the Workshop Evaluation forms returned by participants.

3. PERCEIVED RETURNS TO INVESTMENT IN NATURAL RESOURCE MANAGEMENT

3.1 Overall Returns

Participants were asked to "*indicate with a dot (max 3 dots/cell) where you think the highest returns to natural resource management investment lie within the region*". Their overall response, totalled across the three sessions for Workshop A, is given in Table 1.

Table 1: Returns to nrm investment, by asset category: Workshop "A" responses (%).

	Asset Category	%
1	Urban Land Uses	6.4
2	Agricultural Land Uses	4.6
3	Forest & Woodlands	7.3
4	Terrestrial Biodiversity	20.3
5	Swan-Canning Estuary and Coastal Plain Streams	12.7
6	Freshwater Lakes	11.0
7	Groundwater	7.8
8	Darling Range Streams	3.0
9	Coast & Marine	9.7
10	Air	2.1
11	Indigenous Heritage	6.0
12	Other Heritage	0.3
13	Regional Capacity	8.3
14	Other	0.5
	TOTAL	100.0

Terrestrial Biodiversity scored the highest with 20.3% of the rating for total returns to investment. This was followed by *Swan-Canning Estuary and Coastal Plain Streams* (12.7%) and *Freshwater Lakes* (11%), while *Groundwater* accounted for a further 7.8%. Coast and Marine accounted for 9.7% of the total. The three land use categories scored a combined total of 18.3%, across *Urban Land* (6.4%), *Agricultural Land* (4.6%) and *Forests and Woodland* (7.3%), while *Indigenous Heritage* constituted 6.0% of the total return. Investment in building *Regional Capacity* for natural resources management was seen as having a high return (8.3%). The only categories with notably low ratings were *Air* and *Other Heritage*.

It may be concluded that workshop participants see positive returns to investment across a wide range of natural resource management issues in the region, and notably in biodiversity preservation, surface water resources and estuaries of the Swan Coastal Plain and the marine and coastal environment. This result is entirely to be expected. However, it does show that participants as a whole were not inclined to emphasise any one category to the exclusion of others.

The following sections give comments on each of the individual asset classes.

3.2 Urban Land

The greatest returns to nrm investment affecting the urban areas were seen in restoring and protecting biodiversity assets. Averting biodiversity decline, ecosystem fragmentation, habitat loss and the loss of key areas of native vegetation accounted for 44.2% of perceived returns to nrm investment.

Water or air-borne pollutants are another key area for investment totalling 18.8%. These items include Urban or Industrial Discharges (7.3%), Drainage modification (4.2%) Nutrient export & enrichment (4.2%), Chemical contamination (3.1%) and Erosion and sedimentation (2.1%)

Table 2: Key areas of nrm investment for averting threats to urban land values

	Investment Target	%
1	Biodiversity decline	14.6
2	Native vegetation clearing or loss	14.6
3	Ecosystem fragmentation	9.4
4	Urban or Industrial Discharges	7.3
5	Infrastructure development	7.3
6	Political will (lack of)	7.3
7	Habitat loss	5.2
8	Climate Change	4.2
9	Nutrient export & enrichment	4.2
10	Drainage modification	4.2
11	Chemical Contamination	3.1
12	Ignorance, negligence, intolerance	3.1
13	Non-acceptance of NRM principles	3.1
14	Erosion & sedimentation	2.1
15	Inadequate coordination of government & community activity	2.1
16	Inadequate involvement of community or industry	2.1
17	Acidification	1.0
18	Diseases -plants	1.0
19	Exotic Plants	1.0
20	Process disruption	1.0
21	Abstraction of water	1.0
22	Fossil fuels consumption	1.0
	Total	100.0

Table 3: Comments on threats to agricultural land values in the Swan Region

Threat Category	Comment on Threat	Comment on Capacity
Abstraction of water	Need sustainable water allocation and management for agricultural land use.	Need to invest in knowledge gaps in water availability for sustainable uses, and allocation to the environment, eg: prepare comprehensive water management plans for groundwater and surface water systems and develop EWR's and EWP's.
Erosion and sedimentation	These have wide ranging impacts and they are dependent on each other.	
Exotic plants	Exotic plants affect the value attached to agricultural land use. Weed species are a threat to farmers and costly to control.	
Infrastructure development	Need to protect priority agricultural land for long term agricultural uses and production.	
Nutrient enrichment	Nutrient enrichment of land and groundwater due to agricultural land use (particularly in Ellen Brockman) requires significantly more investment in: improved land management practices;replacing land uses with less polluting activities (eg: tree farms, carbon sinks);	
Nutrient export and enrichment	Rated 3, specifically with regard to areas such as the Ellen Brook where phosphorus input is highest in the upper reaches of the Brook where agricultural land uses dominate. The Ellen Brook contributes the majority of phosphorus into the Swan River.	
Political will (lack of)	All answers to questions (knowledge of repair) are available – political will to do anything about it is lacking.	
Salinity	Asset loss of production; in the Upper Swan Avon investment against salinity has multiple benefits.	Capacity to effect change arises from community. Government processes (tied as they must) to strict guidelines are never able to move swiftly enough to prevent and effect environmental change. So therefore, capacity building must focus on the community level.
Salinity	Use of shallow rooted crops, excessive clearing for agricultural uses interferes with water table. Construction of dams for agriculture – expression of ground water which may be saline leads to seepage of salt into landscape.	Difference between technical know-how, innovation and knowledge (within the general community) probably needs highlighting.

3.3 Agricultural Land

Participants identified a wide range of nrm investments for addressing threats to agricultural land values, notably salinity (20.6%), exotic plants (8.8%), erosion and sedimentation (2.9%), exotic animals (2.9%), and plant and animal diseases (3.0%). It appears that some participants may have been as much concerned about off-site effects as on-site effects with agricultural management practices (13.2%), nutrient export and enrichment (10.3%) and native vegetation clearing or loss (1.5%) all being mentioned.

Table 4: Key areas of nrm investment for averting threats to agricultural land values

	Investment Target	%
1	Salinity	20.6
2	Agricultural Management Practices	13.2
3	Nutrient export & enrichment	10.3
4	Exotic Plants	8.8
5	Habitat loss	7.4
6	Political will (lack of)	7.4
7	Non-acceptance of NRM principles	4.4
8	Erosion & sedimentation	2.9
9	Exotic (feral) animals	2.9
10	Abstraction of water	2.9
11	Urban or Industrial Discharges	2.9
12	Drainage modification	2.9
13	Acidification	1.5
14	Biodiversity decline	1.5
15	Chemical Contamination	1.5
16	Diseases -plants	1.5
17	Diseases -animals	1.5
18	Ecosystem fragmentation	1.5
19	Native vegetation clearing or loss	1.5
20	Ignorance, negligence, intolerance	1.5
21	Inadequate coordination of government & community activity	1.5
	Total	100.0

3.4 Forests & Woodlands

Participants produced a considerable list of areas for nrm investment to maintain or enhance the values of forest, woodlands and heath lands in the region. These cluster around native vegetation clearing or loss (17.4%), and biodiversity decline (14.7%), and include exotic plants (9.2%); ecosystem fragmentation (8.3%); habitat loss (8.3%); plant diseases including dieback (5.5%); fire management regime (2.8%); and recreational access (2.8%).

Table 5: Key areas of nrm investment for averting threats to forest and woodland values

	Investment Target	%
1	Native vegetation clearing or loss	17.4
2	Biodiversity decline	14.7
3	Exotic Plants	9.2
4	Ecosystem fragmentation	8.3
5	Habitat loss	8.3
6	Political will (lack of)	7.3
7	Diseases -plants	5.5
8	Ignorance, negligence, intolerance	4.6
9	Infrastructure development	3.7
10	Inadequate involvement of community or industry	3.7
11	Process disruption	2.8
12	Fire management regime	2.8
13	Recreation & access	2.8
14	Inadequate coordination of government & community activity	2.8
15	Erosion & sedimentation	1.8
16	Chemical Contamination	0.9
17	Diseases -animals	0.9
18	Exotic (feral) animals	0.9
19	Abstraction of water	0.9
20	Non-acceptance of NRM principles	0.9
	Total	100.0

Clearly, an integrated approach is required for project design in this asset category.

Table 6: Comments on threats to forest and woodlands in the Swan Region

Threat Category	Comment on Threat	Comment on Capacity
Political will (lack of)	Legislation available through Local Government and State Government to prevent clearing – political will not available.	
Ecosystem fragmentation	Not enough corridor links. 'Pocket Parks' are not biodiversity sustainable. We need larger areas of conservation areas, not fragmented and isolated ones, especially in urban development.	
Infrastructure development / land use planning and clearing	Any additional forests and woodlands to be protected (not just retained) over and above Bush Forever and Forest Management Plan will be protected through: Local Biodiversity Planning leading to Local Planning Strategy leading to Town Planning Scheme.	Support good Local and State Government issues rather than creating a fourth tier of government.

3.5 Biodiversity

With minor differences, the returns to investment in biodiversity maintenance or rehabilitation replicate those for forests and woodlands.

Table 7: Key areas of nrm investment for maintaining or enhancing biodiversity values

	Investment Target	%
1	Native vegetation clearing or loss	13.2
2	Biodiversity decline	12.6
3	Ecosystem fragmentation	12.3
4	Exotic Plants	8.3
5	Habitat loss	7.6
6	Ignorance, negligence, intolerance	7.0
7	Political will (lack of)	6.0
8	Inadequate coordination of government & community activity	4.3
9	Exotic (feral) animals	4.0
10	Climate Change	3.6
11	Fire management regime	3.3
12	Process disruption	2.6
13	Diseases -plants	2.0
14	Abstraction of water	2.0
15	Infrastructure development	2.0
16	Inadequate involvement of community or industry	2.0
17	Salinity	1.7
18	Non-acceptance of NRM principles	1.3
19	Agricultural Management Practices	1.0
20	Recreation & Access	1.0
21	Erosion & sedimentation	0.7
22	Drainage modification	0.7
23	Chemical Contamination	0.3
24	Hydrological change	0.3
25	Fossil fuels consumption	0.3
	Total	100.0

Table 8: Comments on threats to biodiversity in the Swan Region

Threat Category	Comment on Threat	Comment on Capacity
Biodiversity decline	Biodiversity decline is a major threat to terrestrial biodiversity (see above). Clearing, in particular, is the major cause of loss of biodiversity on the SCP.	
Biodiversity decline	For conservation of biodiversity, it is a combination of immediate threats and historical prevention and treatment. Looked at it as an umbrella approach: stop clearing = reduction in habitat loss and fragmentation. Need to look and address bigger processes of biodiversity decline: understanding of population dynamics. Focused on biodiversity as I believe it underpins many processes and other assets.	
Biodiversity decline	Fundamental change is required to status quo development if we are to retain adequate representation of biodiversity. Politically bold action is required to reverse dangerous trends. Its important to take action to keep the common, common!	
Biodiversity decline	High level of endemism in area under maximum pressure. High level of diversity in area of maximum pressure. High level of human and financial resources centered in this region. A hallmark arena!	
Climate change	The impacts of climate change over coming decades will be major ones – but won't really know what and how much.	We need to be very clever in doing this, particularly to 'capture hearts and minds', coupled with ongoing education.
Diseases - plants	Loss of biodiversity due to Phytophthora *cinnam*. (once it is infested it will always be infested at this stage, with current knowledge of treatments and control measures).	
Ecosystem fragmentation	Will impact on sustainable / viable populations of flora, fauna, fungi.	Lack of cross government process and responsibility for coastal and marine.
Ecosystem fragmentation	Fragmentation and loss of significant area to sustain species means loss of ecobalance / symbiosis. Domino effect.	
Ecosystem fragmentation	Ecosystem fragmentation of terrestrial biodiversity due to urban planning and development, focusing away from territorial biodiversity.	
Exotic plants	Exotic plants are a major threat to biodiversity in the Swan Region. Weeds replace native species, alter the structure of ecosystems, increase the risk, etc, etc .	

3.6 Swan-Canning Estuary and Coastal Plain Streams

The key targets for investment in the Swan-Canning Estuary and Swan Coastal Plain streams cluster around pollutants, most notably nutrients, and include: nutrient export and enrichment (14.8%); urban and industrial discharges (12.7%); drainage modification (6.3%); and erosion and sedimentation (5.3%). Smaller, but still important, investment targets relate to agricultural land management practices (4.2%); abstraction of water (3.7%); hydrological change (2.6%); and chemical contamination (2.1%).

Table 9: Key areas of nrm investment for maintaining or enhancing the values of the Swan-Canning Estuary and Coastal Plain Streams

	Investment Target	%
1	Nutrient export & enrichment	14.8
2	Urban or Industrial Discharges	12.7
3	Inadequate involvement of community or industry	6.9
4	Drainage modification	6.3
5	Erosion & sedimentation	5.3
6	Habitat loss	5.3
7	Ignorance, negligence, intolerance	5.3
8	Political will (lack of)	4.8
9	Agricultural Management Practices	4.2
10	Biodiversity decline	3.7
11	Ecosystem fragmentation	3.7
12	Exotic Plants	3.7
13	Abstraction of water	3.7
14	Hydrological change	2.6
15	Process disruption	2.6
16	Salinity	2.6
17	Recreation & Access	2.6
18	Inadequate coordination of government & community activity	2.6
19	Chemical Contamination	2.1
20	Non-acceptance of NRM principles	1.6
21	Acidification	0.5
22	Climate Change	0.5
23	Diseases -plants	0.5
24	Exotic (feral) animals	0.5
25	Infrastructure development	0.5
	Total	100.0

There is also a cluster of biodiversity-related threats including biodiversity decline (8.5%); ecosystem fragmentation (7.9%); native vegetation clearing or loss (6.7%) and exotic plants (4.3%).

Table 10: Comments on threats to the Swan-Canning estuary and coastal plain streams

Threat Category	Comment on Threat	Comment on Capacity
Urban or industrial discharge	Deterioration of water quality impacts on a large range of values.	
Abstraction of water	Rated 3, impacts from excessive abstraction can impact on water flows, increasing salinity.	
Agricultural management practices	Despite effort, nutrient loss from rural areas is a key problem on the Swan Coastal Plain. Continued support of NRM Groups and provision of property planning support to landowners is needed.	
Drainage modification	This category neatly encompasses many of the human failings to NRM.	Planning and Development – Infrastructure:
Drainage modification	Capacity is high but uncertainty about performance objectives and Best Management Practices persist.	
Habitat Loss	The impacts of industrial uses, recreational access, urban development; wetland habitat and estuary ecosystems are being hammered!	Need to utilise all avenues: Universities have a wide ranging knowledge and ability to provide knowledge. Capacity should endeavour to remain in the region, ie: CSIRO may not always remain in Western Australia and continue to build.
Inadequate involvement of community or industry	There is a lack of industry involvement in environmental protection, especially industry discharge and drainage of smaller industries and businesses. Greater demand should come from the community for businesses to be environmentally responsible and / or invest in regional NRM.	
Nutrient export and enrichment	Nutrient export and enrichment affects the value attached to Swan Canning Estuary and Coastal Plain Streams, also freshwater lakes. Algal blooms may develop, causing threats to public health, loss of recreational use and fish kills (loss of biodiversity).	Actions to mitigate threats will depend largely on financial resources. All levels of government, including local government and catchment groups must be financially resourced to cover costs.
Nutrient export and enrichment	Still is major issue of the Swan-Canning even though inputs have decreased.	
Urban or industrial discharge	While perhaps not the greatest threat to Swan – Canning, small industry has been the most difficult to engage. Swan – Canning Industry Survey found most industry does not know how it disposes of its wastes. Significant effort (increase) is needed to work directly with industry and Industry Associations to change behaviours as passive approaches have not worked. A framework for dealing with all industries is required.	
Human failings	I ranked human failings high, eg: need for increased overall education of wider community. I believe that once we increase widely education and therefore awareness of those issues then the political support and will, will therefore increase across all levels of Government.	
Urban and industrial discharge		
Nutrient export and enrichment	Linked to previous. River being used as a drain – fringing and aquatic vegetation being killed, algal blooms and fish kills.	
Urban or industrial discharge	Pollution discharge, drainage, loss of coastal ecosystems and impacts on groundwater and streamlines. Is there a correlation of rich people to low environmental appreciation and poor people to high environmental interest?	

3.7 Freshwater Lakes

The Swan Coastal Plain has a large number of freshwater lakes generally formed by a groundwater table at inter-dunal depressions. The Strategy gives those listed as Ramsar wetlands. Returns to investment are indicated in most of the nrm target areas cited for the Swan-Canning Estuary and Coastal Plain streams

Table 11: Key areas of nrm investment for maintaining or enhancing the values of freshwater lakes

	Investment Target	%
1	Nutrient export & enrichment	11.6
2	Biodiversity decline	8.5
3	Ecosystem fragmentation	7.9
4	Native vegetation clearing or loss	6.7
5	Urban or Industrial Discharges	6.1
6	Infrastructure development	6.1
7	Inadequate involvement of community or industry	6.1
8	Habitat loss	5.5
9	Hydrological change	5.5
10	Ignorance, negligence, intolerance	5.5
11	Drainage modification	4.9
12	Erosion & sedimentation	4.3
13	Exotic Plants	4.3
14	Abstraction of water	4.3
15	Political will (lack of)	3.7
16	Chemical Contamination	2.4
17	Inadequate coordination of government & community activity	1.8
18	Climate Change	1.2
19	Agricultural Management Practices	1.2
20	Exotic (feral) animals	0.6
21	Process disruption	0.6
22	Recreation & Access	0.6
23	Non-acceptance of NRM principles	0.6
	Total	100.0

Table 12: Comments on threats to freshwater lakes/wetlands

Threat Category	Comment on Threat	Comment on Capacity
Ecosystem fragmentation	Urban developments resulting in loss of freshwater ecosystems (linked to previous).	
Hydrological change	Major issue for water quality decline, habitat loss and impacts from acid sulphate soils.	
Native vegetation clearing or loss	I think this category should be called Freshwater Wetlands. This is a broader category; lakes are one type of wetland, many of the Swan Region's important wetlands are not lakes but damplands, palus plains, sumplands, etc. Wetland destruction and loss is one of the key threats to biodiversity in the Swan Region. The rate of wetland loss is still substantial (and catastrophic). Current planning, regulatory and institutional arrangements are demonstrably inadequate (latest estimate from two years ago [from Water and Rivers Commission] was 13% of Conservation Category Wetlands are being destroyed per year). Resource Enhancement and Multiple Use Wetlands are also being lost at a rapid rate	Weeds are the biggest threat to most environmental values. We do not have the political will, funding, knowledge or time to deal with this urgent threat. Developments must not cause fragmentation, biodiversity loss or decline. Money must be invested in stopping development on the SCP before we have no assets left. Development causes: weeds, fragmentation, loss, biodiversity decline, habitat destruction – it leads to other threats. We know this. Why can't we stop it?
Political will (lack of)	The legislation controlling the clearing, filling and loss of wetlands is inadequate and has been for years. It does not deter developers from illegally clearing them for development. Greater political will and legislation is required to protect wetlands.	
Abstraction of water	Significant issue due to extraction of bore water for garden use is resulting in low lake levels and disruption to natural systems.	
Inadequate involvement of community or industry;	There needs to be a significant increase in resources directed towards protection of natural water bodies from light industrial contaminants.	
Human activities and Ignorance	We have the know-how. We have the legislation but wetlands are continuously lost or degraded unnecessarily through poorly planned urban / rural development. So what do we need to do to properly protect and value wetlands: tougher, better resourced legislation (political will); better planning focus; better community education.	

3.8 Groundwater

Areas of investment to maintain our very important groundwater values include targeting the abstraction of water (21.6%); hydrological change (6%); and drainage modification (5.2%) There is also a cluster of initiatives addressing groundwater contamination, including nutrient export & enrichment (10.3%); chemical contamination (9.5%), urban or industrial discharges (8.6%); and agricultural land management practices (3.4%).

Table 13: Key areas of nrm investment for maintaining or enhancing the values of groundwater

	Investment Target	%
1	Abstraction of water	21.6
2	Nutrient export & enrichment	10.3
3	Chemical Contamination	9.5
4	Urban or Industrial Discharges	8.6
5	Climate Change	7.8
6	Hydrological change	6.0
7	Drainage modification	5.2
8	Ignorance, negligence, intolerance	5.2
9	Inadequate involvement of community or industry	5.2
10	Political will (lack of)	4.3
11	Agricultural Management Practices	3.4
12	Inadequate coordination of government & community activity	2.6
13	Biodiversity decline	1.7
14	Infrastructure development	1.7
15	Acidification	0.9
16	Ecosystem fragmentation	0.9
17	Habitat loss	0.9
18	Process disruption	0.9
19	Salinity	0.9
20	Native vegetation clearing or loss	0.9
21	Recreation & Access	0.9
22	Non-acceptance of NRM principles	0.9
	Total	100.0

Table 14: Comments on threats to groundwater

Threat Category	Comment on Threat	Comment on Capacity
Abstraction of water	Abstraction impacts on ecosystem function and human water supply.	Groundwater – lack of knowledge to address risks (ie: not using precautionary principle).
Climate change	Diminishing run-off and precipitation – all life is dependent on water. Loss of habitat or change (rapid) – migration of species. Impacts?	Groundwater should not be used to water our gardens. It is an unsustainable resource. Start giving water a true monetary value and make us value it as resource and protect it.
Inadequate coordination of government and community activity	Whilst groundwater abstractions from institutional and rural bores are licensed, little if anything is being done to regulate private bores in the urban sphere.	
Nutrient export and enrichment	This process is one of the major nutrient sources on the coast, particularly in Cockburn Sound.	
Urban or industrial discharge – chemical contamination	More emphasis / resources required to deal with point source of contamination – long term cheaper.	
	Education is ongoing!	

3.9 Darling Range Streams

In addressing asset values in the streams of the Darling Range relatively greater importance is given to hydrological change (15.9%), drainage modification (13.6%) and abstraction of water (4.5%) than is found in the investment requirements for the surface waters of the coastal plain.

Table 15: Key areas of nrm investment for maintaining or enhancing the values of Darling Range Streams

	Investment Target	%
1	Hydrological change	15.9
2	Drainage modification	13.6
3	Nutrient export & enrichment	11.4
4	Biodiversity decline	9.1
5	Erosion & sedimentation	9.1
6	Ecosystem fragmentation	6.8
7	Exotic Plants	6.8
8	Habitat loss	4.5
9	Abstraction of water	4.5
10	Urban or Industrial Discharges	4.5
11	Native vegetation clearing or loss	4.5
12	Political will (lack of)	4.5
13	Salinity	2.3
14	Non-acceptance of NRM principles	2.3
	Total	100.0

Also, investment for this asset category should significantly target biodiversity values (9.1%), ecosystem fragmentation (6.8%), habitat loss (4.5%) and native vegetation clearing or loss (4.5%). Otherwise, the pattern of investment is similar to that for the surface waters of the coastal plain, including nutrient export and enrichment (11.4%); urban or industrial discharges (4.5%); and salinity (2.3%). Generally, the catchments of Darling Range streams are protected from salinity by clearing controls, but notable exceptions occur through the Avon, Brockman, Ellen Brook and Helena River catchments. One workshop participant chose to comment on this asset.

3.10 Coast and Marine

Symptoms of degradation of the region's coastal and marine environment, which creates a need for new nrm investment, are biodiversity decline (13.1%); exotic marine species (5.5%); ecosystem fragmentation (4.1%); exotic plants (4.1%); and habitat loss (3.4%).

Prominent causes are recreational activities (7.6%), urban or industrial discharges (6.2%); erosion and sedimentation (4.8%); nutrient export and enrichment (4.8%); process disruption (2.1%); infrastructure development (3.4%); and chemical contamination (2.8%).

Investment is needed to change community attitudes to use of the coast and marine environment, particularly with regard to recreational boating (7.6%), and to increase community involvement (9.1%) and awareness (9.0%).

Table 16: Key areas of nrm investment for maintaining or enhancing coastal and marine values

	Investment Target	%
1	Biodiversity decline	13.1
2	Inadequate involvement of community or industry	9.7
3	Ignorance, negligence, intolerance	9.0
4	Recreation & Access	7.6
5	Inadequate coordination of government & community activity	6.9
6	Urban or Industrial Discharges	6.2
7	Exotic (feral) animals	5.5
8	Political will (lack of)	5.5
9	Erosion & sedimentation	4.8
10	Nutrient export & enrichment	4.8
11	Climate Change	4.1
12	Ecosystem fragmentation	4.1
13	Exotic Plants	4.1
14	Habitat loss	3.4
15	Infrastructure development	3.4
16	Chemical Contamination	2.8
17	Non-acceptance of NRM principles	2.8
18	Process disruption	2.1
	Total	100.0

Table 17: Comments on threats to coastal and marine assets

Threat Category	Comment on Threat	Comment on Capacity
Biodiversity decline	The decline of coastline and marine biodiversity due to the lack of existing knowledge of the biodiversity and ecosystem function in this area.	
Climate change	Can we effectively influence it?	
Cockburn Sound / Owen Anchorage	Important point – should sort out boundary ambiguity for Cockburn, Kwinana and Rockingham. Shared catchment OK, but needs to be decided.	
Ignorance; Inadequate coordination;Inadequate involvement;Non-acceptance; Political will (lack of)	Inadequate recognition of long term effect of usage and development on the coastal strip.	
Infrastructure development	Need to protect coastline and marine areas from planning and development (eg: marinas, ports, development).	
Infrastructure development	There appears to be no consistent approach to infrastructure development along the Perth Metro coast. Planning is currently more reactive than proactive. We have 'no vision' for the future of our coast. What do we want in the future?	
Nutrient export and enrichment	Nutrients are a major cause of seagrass death or loss, and can create "monocultures"' of plants elsewhere.	
Recreation and access	Beach access is an ongoing issue. Recreational (and commercial) fisheries are a constant threat. The fact that we know very little about the total recreational fishing catch is a really big issue; to fisheries management and target species sustainability.	
Recreation and access (for recreational fishing)	Zillions of people doing it, but we know so little about the real catch amounts – it is currently unmanaged.	
Exotic (feral) animals	Introduction of marine pests is a substantial and important issue which lacks adequate funding, coordination and knowledge.	
Exotic animals	Introduced marine pests are a real threat to marine and estuary biodiversity and fishing industries (commercial and recreational).	The future of Swan is its people and the will to change our impacts on our environment. The first step for this is awareness raising and education. We need to radically improve this and ensure wide spread application.
Recreation and access	With the move towards marine planning on a State level and Commonwealth level, access to and resource allocation will become an issue.	Until the day comes when traditional data is aligned with scientific data, there will never be integrated management options and outcomes sought for multiple benefit outcomes.

3.11 Air

The principle issues for targeting investment relate to the consumption of fossil fuels (34.4%); urban or industrial discharges (9.4%); and chemical contamination (3.1%). Infrastructure development (12.5%), biodiversity loss (3.1%), habitat loss (3.1%), and loss of native vegetation (3.1%) are all seen as being implicated as threats to air quality.

Table 18: : Key areas of nrm investment for maintaining or enhancing air quality

	Investment Target	%
1	Fossil fuels consumption	34.4
2	Climate Change	12.5
3	Infrastructure development	12.5
4	Urban or Industrial Discharges	9.4
5	Political will (lack of)	6.3
6	Biodiversity decline	3.1
7	Chemical Contamination	3.1
8	Habitat loss	3.1
9	Native vegetation clearing or loss	3.1
10	Recreation & Access	3.1
11	Ignorance, negligence, intolerance	3.1
12	Inadequate coordination of government & community activity	3.1
13	Non-acceptance of NRM principles	3.1
	Total	100.0

Burning of wood, for domestic heating and for forest fire management is seen as the biggest threat to air quality in the region. There was just one participant comment, which sums up the issue.

Table 19: Comment on air quality

Threat Category	Comment on Threat
Fossil Fuels consumption	Focus on consumption (reducing it) to improve air quality.

3.12 Cultural Heritage

A quartet of social factors is targeted to help enhance indigenous heritage values. These include information and educational products (23.3%); initiatives to increase community involvement (13.3%); increased political will (13.3%); and improve coordination (10%). Natural features that add to indigenous heritage values include biodiversity (8.9%), habitat loss (7.8%), ecosystem fragmentation (5.6%), and exotic plants (4.4%). These are threatened by native vegetation clearing or loss (2.2%) and water abstraction (2.2%). Human activities that must be managed better for protection of indigenous heritage values include recreational access (3.3%) and fire management regimes (3.3%)

Table 20: Key areas of nrm investment for maintaining or enhancing indigenous heritage values

Table 21: Comments on threats to heritage values

	Investment Target	%
1	Ignorance, negligence, intolerance	23.3
2	Inadequate involvement of community or industry	13.3
3	Political will (lack of)	13.3
4	Inadequate coordination of government & community activity	10.0
5	Biodiversity decline	8.9
6	Habitat loss	7.8
7	Ecosystem fragmentation	5.6
8	Exotic Plants	4.4
9	Fire management regime	3.3
10	Recreation & Access	3.3
11	Hydrological change	2.2
12	Native vegetation clearing or loss	2.2
13	Process disruption	1.1
14	Non-acceptance of NRM principles	1.1
	Total	100.0

Threat Category	Comment on Threat
Infrastructure development	Lead to healthy, co-operative societies that can address other issues coherently and collaboratively.
Ignorance, negligence, intolerance	Educating our broader community is essential to gaining ecological and Indigenous Heritage understanding, therefore, gaining a passion to protect, restore and respect our environment.
Ignorance, negligence, intolerance	Indigenous heritage can provide many insights for future environmental management but also the NRM Strategy has great potential to provide for Indigenous community development by re-establishing connections to heritage and the country.
Political Will (lack of)	Need more than talk, therefore, real legislation to respect, understand and value Indigenous spirit, knowledge and ecological understanding.
	Indigenous involvement is lacking in a number of key areas of NRM.
Ignorance, negligence, intolerance	Indigenous knowledge and land management practice can play a larger part of NRM

4. REGIONAL CAPACITY TO ADDRESS NRM ISSUES

4.1 Approach

The Workshop sessions included a period for reflection on what determines the region's capacity to address NRM issues. Participants were invited to consider a list of factors that contribute to "capacity". The responses are discussed in Section 4.3. First, we report on how participants viewed the lack of capacity as a threat to asset values requiring corrective investment.

4.2 Regional capacity as a target for investment

Investment could help to improve regional capacity to tackle nrm issues, across a range of social factors namely: education (17.9%); increased community and stakeholder involvement (17.1%); improved coordination of government and community (9.8%); increased awareness of nrm principles (8.1%); and increased political will (4.9%). These were seen as being likely to leads to improvements across a wide range of nrm issues.

Table 22: Key areas of nrm investment for maintaining or enhancing regional capacity for natural resource management

	Investment Target	%
1	Ignorance, negligence, intolerance	17.9
2	Inadequate involvement of community or industry	17.1
3	Inadequate coordination of government & community activity	9.8
4	Nutrient export & enrichment	8.1
5	Non-acceptance of NRM principles	8.1
6	Biodiversity decline	6.5
7	Urban or Industrial Discharges	5.7
8	Political will (lack of)	4.9
9	Drainage modification	3.3
10	Native vegetation clearing or loss	3.3
11	Chemical Contamination	2.4
12	Habitat loss	2.4
13	Ecosystem fragmentation	1.6
14	Exotic Plants	1.6
15	Agricultural Management Practices	1.6
16	Erosion & sedimentation	0.8
17	Hydrological change	0.8
18	Process disruption	0.8
19	Salinity	0.8
20	Fire management regime	0.8
21	Infrastructure development	0.8
22	Fossil fuels consumption	0.8

Table 23: Comments on building regional capacity

Threat Category	Comment on Threat
Chemical contamination	education / capacity building; incentives (MBIs); appropriate infrastructure; appropriate planning processes; regulation; parthershiops; coordination
Habitat loss	Not enough Local Government planning and integration with State Planning on this issue. Too much habitat loss equals loss of local providence and biodiversity for flora and fauna.
Human failings	Education of the **whole** community is severely under-funded.
Ignorance, intolerance	Education is the foremost.
Ignorance, negligence, intolerance	If people do not know that there are environmental problems or if they don't know that their actions are causing problems, how can we possibly fix any of the major environmental issues in Perth. Education is the key. We need to tackle the key causes rather than try and fix the symptoms. It comes down to informed people, being inspired to change their behaviour for the benefit of all.
Infrastructure development	Education / public relations process for all who are affecting or causing issue, makes community and industry responsible for their actions and consequences.
Nutrient export and enrichment	One of the major environmental issues in Perth. Needs to be highlighted more to the community so that we don't have a 'dead' river system in 10 years. This will then affect the entire Perth community. If people don't know about the issue then they can't do anything to fix it. And if they don't know how to fix the problem, then it will only get worse.

4.3 Participants' views on factors influencing regional capacity

Participants were asked to fill out a table showing a list of factors that contribute to regional capacity, against a list of 29 threats, by putting a tick in any cell where they thought that regional capacity was relatively good, and a cross where they thought that regional capacity was inadequate.

A total of 2017 ticks were provided by participants, who worked either individually or in pairs. Table 24 shows the relative scoring of different factors. There was strong agreement that the region possessed (i) the necessary technical know-how, knowledge and capacity to innovate (1.6 times the average rating); and (ii) the capacity to change policies and legislation if needed (1.3 times the average rating).

All other factors were considered to be less than adequate. These included human resources (0.9), financial resources (0.6), time (0.8) and organisation and coordination (0.7).

Table 24: Rating of regional capacity against different factors

	Total Ticks	Average Ticks per Cell across 29 Threats	Ratio to Overall Average
Technical know-how, knowledge, innovation	455	15.7	1.6
Human resources	254	8.8	0.9
Degree of community involvement	243	8.4	0.8
Financial resources	172	5.9	0.6
Time	225	7.8	0.8
Organisation & coordination	197	6.8	0.7
Ability to change policies & legislation	384	13.2	1.3
Other… Knowledge	74	2.6	0.3
Other….Adaptation	8	0.3	0.0
Other…..Political Will	5	0.2	0.0
Total	2017	9.9	1.0

Table 25 shows how participants rated the region's capacity to address particular threats. Capacity was rated as "relatively high" for many of the traditional NRM issues, though it is notable that capacity to deal with some of the most salient threats to asset values in this region, including nutrient export and enrichment, native vegetation clearing, exotic plants and animals, and hydrological change was rated as only "moderate".

Capacity was rated as inadequate against a number of typical "big city" environmental issues such as urban or industrial discharges and air pollution, , process disruption, habitat loss and ecosystem fragmentation. It was also thought that there is inadequate capacity to deal with a number of societal threats to asset values, including inadequate coordination, acceptance of NRM principles and lack of political will.

Table 25: Participants' rating of regional capacity against particular threats.

	Ratio to Mean	Relative Capacity[1]
Region has relatively high capacity to address:		
Recreation & Access	1.37	H
Fire management regime	1.35	H
Infrastructure development	1.29	H
Salinity	1.24	H
Chemical Contamination	1.21	H
Diseases -plants	1.18	H
Acidification	1.14	H
Agricultural Management Practices	1.14	H
Drainage modification	1.14	H
Abstraction of water	1.11	H
Biodiversity decline	1.08	H
Region has moderate capacity to address:		
Erosion & sedimentation	1.04	M
Diseases -animals	1.02	M
Nutrient export & enrichment	1.02	M
Exotic Plants	0.99	M
Native vegetation clearing or loss	0.99	M
Ignorance, negligence, intolerance	0.99	M
Exotic (feral) animals	0.96	M
Hydrological change	0.95	M
Climate Change	0.93	M
Region has relatively low capacity to address:		
Urban or Industrial Discharges	0.89	L
Fossil fuels consumption	0.83	L
Habitat loss	0.81	L
Involvement of community or industry	0.79	L
Coordination of government & community activity	0.76	L
Non-acceptance of NRM principles	0.75	L
Ecosystem fragmentation	0.73	L
Political will (lack of)	0.69	L
Process disruption	0.62	L

Note 1: (i) If the average score against the particular threat across all asset categories is greater than 110% of the average score for all threats across all assets, then capacity against the particular threat is classed as "relatively high"; (ii) if the average for the particular threat is less than 90% lower then capacity against the particular threat is classed as relatively high; (iii) if the average for the particular threat is within +/- 10% of the overall mean, then capacity to address that threat is classed as "moderate"

5. INVESTMENT STRATEGY

5.1 Analysis of Workshop Results

The outcome of the workshop is a classification of asset categories into a simple (but large) 2 x 2 matrix as follows.

	Capacity to Address the Issue	
Threat to Asset Value	HL	HH
	LL	LH

Asset/threat combinations that are classified as HL will have high levels of threat to asset values and low perceived current capacity to address the problem. These would be high-priority areas for additional expenditure under the Strategy. Conversely any asset-threat combination that was classified as LH would be an area where continued investment should be questioned. LL scores indicate that investment should not occur. A HH score would indicate that current efforts should probably continue, but that additional investment should be carefully evaluated.

The total matrix comprises 13 asset groups by 29 threats identified in the Strategy, a total of 385 cells. Participants were given 25 stickers each, and were asked to place their stickers in the cells that represented in their view the greatest returns to NRM investment. They were limited to a maximum of three stickers in any one cell, but were also encouraged to take account of where other participants were placing their stickers, so as to achieve what, in their view, would be the "best" distribution of investment across all options. In all, a total of 1,490 stickers were placed in the matrix combining the three workshop sessions.

The results are shown in Table 26.

Table 26: Participants' scores of return to investment by asset class and type of threat.

POSSIBLE THREATS TO ENVIRONMENTAL SOCIAL AND ECONOMIC VALUES	BIOPHYSICAL PROCESSES														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Acidification	Biodiversity decline	Climate Change	Chemical Contamination	Diseases -plants	Diseases -animals	Ecosystem fragmentation	Erosion & sedimentation	Exotic (feral) animals	Exotic Plants	Habitat loss	Hydrological change	Nutrient export & enrichment	Process disruption	Salinity
Urban Land Uses	1	14	4	3	1	0	9	2	0	1	5	0	4	1	0
Agricultural Land Uses	1	1	0	1	1	1	1	2	2	6	5	0	7	0	14
Forest & Wooodlands	0	16	0	1	6	1	9	2	1	10	9	0	0	3	0
Terrestrial Biodiversity	0	38	11	1	6	0	37	2	12	25	23	1	0	8	5
Swan-Canning Estuary and Coastal Plain Streams	1	7	1	4	1	0	7	10	1	7	10	5	28	5	5
Freshwater Lakes	0	14	2	4	0	0	13	7	1	7	9	9	19	1	0
Groundwater	1	2	9	11	0	0	1	0	0	0	1	7	12	1	1
Darling Range Streams	0	4	0	0	0	0	3	4	0	3	2	7	5	0	1
Coastline & Marine	0	19	6	4	0	0	6	7	8	6	5	0	7	3	0
Air	0	1	4	1	0	0	0	0	0	0	1	0	0	0	0
Indigenous Heritage	0	8	0	0	0	0	5	0	0	4	7	2	0	1	0
Other heritage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Capacity	0	8	0	3	0	0	2	1	0	2	3	1	10	1	1
OTHER 2.....	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
OTHER 3.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	132	37	33	15	2	94	37	25	71	81	32	92	24	27
Percentage	0.3%	8.9%	2.5%	2.2%	1.0%	0.1%	6.3%	2.5%	1.7%	4.8%	5.4%	2.1%	6.2%	1.6%	1.8%

Table 26 (Cont)

POSSIBLE THREATS TO ENVIRONMENTAL SOCIAL AND ECONOMIC VALUES (Cont)	HUMAN ACTIVITIES									HUMAN FAILINGS					Total	Percent
	16	17	18	19	20	21	22	23	24	25	26	27	28	29		
	Abstraction of water	Agricultural Management Practices	Urban or Industrial Discharges	Drainage modification	Fire management regime	Infrastructure development	Native vegetation clearing or loss	Fossil fuels consumption	Recreation & Access	Ignorance, negligence, intolerance	Inadequate coordination of government & community activity	Inadequate involvement of community or industry	Non-acceptance of NRM principles	Political will (lack of)		
Urban Land Uses	1	0	7	4	0	7	14	1	0	3	2	2	3	7	96	6.4%
Agricultural Land Uses	2	9	2	2	0	0	1	0	0	1	1	0	3	5	68	4.6%
Forest & Wooodlands	1	0	0	0	3	4	19	0	3	5	3	4	1	8	109	7.3%
Terrestrial Biodiversity	6	3	0	2	10	6	40	1	3	21	13	6	4	18	302	20.3%
Swan-Canning Estuary and Coastal Plain Streams	7	8	24	12	0	1	0	0	5	10	5	13	3	9	189	12.7%
Freshwater Lakes	7	2	10	8	0	10	11	0	1	9	3	10	1	6	164	11.0%
Groundwater	25	4	10	6	0	2	1	0	1	6	3	6	1	5	116	7.8%
Darling Range Streams	2	0	2	6	0	0	2	0	0	0	0	0	1	2	44	3.0%
Coastline & Marine	0	0	9	0	0	5	0	0	11	13	10	14	4	8	145	9.7%
Air	0	0	3	0	0	4	1	11	1	1	1	0	1	2	32	2.1%
Indigenous Heritage	0	0	0	0	3	0	2	0	3	21	9	12	1	12	90	6.0%
Other heritage	0	0	0	0	0	3	0	0	0	0	0	0	0	1	4	0.3%
Regional Capacity	0	2	7	4	1	1	4	1	0	22	12	21	10	6	123	8.3%
OTHER 2……	0	0	0	0	0	0	0	0	0	0	0	0	0	6	8	0.5%
OTHER 3……	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
TOTAL	51	28	74	44	17	43	95	14	28	112	62	88	33	95	1490	100.0%
Percentage	3.4%	1.9%	5.0%	3.0%	1.1%	2.9%	6.4%	0.9%	1.9%	7.5%	4.2%	5.9%	2.2%	6.4%	100.0%	

In analysing the data given in Table 26 all 385 cells were separately listed, with their cell address e.g. "*Asset Class Darling Range Streams by Salinity*", together with the rating of return to investment and the capacity score for the particular threat i.e. in this case Salinity. The data were then sorted with the highest return to investment and lowest current capacity listed first, and the lowest return to investment and highest current capacity listed last. There were 136 cells with no sticker, indicating insignificant return to investment. These were discarded. Of the remaining 249 cells the "top 48" cells were then coded into the four groups HL, HH, LH, LL. The results are shown in Table 27.

Table 27: The top 48 threats to asset values, and regional capacity for dealing with the threat

	Asset Class	Threat	Value Score	Capacity
1	Urban Land Uses	Native vegetation clearing or loss	14	L
1	Urban Land Uses	Biodiversity decline	14	H
2	Agricultural Land	Salinity	14	H
3	Forest & Woodlands	Native vegetation clearing or loss	19	L
3	Forest & Woodlands	Biodiversity decline	16	H
3	Forest & Woodlands	Exotic Plants	10	L
4	Terrestrial Biodiversity	Native vegetation clearing or loss	40	L
4	Terrestrial Biodiversity	Biodiversity decline	38	H
4	Terrestrial Biodiversity	Ecosystem fragmentation	37	L
4	Terrestrial Biodiversity	Exotic Plants	25	L
4	Terrestrial Biodiversity	Habitat loss	23	L
4	Terrestrial Biodiversity	Ignorance, negligence, intolerance	21	L
4	Terrestrial Biodiversity	Political will (lack of)	18	L
4	Terrestrial Biodiversity	Inadequate coordination of government & community activity	13	L
4	Terrestrial Biodiversity	Exotic (feral) animals	12	L
4	Terrestrial Biodiversity	Climate Change	11	L
4	Terrestrial Biodiversity	Fire management regime	10	H
5	Swan-Canning & Coastal Plain Streams	Nutrient export & enrichment	28	H
5	Swan-Canning & Coastal Plain Streams	Urban or Industrial Discharges	24	L
5	Swan-Canning & Coastal Plain Streams	Inadequate involvement of community or industry	13	L
5	Swan-Canning & Coastal Plain Streams	Drainage modification	12	H
5	Swan-Canning & Coastal Plain Streams	Ignorance, negligence, intolerance	10	L
5	Swan-Canning & Coastal Plain Streams	Habitat loss	10	L
5	Swan-Canning & Coastal Plain Streams	Erosion & sedimentation	10	H
6	Freshwater Lakes	Nutrient export & enrichment	19	H
6	Freshwater Lakes	Biodiversity decline	14	H
6	Freshwater Lakes	Ecosystem fragmentation	13	L
6	Freshwater Lakes	Native vegetation clearing or loss	11	L

	Asset Class	Threat	Value Score	Capacity
6	Freshwater Lakes	Inadequate involvement of community or industry	10	L
6	Freshwater Lakes	Urban or Industrial Discharges	10	L
6	Freshwater Lakes	Infrastructure development	10	H
7	Groundwater	Abstraction of water	25	H
7	Groundwater	Nutrient export & enrichment	12	H
7	Groundwater	Chemical Contamination	11	H
7	Groundwater	Urban or Industrial Discharges	10	L
9	Coast & Marine	Biodiversity decline	19	H
9	Coast & Marine	Inadequate involvement of community or industry	14	L
9	Coast & Marine	Ignorance, negligence, intolerance	13	L
9	Coast & Marine	Recreation & Access	11	H
9	Coast & Marine	Inadequate coordination of government & community activity	10	L
10	Air	Fossil fuels consumption	11	L
11	Indigenous Heritage	Ignorance, negligence, intolerance	21	L
11	Indigenous Heritage	Inadequate involvement of community or industry	12	L
11	Indigenous Heritage	Political will (lack of)	12	L
12	Regional Capacity	Ignorance, negligence, intolerance	22	L
12	Regional Capacity	Inadequate involvement of community or industry	21	L
12	Regional Capacity	Inadequate coordination of government & community activity	12	L
12	Regional Capacity	Non-acceptance of NRM principles	10	L
12	Regional Capacity	Nutrient export & enrichment	10	H

It is seen that Terrestrial Biodiversity, together with Forests and Woodlands are regarded as a prime target for investment across a wide range of threats. Capacity in this area is still mainly low.

The condition of the Swan-Canning Estuary and Coastal Plain Streams is another prime target for investment. Capacity for addressing this issue is adequate in some respects, but low capacity is identified in regard to urban and industrial discharge control and the level of community involvement. Freshwater Lakes and Wetlands have a wider range of threats, including biodiversity values, and capacity is generally perceived to be low in relation to management of the threats to this asset group. Groundwater is also viewed as offering high returns to investment in NRM, with capacity generally received as adequate, except for controls of urban and industrial discharges.

Coast and marine issues were perceived as important, though overall ranked slightly lower than the issues discussed above. Areas offering significant returns to investment are initiatives to maintain marine biodiversity and it is viewed as critical to engage the community and improve communication in this regard.

Air quality was not viewed as a particularly high priority for investment, though capacity for dealing with fuels consumption was seen as low.

Indigenous heritage is seen as an important area for investment, emphasising social and educational initiatives rather than on-ground works.

Finally, the capacity of the region to deal effectively with NRM issues across the board is viewed as inadequate, with emphasis being needed on education, involvement, coordination and embedding of NRM principles into the way the Swan Region is planned and managed.

6. NEXT STEPS

The results achieved in Investment Workshop series "A" provide a first-cut rating of returns to investment across asset classes and threats within the Swan Region. But investment decisions will need further justification than what we have achieved so far. In particular it will be necessary to identify potential projects having a high probability of success, and positive benefit-cost ratios. It will also be necessary to make tradeoffs across the different asset classes.

The next step will be to derive an allocation of resources for natural resource management across Asset Categories that is *approximately proportional to relative social preference*, and which defines a cut-off point for selection of management actions.

This will be the subject of Investment Workshop Series "B".

Swan Region Strategy for Natural Resource Management

INVESTMENT PLAN TECHNICAL REPORT No 3

ASSESSMENT OF OVERALL PRIORITIES FOR INVESTMENT ACROSS THEMES

DRAFT 09/02/05

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Swan Region Strategy for Natural Resource Management

INVESTMENT PLAN TECHNICAL REPORT No 3

ASSESSMENT OF OVERALL PRIORITIES FOR INVESTMENT ACROSS THEMES

1. BACKGROUND

The Swan Catchment Council is developing a Strategy for Natural Resource Management (the Strategy). Under a Bilateral Agreement with the Commonwealth the Council is required to develop an Investment Framework and Plan for effective and efficient implementation of the Strategy.

This requires a consistent framework for assessing action priorities within and across Asset Categories, based on a form of "triple bottom line" assessment. The Strategy identifies six broad "Asset Categories": respectively land, water, biodiversity, coastal/marine, air and cultural heritage.

The Consultancy Brief indicates that selection of assets for investment should be based on the:

- Value of and target for the asset
- Impact of threats on the asset
- Capacity of the wider regional community to take effective action

2. METHODOLOGY

2.1 Developing the Investment Framework

Key steps in the methodology for developing the Investment Framework and Plan are as follows:

- Contacts with the Council's team to establish progress made in identifying and valuing assets under threat, proposed targets, management options, indicators of performance and monitoring and evaluation system;
- Desk research into all asset categories and financial cost estimates;
- Determine current State and Commonwealth governments' latest thinking about their requirements/preferences for the format of investment frameworks and plans, leading to a decision about the appropriate format for the Swan Catchment Investment Framework and Plan;
- A short but intensive program of workshops designed to elicit stakeholder views on an appropriate Investment Framework including targets and management practices; and
- Development of an Excel-based forward Investment Plan linking targets with required investments and cost shares.

2.2 Workshop Design

There are two levels at which prioritisation of NRM investments needs to be done: namely at the levels of (i) asset values, threats and capacity to deal with the issue, and (ii) management actions.

The workshops were therefore divided into two sessions, namely:

- Selecting assets for investment, and
- Getting the best mix of management actions, viz overall priorities for investment within and across Themes

Investment Plan Technical Report No 2 *Assessment of the Relative Returns from Investment Across Assets and Threats* gives results for the first workshop series.

This report deals with the workshop series. Three separate workshops were held to discuss and rate all the management actions given in the Swan Catchment Strategy for Natural Resources Management. Each workshop followed the same format, and was attended by fourteen to twenty six participants.

Each workshop began with introductory statements by the Swan Catchment Council representative, Resource Economics Unit, and the Facilitator. There then followed three workshop tasks, which are described in the next Section. Appendix A gives the results of the Workshop Evaluation forms returned by participants.

2.3 Workshop Tasks

The discussion was designed in three segments:

- Task 1: a brief review of outputs from Workshop Series A
- Task 2: consider proposed management actions within each asset category (the bulk of the workshop time was spent on this topic)
- Task 3: consider resource allocation across Themes

2.3.1 Task 1: Review

Task 1 was to review the results of Workshop A (see REU Report). Participants had received a copy of the REU report prior to the workshop. The focus was on the rating of threats to assets key asset values, and then rated the degree to which asset values could be changed by NRM investment (either to avert a future decline in value or to enhance a currently degraded value). Resource Economics Unit had analysed the results and presented tables showing threats to assets ranked in terms of the perceived returns to investment and the capacity of the region to address the threats (HH to LL).

2.3.2 Task 2: Prioritize Management Actions within Themes

For the second task, participants were presented with 11 tables containing a list of all the management actions that have been included in the Swan Region Strategy for Natural Resource Management, asset by asset. The asset category “Air” was excluded, as there had been no participant representing this topic at Workshop A.

The asset classes considered, and indicative total cost of management actions proposed for each asset class are shown in Table 1. Indicative costs for each action, estimated by Resource Economics Unit, were shown in the working sheets used by participants.

Because of the large number of management actions for the asset class "Swan-Canning Estuary and Coastal Plain Streams" it was divided into three groups of management actions, namely those dealing with (i) aquatic ecosystems, (ii) nutrients and (iii) sediments and turbidity. These groups also correspond to the three Matters for Target for this asset.

In order to limit the total number of decisions that participants had to make, many of the management actions listed in the Strategy were combined into a single "larger" action. This was done particularly where components of a particular action had been listed separately in the Strategy (e.g. "undertake a review…and….implement recommendations"), or where actions were of a similar type (e.g. training actions). Participants were invited to break any action into components if they felt they wanted to deal with them individually (e.g. if they wanted to give a higher priority to one part of the action).

At the head of each table were listed the highest ranking returns to NRM investment, obtained from Workshop A. Participants could therefore compare the set of listed management actions with the areas of highest return to NRM investment identified in Workshop A.

The task given to participants was to decide how they would budget for a reduced total funding of management actions for the particular asset. A 75% cut in overall funding was used in each asset class, compared with the indicative total cost estimate. The figure of 75% was considered to be a plausible funding reduction, while forcing participants to make quite significant changes.

Table 1: Preliminary Costings of Management Actions Contained in the Swan Regional Strategy
Source: Resource Economics Unit 19/7/04: PRELIMINARY

Participants were asked whether they would adjust to the reduced funding by doing one of the following with each listed management action:

Asset Category	$000s	%
Land	3,267	19%
Terrestrial Biodiversity	1,186	7%
Swan-Canning Estuary & Coastal Plain Streams:		
Ecosystems	1,835	11%
Nutrients	1,770	10%
Sediments & turbidity	1,590	9%
Freshwater Lakes & Wetlands	800	5%
Groundwater	390	2%
Darling Range Streams	1,690	10%
Coast & Marine	2,652	15%
Heritage	559	3%
Regional Capacity	1,630	9%
Total Investment Plan	17,369	100%

- Keeping
- Spreading
- Trimming
- Deferring, or
- Cutting completely.

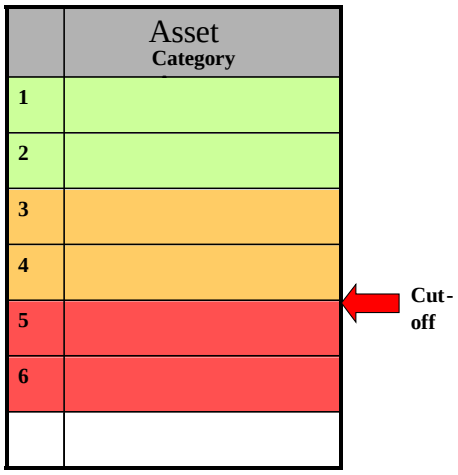
They were then asked to show a new indicative expenditure and new number of years over which the management action would be undertaken.

Participants were allowed to increase funding for an action, but only within the overall 75% budget constraint.

At the end of this exercise the results were collectively reviewed by participants by recording the number of times A (add) K (keep), S (spread), T (trim), D (defer) or C (cut) had been made against each management action.

Having rated all the possible actions within an Asset Category, the cumulative amount of money required as successively more actions are "approved" is noted. Then, If there is a budget constraint, it is possible to "draw the line" under the actions that can be afforded. The tighter the budget constraint the fewer is the number of actions that can be undertaken, and the longer the time needed to achieve resource condition targets. This is illustrated in Figure 1.

Figure 1: Priority ranking within an asset category



Actions 1 and 2, shaded in green, are deemed "essential" (having been rated as "Add" or "Keep"); Actions 3 and 4 (Spread, Defer or Trim) shown in brown are "marginal" and Actions 5 and 6 shown in red (Cut) are "not do-able" given the budget constraint, though they remain as probably still worthwhile actions for some future date.

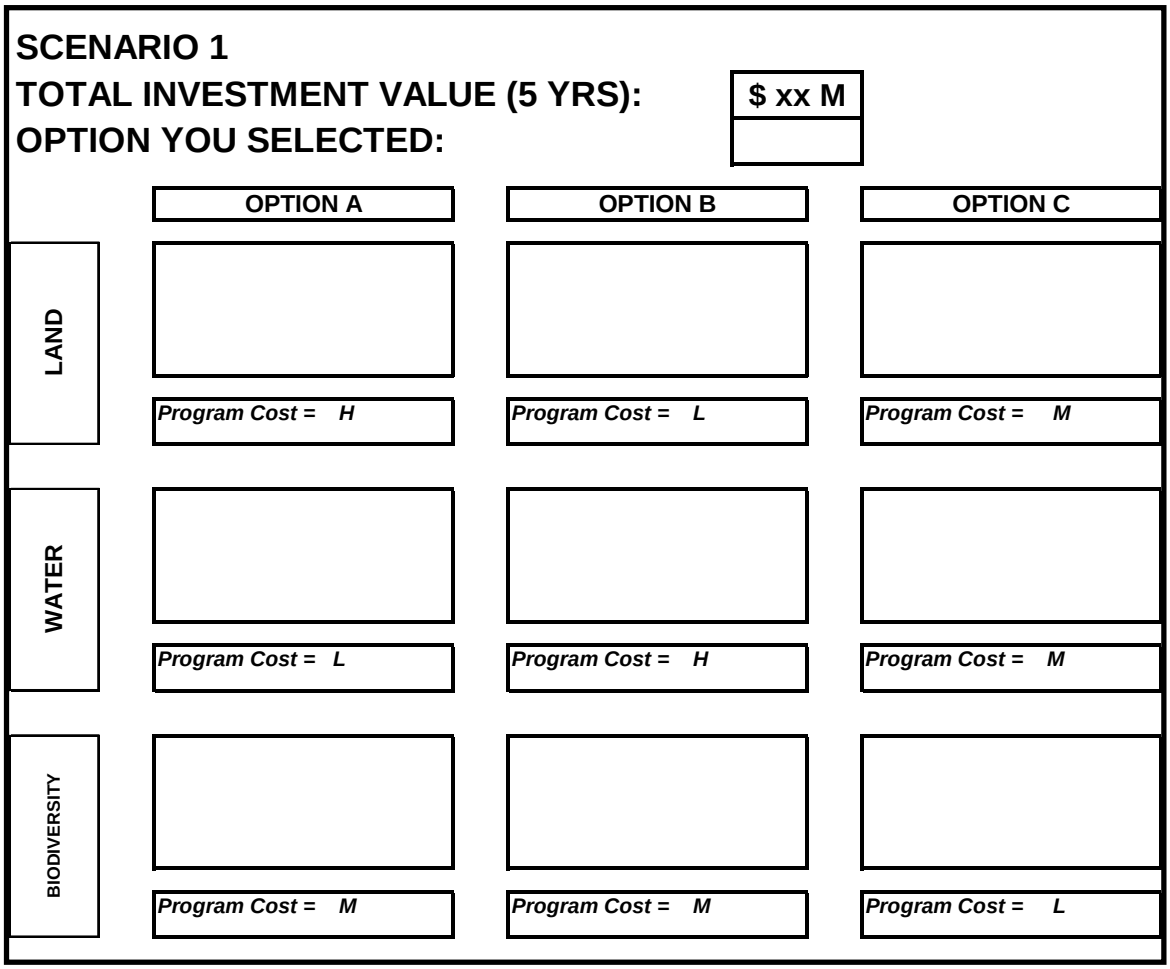
2.3.3 Task 3: Choose Management Actions Across Themes

The final task was to derive an allocation of resources for natural resource management across Asset Categories (Themes) that is *approximately proportional to relative social preference*, and which defines a cut-off point for selection of management actions (see below).

A suitable environmental economics technique for assessing appropriate resource allocation across Asset Categories is *Choice Modelling*. This technique has been used in household surveys used to elicit willingness to pay for generalised outcomes across broad environmental categories (see for example NLWRA 2002).

> The timeline and budget for this consultancy did not allow for a household survey, so a workshop approach was used. Instead of expressing their "willingness to pay" the workshop participants were assumed to be seeking the maximum environmental, social and economic returns obtainable from alternative mixes of management actions. They expressed their preference by choosing from a number of pre-set mixes of actions across asset categories. This is illustrated in Figure 2.

Figure 2: Format of the Choice Sets offered to participants (example)



The mixes of management actions corresponding to the "High", "Medium" and "Low" funding for a particular asset category were developed as follows:

- "High" implied full implementation of all proposed management actions;
- "Medium" implied an intermediate set between "High" and "Low", and
- "Low" implied a set of management actions corresponding to 75% funding

The task required from participants was to select Option A, Option B or Option C out of the three shown on a single sheet, termed a "Scenario". Each Option represented a complete investment plan for the Region, specifying a "high", medium" or "low" bundle of management actions for each of the 11 asset categories. For the purpose of the exercise the management actions were summarised as statements of the outcomes that could be expected following successful completion of the particular set of management options specified.

This exercise was completed four times, each with a different combination of high, medium or low numbers of management actions in each asset category. In two of these Scenarios the management actions for water were held constant across Options. In the other two scenarios management actions for terrestrial biodiversity and land were held constant. This was done in order to force advocates of investment in one area (e.g. water) to consider alternatives across other areas (e.g. terrestrial biodiversity, coast and marine, or regional capacity building) independently from their "pet" area.

Finally, participants were asked to nominate which of the twelve Options they had considered across the four Scenarios came closest to their ideal investment plan for the region. They were also

asked to write down and return their reasons for their best choice on a card. This was done only for Days 2 and 3 of the workshop series.

The outcome of the workshop was therefore a direct statement of the way in which individual participants would allocate investment resources across Asset Categories. Aggregating over all participants gives an "informed judgement" of a preferred investment pattern for the region.

3. MANAGEMENT ACTIONS RATED WITHIN THEMES

The following tables show the results of an exercise undertaken by 64 participants in Investment Plan Workshop B. Participants were asked to consider indicative costs for each action, then to indicate how they would cope, in a financial sense, with an enforced overall budget cut. A notional figure of a 25% overall cut to the Strategy's five-year budget was used. This 25% figure was varied slightly across asset categories, in order to present participants with a total budget for each asset class rounded to the nearest $100,000 in aggregate. Thus, each management action listed in the Strategy is presumed to be worthwhile, but difficult choices are needed if funds are short.

Participants were asked to first decide whether, faced with an overall shortage of funds, they would do one of the following to the budget for a particular management action:

- Keep the action
- Spread the budget over time
- Defer the action
- Trim the budget
- Cut the Action Out Altogether

They were then asked to supply a new cost level for each management action, including any desired increases in allocation to "kept" actions, provided the participant stayed within the new 75% budget overall for the asset class. Calculators were provided to all participants.

Management Actions were taken from the *Swan Region Natural Resource Management Strategy Draft for Public Comment*, (April 2004), with some modifications by the Strategy Team, following from a consideration of comments received. Also, some management actions that were either similar to each other, or belonged to a specific project sequence were amalgamated. This was done in order to keep the total number of choices required of participants to within a feasible number.

Working sheets containing the management actions in each asset category were supplied to each participant. Due to the large number of Matters for Target and management actions proposed for the Swan-Canning Estuary the management actions for this asset were divided into three groups, namely those addressing (i) aquatic ecosystem, (ii) nutrients, and (iii) sediments and turbidity. This gave a total of eleven working sheets. Management actions for air were not rated, as there was no participant from this topic.

The participants worked on tables of four to six people, and freely discussed issues as they worked through the sheets. Participants were allowed to NOT work on a particular sheet if they felt uncomfortable due to a lack of knowledge.

The following tables summarise the results of the workshop as a ranking of the management actions within each asset category, using all participants' responses over the three days that the workshop was held.

3.1 Land

Table 2: Management Actions addressing the Land Asset: priority ranking for budget retention with constrained total funding (least percentage cut ranked 1).

Rank	Management Action
1	Develop a benchmark for community capacity to address acidification, erosion, acid sulfate soils, and land restoration. LM 2.6
2	Strategic partnerships with the Urban Development Institution of Australia (UDIA) for protection of land assets. LM 2.6
3	On-ground projects of community groups, local government and State Agencies addressing acidification, erosion, acid sulfate soils, and land restoration. LM 2.5
4	Network for the use of market based instruments/incentives. LM 2.6
5	Develop a benchmark for regional community salinity management capacity LM 1.4
6	Land-use and management support programs (e.g. planning decision support tools, EMS, best practice guidelines, workshops, education and training, demonstrations, information system & service, land capability tools, property planning) addressing land salinity and restoration. LM 1.4
7	On-ground salinity projects of community groups, local government and State Agencies. LM 1.3
8	Develop and implement land-use and management support programs (e.g. planning decision support tools, EMS, best practice guidelines, workshops, education and training, demonstrations) addressing acidification, erosion, acid sulfate soils, and land restoration. LM 2.5
9	Review Environmental Protection Policies, Statements of Planning Policy and Regional Planning Schemes and build land salinity risk assessments in planning approval process. LM 1.2
10	Review Environmental Protection Policies, Statements of Planning Policy and Regional Planning Schemes; include ASS risk assessments in planning process. LM 2.3
11	Facilitate salinity risk mapping, and interpretation into management strategies. LM1.1
12	Audit land use compatibility through an assessment of capability and suitability. LM 2.7
13	Mapping and prioritisation of prime agricultural land LM 2.4.
14	Develop models predicting land use change scenarios and impacts. LM 2.7
15	Risk mapping of agricultural land affected by wind and water erosion, waterlogging. Monitoring systems. Identify information needs / gaps in land resource information LM 2.1
16	Implement ONE large scale land salinity remedial actions in priority areas. LM 1.3

3.2 Terrestrial Biodiversity

Table 3: Management Actions addressing Biodiversity : priority ranking for budget retention with constrained total funding (least percentage cut ranked 1).

Rank	Management Action
1	Determine of percentage elimination, reduction, containment targets for priority feral/pests and diseases
2	Develop dieback surveying/mapping schedule
3	Expand Skills for Nature Conservation, Urban Nature, Land for Wildlife, Greater Gardens, Grow Us A Home include biodiversity restoration and management training through tertiary institutions and TAFE's
4	Establish collaborative partnerships to ensure the conservation management and recovery planning of threatened species and threatened ecological communities, and to identify research needs.
5	Promote the Local Government Biodiversity Planning Guidelines for Natural area Protection and Management, Local Plants Landscaping Policy and Landscaping with local plants guidelines; support the preparation of local biodiversity strategies and action plans.
6	Provision of training in feral, pest animal and disease identification, mapping and management
7	Develop threat abatement plans and management responses for feral animals and pests linked to National Threat Abatement Strategies
8	Develop recovery plans/interim recovery management and buffering plans
9	Develop and implement local biodiversity action plans
10	Promote wider regional community, land manager and Local Government education and awareness and training programs on feral animal, pest and disease management
11	Regional implementation of State Weed Plan and Environmental Weed Strategy for Western Australia.
12	Review land planning process and design codes for new urban areas. Develop recommendations for local and regional structure planning processes. Identify cleared land suitable for development. Develop mechanisms to preferentially locate new developments on previously cleared land
13	Develop guidelines for rural landscapers
14	Identify significant species populations for monitoring, protection and habitat management
15	Identify priority weed species and determine percentage elimination, reduction and containment targets for priority weed population
16	Review and prioritise existing conservation management actions for natural areas, significant species populations, and threatened ecological communities
17	Review of CAR system. Identify priority areas for addition, and off-reserve areas for protection
18	Review of CAR system. Identify priority areas for addition, and off-reserve areas for protection.

3.3 Swan-Canning Estuary and Coastal Plain Streams: Aquatic Ecology

Table 4: Management Actions addressing Aquatic Ecosystems of the Swan-Canning System: priority ranking for budget retention with constrained total funding (least percentage cut ranked 1

Rank	Management Action
1	Strategic partnerships with UDIA and the Stormwater Industry Association (SIA)
2	Community-training programs: TAFE, Universities, SCCP Education program, Ribbons of Blue, Waterwise, Skills for Nature Conservation, Urban Nature and Land for Wildlife. Include stormwater education, water use efficiency and water conservation.
3	Implement prioritized actions from Swan River Trust Foreshore Condition project
4	Support restoration plans to protect major rivers
5	Continue Riverplan; the Swan-Canning Cleanup Program; plus new sub regional and local action plans. WM 1.2
6	Continue large scale implementation of Riverbank and Swan Alcoa Landcare Program foreshore projects
7	Continue Canning River Environmental Water Provision project
8	Integrated regional information system to enhance planning, implementation, monitoring and evaluation of inland aquatic ecosystems
9	Develop MoU between the Swan Catchment Council and Swan River Trust to implement Riverplan.
10	Continue Foreshore Condition project: water quantity & quality baseline data, targets, investigate marine pests & response mechanisms, research water and dependency of ecosystems, prioritise stream condition; "catchment" report card monitoring program. WM 1.1
11	Dept Fisheries 12 month study of fish kills in the Swan River
12	Implement incentive schemes and revolving fund for protection and conservation of major tributaries.
13	New EWP projects for Helena River & Brockman River
14	Undertake a strategic review of Planning Policies WM 1.2
15	Benchmark community capacity to protect major tributaries

3.4 Swan-Canning Estuary and Coastal Plain Streams: Nutrients

Table 5: Management Actions addressing Nutrients in the Swan-Canning System: priority ranking for budget retention with constrained total funding (least percentage cut ranked 1).

Rank	Management Action
1	Councils to adopt the Local Government NRM Policy Manual.
2	Continue and expand existing community-training programs such as Swan-Canning Cleanup Program education initiatives, Ribbons of Blue, Wetland Watch and Skills for Nature Conservation, through the integrated regional education and training program. Support wetland restoration and management training through tertiary institutions and TAFE's.
3	Industry awareness and accreditation programs for small to medium sized industries (SME's).
4	Review existing training programs for SME's. Include stormwater education, water use efficiency and water conservation into the regional training and education program.
5	Incorporate Water Sensitive Design (WSD) and Total Water Cycle Management principles in new developments, retrofits and drainage network
6	Include stormwater education, water use efficiency and water conservation into the regional training and education program.
7	Implement WaterWise program across all water users including schools, Local Government and industry.
8	Develop and implement nutrient intervention program, with financial assistance package, incentives and strategic partnerships to assist resourcing and implementation.
9	New regulations for urban drainage
10	Water quality monitoring and analysis to support ICM/NRM management plans to address the eutrophication of waterways Algal bloom and fish death assessments. Advice to the community and regional groups
11	Facilitate SCCP priority actions related to water quality resource assessment, research and monitoring and evaluation
12	Historical land use surveys to identify sources of nutrients and contaminants.
13	Review regulations for point source contamination.

3.5 Swan-Canning Estuary and Coastal Plain Streams: Sediments and Turbidity

Table 6: Management Actions addressing Sediments and Turbidity in the Swan-Canning System: priority ranking for budget retention with constrained total funding (least percentage cut ranked 1).

Rank	Management Action
1	Integrate water quality monitoring programs.
2	Support waterways and wetland restoration and management training through tertiary institutions and TAFE's.
3	Continue and expand existing community-training programs such as River Restoration training, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program
4	Fence off defined waterways
5	Support development, resourcing and implementation of restoration plans to conserve and protect waterways and wetlands
6	Program support for foreshore and riparian restoration on waterways
7	Support sediment sourcing study to identify and assess active erosion areas and their impact on the Swan-Canning River system.
8	Include biological indicators and an index of river condition in the development of monitoring systems.
9	Best management practice for minimising waterways and land erosion
10	Review regulations for minimizing erosion from urban and rural landuses.
11	Establish baseline and trends and set targets for turbidity/ suspended particulate matter.
12	Decision-making tools for land use planners to identify and address turbidity/particulate matter impacts.
13	Develop a benchmark for wider regional community capacity to address impacts of turbidity/particulate matter
14	Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation.

3.6 Freshwater Lakes & Wetlands

Table 7: Management Actions addressing Freshwater Lakes and Wetlands: priority ranking for budget retention with constrained total funding (least percentage cut ranked 1).

Rank	Management Action
1	Form strategic partnerships with UDIA and the Stormwater Industry Association (SIA)
2	Include stormwater education, water use efficiency and water conservation training program. Expand Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife. Assist the WaterWise program across all water users. Support wetland restoration and management training through tertiary institutions and TAFE's.
3	Further development and implementation of Wetland Watch program.
4	Develop & implement restoration plans to conserve and protect wetlands
5	Implement a framework for incentives schemes and revolving fund for protection and conservation of priority wetlands by 2005
6	Develop a benchmark for regional community capacity to protect priority wetlands
7	Consolidate baseline data and analyse priority wetland condition. Classify and evaluate resource condition.
8	Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation.

3.7 Groundwater

Table 8: Management Actions addressing Groundwater: priority ranking for budget retention with constrained total funding (least percentage cut ranked 1).

Rank	Management Action
1	Determine priority groundwater-dependent ecosystems. Research into acid sulphate soil risk potential and groundwater contamination plumes.Develop groundwater-modelling programs for priority areas.
2	Review Environmental Protection Policy (Swan Coastal Plain Wetlands). Incorporate sustainable limits and allocations in Water Source Protection Plans and Landuse and Water Management Strategies. Prepare new Groundwater Management Plans
3	Monitor commercial bores and make sustainable allocations.

3.8 Darling Range Streams

Table 9: Management Actions addressing Darling Range Streams: priority ranking for budget retention with constrained total funding (least percentage cut ranked 1).

Rank	Management Action
1	Strategic large-scale revegetation programs in the Brockman River, Wooroloo Brook and Helena River catchments (see "Land" Sheet).
2	Expand River Restoration training, Ribbons of Blue, Wetland Watch, Skills for Nature Conservation, Urban Nature, Land for Wildlife
3	Adoption by Local Government Authorities of the Local Government NRM Policy Manual.
4	Develop a benchmark for wider regional community capacity to address surface water salinity
5	Support land management, waterways and wetland restoration and management training through tertiary institutions and TAFE's.
6	Evaluate and coordinate available data and establish adequate monitoring systems, including extent of rising water tables, salinisation of currently freshwater bodies, area affected by secondary salinity and the risk of further salinity. Identify, map and develop management plans for all salinity risk areas.
7	Support development, resourcing and implementation of restoration plans to address surface water salinity
8	Strategic large scale surface water management programs in priority areas
9	Review regulations for addressing surface water salinity in the Avon Upper Swan region.
10	Decision-making tools for land use planners to identify and address surface water salinity impacts.
11	Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation of salinity initiatives.

3.9 Coast and Marine

Table 10: Management Actions addressing Coastal and Marine Environments: priority ranking for budget retention with constrained total funding (least percentage cut ranked 1).

Rank	Management Action
1	Promote the Coastal SPP widely to Councils to ensure consideration is given to sea level rise when establishing appropriate setbacks for new developments. MoU with Local Government on stormwater action plans. Implement WESROC's stormwater management plan
2	Support national and international effort into sea level rise modeling and research
3	Consolidate existing information on marine commercial and recreational fishing in the region to better understand the effects on target species, including recreational fishing effort, boat and on-shore line catch, and effects on fish biodiversity.
4	Training and capacity building for Local Government and Coastcare groups on coastal biodiversity/ecology. Continue to support strategic local level rehabilitation and revegetation works.
5	Implement 1-5 year groundwater quality targets outlined in the Cockburn Sound Management Plan
6	All future proposals of land based aquaculture to LGAs to undergo land capability assessment, (ongoing); Land/sea areas zoned for aquaculture use
7	Update the Contaminated Inputs Inventory annually;
8	Development of integrated marine wildlife management and monitoring program.
9	Support the extension of Shoalwater Islands Marine Park.
10	Develop benchmark for regional community capacity to protect marine habitats
11	Support Marine Community Monitoring Program. Develop an ecological monitoring program: ecological reference sites, habitat types and spatial extent, mapping, threat analysis, observation targets for each habitat type
12	Implement and expand the recommended State Marine Parks and Reserves Authority (MPRA) marine reserve system
13	Develop regional information system to enhance planning, management, monitoring and evaluation.
14	Respond to suspected incursions in accordance with the National and State framework for management response to marine pests
15	New monitoring systems for stormwater impacts on nearshore marine habitat
16	Develop training programs in marine habitat management, operational policy, and restoration for Local Government Authorities
17	Include marine fauna restoration and management training through tertiary institutions and TAFE's.
18	Develop and implement Regional Coastal Strategic Plan
19	Estimate current and predicted human usage of estuarine and marine resources, focusing on Rottnest Island, Shoalwater Islands Marine Park and other metropolitan marine parks
20	Partnerships with Agencies and Local Government for implementation of the Beach Watch program
21	Identify 100% regionally representative marine habitat types using CAR approach. Determine priority areas for management/protection; management programs for priority areas
22	Develop five-year protection and restoration target for wind erosion by 2005 (all coastal areas). Develop strategies to meet targets to reduce the coastal dune areas affected by coastal wind

	erosion.
23	Identify 100% marine habitat areas 'at risk' from introduced marine pests; Identify at-risk areas, and support the preparation of the State framework for management response to marine pests
24	Develop scientific methodology to identify key indicator species; wildlife mapping; Develop project for use as decision-making support tool
25	100% of priority natural coastal areas identified and assessed by 2005·including monitoring systems, biodiversity buffer zones threatened by sea level rise Estimate current and predicted human usage of coastal resources
26	Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation.
27	Water quality monitoring and evaluation action plan consistent with the Perth Coastal Waters (2000); define natural variability of marine quality; further develop R&D; identify future reference sites

3.10 Air

Not ranked

3.11 Cultural Heritage

Table 11: Management Actions addressing Cultural Heritage: priority ranking for budget retention with constrained total funding (least percentage cut ranked 1).

Rank	Management Action
1	Develop and implement cultural heritage training programs for the range of stakeholders.
2	Establish partnerships with The National Trust and the Heritage Council of WA for mutually beneficial outcomes for NRM and heritage protection.
3	Research, record, and publish Nyoongar history of the Swan region by 2009.
4	Identify sites of cultural and historical significance in each local area and support the development of management plans for significant sites
5	Work with Local Government and heritage bodies to encourage more proactive management of sites
6	Review opportunities in policy and legislation to include Indigenous cultural heritage by 2009, including management by DIA (Aboriginal Land Trust estate), management plans and arrangements, inclusion of clauses in NRM related policies and legislation at all jurisdictional levels.
7	Funding for training facilitators.
8	Develop or identify existing MOU's with State and local government and SCC/ATSIC/SWLSC/ILC.
9	Facilitate the preparation of management plans (including human impact) for recreational and tourism areas that have high ecological value

3.12 Regional Capacity Building

Table 12: Management Actions addressing Regional Capacity: priority ranking for budget retention with constrained total funding (least percentage cut ranked 1).

Rank	Management Action
1	Develop a sub-regional community support structure with security of tenure by 2005.
2	Provision of training fund to enable volunteer development in local communities
3	NRMO's to rejuvenate local groups or support new groups to form where there is a defined role for group.
4	Council costs for implementing the Strategy, including communications and engagement strategies; an integrated regional education and training program; develop sponsorship and partnership strategy for major corporate bodies;
5	Developed working relationship with Aboriginal reference groups and local Aboriginal organisations.
6	Align NRM plans with local area land use plans and design sacrificial zones for region for recreation and development, and earmark areas for conservation and preservation.
7	Integrated incentive schemes for private investment; local government planning systems; cost recovery schemes, market based incentive programs and regional trading of "costs and benefits" in NRM.
8	Develop appropriate targets, indicators and a monitoring and evaluation framework for regional community's capacity in consultation with the State Monitoring and Evaluation Working Group and the Australian Government.
9	Developed NRM entrepreneurship program which focuses on innovation thinking "out of the box"
10	Develop a map of all key players and define roles and responsibilities and investment partners for strategy implementation (include special interest groups), partnerships with players outside the region (inter-region partnerships and network with opportunities wherever they lie).
11	Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation. Review local level environmental plans for spatial compatibility and establish linkages to the Strategy by 2008.
12	Audit of all relevant legislation impacting strategy implementation.
13	Viability rural population maintained or increased by facilitating incentives/subsidies to encourage local business / industry development

4. THE PREFERRED INVESTMENT PLAN

4.1 Description of Choice Sets

The Choice Sets presented to participants may be summarised as follows.

Scenario 1 (Water fixed):

- Option A: maximises the financial allocation to Land at the expense of Coasts and Marine, Cultural Heritage and Regional Capacity Building
- Option B: Emphasises Cultural Heritage and Regional Capacity Building relative to Land and Terrestrial Biodiversity
- Option C: Accepts a reduction in allocation to Land in order to strengthen Terrestrial Biodiversity, Coasts and Marine, Cultural Heritage and Regional Capacity Building

Scenario 2 (Water fixed):

- Option A: Is very similar to Scenario 1, Option C, but with a smaller reduction in the allocation to Land.
- Option B: Is equal to or inferior to Option 2A on all counts
- Option C: Contrasts with Option 2A, and strongly emphasises allocation to Land.

Scenario 3 (Land and Terrestrial Biodiversity fixed):

- Option A: Maximises actions dealing with the water asset rather than with Coasts and Marine or Regional Capacity Building
- Option B: gives a “fair go” to most assets, and gives mainly “Medium” allocations to all asset categories
- Option C: participants choosing this option were willing to give up some Water actions in order to maximise Coasts and Marine, Cultural Heritage and Regional Capacity Building

Scenario 4 (Land and Biodiversity fixed)::

- Option A: This provides strong programs for Water and Coasts and Marine at the expense of Cultural Heritage and Regional Capacity Building
- Option B: In contrast with Option 4A, allocation to Water is trimmed in order to strengthen Cultural Heritage and Regional Capacity Building
- Option C: Maximises allocation to Water without losing emphasis on Cultural Heritage.

4.2 Results for each Scenario

Table 13: Percent of participants selecting Options A, B, or C in each of four choice sets: participants on Day 1

Scenario	OPTION A	OPTION B	OPTION C	Total
1	14	57	29	100
2	78	18	4	100
3	36	32	32	100
4	50	36	14	100

Total participants = 28

Table 14: Percent of participants selecting Options A, B, or C in each of four choice sets: participants on Day 2

Scenario	OPTION A	OPTION B	OPTION C	
1	0	50	50	100
2	90	10	0	100
3	58	27	15	100
4	62	12	27	100

Total participants = 26

Table 15: Percent of participants selecting Options A, B, or C in each of four choice sets: participants on Day 3

Scenario	OPTION A	OPTION B	OPTION C	
1	0	50	50	100
2	86	14	0	100
3	50	29	21	100
4	64	14	21	100

Total participants = 14

Table 16: Percent of participants selecting Options A, B, or C in each of four choice sets: all participants

Scenario	OPTION A	OPTION B	OPTION C	
1	6	53	41	100
2	84	15	1	100
3	47	29	24	100
4	57	22	21	100

4.3 Overall Preference

On days 2 and 3, as a final task, participants were asked to nominate which of the twelve Options contained in the four Scenarios was "closest" to their ideal investment plan. Results are shown in Table 17 to Table 19. It is seen from Table 19 that Scenario 2 Option A was the preferred overall investment strategy for 48% of participants. This Option contains a "Medium", but still considerable allocation of investment to Water and Land, while also giving strong support to Biodiversity, Coasts and Marine, Cultural Heritage and Regional Capacity. The nearest "rival" to Scenario 2 Option A was Scenario 1 Option B. This emphasises Coasts and Marine slightly less than does Scenario 2 Option A, but is in other respects similar. It is notable that the pattern of selections was very similar across the three workshop days, as can be seen by comparing Table 17, and Table 18.

It may be concluded that participants generally rejected Options that would significantly reduce investment in Coasts and Marine, Cultural Heritage and Regional Capacity Building. An investment plan that promotes the mix of management options suggested by Scenario 2 Option A is likely to gain approval from a wide range of stakeholders.

Table 17: Percentage of participants nominating an Option as "Best Overall": Day 2 participants

Scenario	OPTION A	OPTION B	OPTION C
1	0%	19%	15%
2	46%	0%	0%
3	8%	0$	4%
4	8%	0%	0%

Total participants = 26

Table 18: Percentage of participants nominating an Option as "Best Overall": Day 3 participants

Scenario	OPTION A	OPTION B	OPTION C
1	0%	7%	0%
2	50%	0%	0%
3	7%	14%	7%
4	14%	0%	0%

Total participants = 14

Table 19: Percentage of participants nominating an Option as "Best Overall": Day 2 and Day 3 participants combined

Scenario	OPTION A	OPTION B	OPTION C
1	0%	15%	10%
2	48%	0%	0%
3	8%	5%	5%
4	10%	0%	0%

Total participants = 40

4.4 Marginal utilities of additional dollars spent

Results of the choice exercise can be used to indicate the relative preferences of participants with respect to marginal changes in financial allocations to alternative asset classes. This is done through a model that "explains" the expected proportion of participants who choose a particular Option in terms of the amount of money allocated across asset categories. Formally,

$$P = f(L, W, B, C\&M, CH, RCB),$$

Where

P is the percentage of participants selecting an Option, and

L, W, B, C&M, CH and RCB are the respective dollar allocations to Land, Water, Biodiversity, Coasts and Marine, Cultural Heritage, and Regional Capacity Building involved in each of the twelve Options.

Ordinary Least Squares Multiple Regression is used to estimate coefficients on L, W, B, C&M, CH and RCB.

This model was estimated using the data for each of the three workshop days individually, and for the aggregated results over all three days.

The results are shown in Table 20. The meaning of the results is that a $1million *increase* in the allocation to any asset category would change the percentage of participants selecting the Option containing that increase by the following amounts:

+ 0.7%	for Land
- 4.1%	for Water
+45.8%	for Biodiversity
- 2.5%	for Coasts & Marine
-18.9%	for Cultural Heritage
- 2.6%	for Regional Capacity Building

This is a striking result. It shows that, for the group of participants present at the workshops, any increase in $ allocation to Biodiversity would produce a large change in the proportion selecting that Option. Conversely, increased allocation to one or more of Water, Coast & Marine, Cultural Heritage or Regional Capacity Building would slightly reduce the proportion selecting that Option. It is also notable that the Options containing increased allocations to Cultural Heritage were associated with reduced percentage support, because these increases were generally associated with reduced allocations to Biodiversity.

The value of r^2 indicates that the model does not provide a particularly good fit, which is understandable with only 12 observations, and the standard error of the estimated percentage of participants choosing any Option are fairly wide. Nevertheless, it can be seen that the results obtained were very consistent over the three days, even though the composition of participants varied.

Table 20: Choice model regression results

	Day 1	Day 2	Day3	All Days
r^2 (Intercept constrained to 0,0)	0.46	0.43	0.48	0.44
Coefficients on:				
Land	1.97	-0.17	-0.37	0.67
Water	-4.63	-3.62	-3.72	-4.06
Biodiversity	43.73	47.61	46.75	45.83
Coasts & Marine	-2.73	-2.43	-1.92	-2.45
Cultural Heritage	-19.62	-17.50	-20.18	-18.92
Regional Capacity Building	0.04	-5.04	-3.16	-2.56

SWAN REGION STRATEGY FOR NATURAL RESOURCE MANAGEMENT

INVESTMENT PLAN TECHNICAL REPORT NO 4

DEVELOPING PROJECTS TO IMPLEMENT THE STRATEGY'S MANAGEMENT ACTIONS: A GAP ANALYSIS

DRAFT 09/02/05

CONTENTS

TABLES

DEVELOPING PROJECTS TO IMPLEMENT THE STRATEGY'S MANAGEMENT ACTIONS: A GAP ANALYSIS

1. FROM STRATEGY TO PROJECT PLANS

1.1 Overview

The *Swan Region Strategy for Natural Resource Management* specifies all the Matters for Target and Management Actions that are needed to implement the Strategy. These have been separated into four main types of action: Resource Assessment, Planning, On-Ground Works and Regional Capacity Building. The Strategy Investment Plan gives an indicative costing of all Management Actions. But the Management Actions themselves are expressed in general terms. To give them effect they have to be formulated, sometimes broken down into different parts, and sometimes aggregated into projects having an identified team to carry out the work, precise objectives, methodologies, timelines, budgets, and monitoring and evaluation provisions. Projects will often address several types of management action: e.g. resource assessment leading to management plans and on-ground works.

State Government departments and agencies, Local Governments, and the wider community are both proponents and substantial providers of funds for many of these actions independently of the NHT. See Investment Plan Table 1 for a breakdown of fund sources. Thus, the *Swan Region Strategy for Natural Resource Management* will be implemented through a variety of both NHT-funded and non-NHT-funded projects.

1.2 The "Gap Analysis"

In order to translate the comprehensive set of Management Actions required by the Strategy into "bankable" projects for funding by NHT and other sources a "Gap Analysis" was undertaken. Its objectives were to:

- Determine what activities are currently taking place for each Management Action;
- Whether existing activities (whatever their funding source) are adequate to give full effect to the Management Actions listed in the Strategy;
- What new activities are needed to fill the "gaps", where there is either (i) no current activity or where (ii) current activity is inadequate to reach the Strategy's objectives; and
- What would be an appropriate method for funding new or expanded activities.

This analysis was undertaken through a series of seven Program Workshops dealing respectively with:

(i) Natural Diversity,
(ii) Integrated Water Management,
(iii) Sustainable Production – Agriculture,
(iv) Sustainable Production – Industry,
(v) Coastal & Marine,
(vi) Cultural Heritage, and
(vii) Regional Capacity Building.

The outputs from the Gap Analysis were then used to develop a portfolio of projects, which the Swan Catchment Council can use to stimulate investment, including submitting proposals to NHT.

This report describes the Gap Analysis, and its conclusions in terms of an account of current activities addressing natural resource management issues in the Swan Region, and a set of projects that are needed to address the gaps. Technical Report No 5 gives the project summaries and technical assessments. Technical Report No 6 gives full Project Statements, and Technical Report No 7 gives the results of an analysis of funding priorities.

1.3 Methodology

The "Gap Analysis" identified current activities within the region that are already addressing the Strategy Management Actions, to assess their adequacy and to highlight where new or additional work is needed.

A stakeholder workshop approach was used as this was considered to most efficient way of collecting information on current activities leading to a discussion of gaps and projects that could fill the gaps. Possible funding sources were also discussed.

By the end of the workshops, participants had:

- identified current activities against Management Actions;
- assessed adequacy and identified gaps;
- suggested new activities, funding and linkages; and
- recommended a suite of NHT and other project proposal areas

1.4 Report Outline

The following chapters give, for each Regional Delivery Program:

- A summary of the projects that are recommended by stakeholders and their suggested funding sources
- An account of current activities against each Matter for Target. Current activities are reported as either "NHT Funded" or "Other Funded". They serve as a valuable database of the level of current activity against each Management Action Target. From this level of activity, participants were able to make judgement about the adequacy of activity, identify gaps and suggest projects to meet those gaps.
- Stakeholders' assessments of the adequacy of current activities given the Targets and Management Actions required by the Strategy;
- Key Gaps; and
- Identified opportunities for new or expanded projects to fill the identified gaps.

2. NATURAL DIVERSITY DELIVERY PROGRAM

2.1 Summary of Recommended Projects

The recommended set of projects for **NHT Regional Funding** is shown in Table 1.

Table 1: Natural Diversity Projects Recommended for NHT2 funding

	Matter for Target/Project Description	Indicative Budget
	Native vegetation communities integrity	
1.	Audit and stock-take of existing plans, strategies and NRM documents.	
2.	Gap analysis of NRM legislation and other related legislation.	
3.	Biodiversity Network development (seed money).	$5,000
4.	Increasing skills and knowledge.	
5.	Agreed methodology.	
6.	Partnership development.	
7.	General education to raise biodiversity profile.	
8.	On-ground works.	
	Significant species and ecological communities	
1	Western Swamp Tortoise (existing project)	
2.	TEC's (9) (existing project)	
3.	Perth Biodiversity Project (links to BR1 & BR3) (existing project)	
4.	Perth Fungi Project.	$500,000/ 3 yrs
5.	Additional support for soil microbiology studies in support of threatened species activities.	$500,000/3 yrs
6.	New project for threatened species and communities, including flora, fauna and migratory species.	$1,000,000/5 yrs
7.	Support to Local Governments for further ecological assessment of natural areas (ecologists needed).	$150,000/5 yrs
8.	Predictive mapping of threatened species and communities.	$450,000/5 yrs
9.	Expanded Threatened Species Network funding for site–specific management plans having threatened species (competitive).	Covered under Project 6
10.	Regional delivery of grants and incentives for private land conservation (on-ground works and protection).	
	Ecologically significant species	
1.	Guidelines for rural landscaping (based on Local Plant package).	
2.	Capacity building for government and community – knowledge (network events, training).	
3.	Dedicated Officer for weeds and pests in the region.	

The recommended set of projects for **Other Sources Funding** for this Program is:

Table 2: Natural Diversity Projects recommended for non-NHT funding sources

	Matter for Target/Suggested Project	Indicative Cost
Native vegetation communities integrity		
1.	Regional Biodiversity Strategy.	$250,000
2.	Regional Biodiversity Toolkit (extension of National Biodiversity Toolkit).	$120,000
3.	Biodiversity Network development (matching).	
1.	Reconciliation of WA and Commonwealth Threatened Species and Communities lists.	$300,000
2.	Writing of Recovery Plans for remaining species.	$200,000
3.	Statutory planning protection mechanisms for conservation outcomes.	$300,000
Significant species and ecological communities		
1.	Discovery Program (desktop) (Threat Abatement Plans).	
2.	Model local law development for weeds and local plant species.	
Ecologically significant species		
1.	Guidelines for rural landscaping (based on Local Plant package).	
2.	Capacity building for government and community – knowledge (network events, training).	
3.	Dedicated Officer for weeds and pests in the region.	

Table 3: Suggested Fund Sources for non-NHT2 Natural Diversity Projects

No	*Name of Project*	*Funding Required*	*Tick Likely Fund Sources*					
			Strategic Reserve	*Cross-Regional*	*Enviro Fund*	*NLP*	*Other Public*	*Private Sources*
Native vegetation communities integrity								
1.	Regional Biodiversity Strategy.	$250,000			✓	✓	✓	✓
2.	Regional Biodiversity Toolkit (extension of National Biodiversity Toolkit).	$120,000	✓	✓	✓			
3.	Biodiversity Network development (matching).						✓	✓
Significant species and ecological communities								
1.	Discovery Program (desktop) (Threat Abatement Plans).							
2.	Model local law development for weeds and local plant species.							
Ecologically significant species								
1.	Reconciliation of WA and Commonwealth Threatened Species and Communities lists.	$300,000				✓		
2.	Writing of Recovery Plans for remaining species.	$200,000				✓		
3.	Statutory planning protection mechanisms for conservation outcomes.	$300,000	✓					

2.2 Native Vegetation Communities Integrity

Current projects and activities under this Management Action Target were assessed for adequacy to ensure that the MAT is achieved. Major needs are seen in the areas of:

- Lack of coordination between agencies.
- A consistent monitoring and evaluation framework, for numerous agencies and organisations, operating at various levels.
- The Region needs input into State Biodiversity Strategy, with Local Government, State Government and Regional Body.

2.2.1 BM 1.1 Priority areas included in CAR System

2.2.1.1 Current Activities

BM1.1	MAT	100% of priority areas in each IBRA sub-region identified for inclusion into CAR reserve system by 2005	• Review CAR reserve system by major landform element in each IBRA sub-region • Develop natural diversity condition assessment framework and methodology • Determine extent and condition of native vegetation complexes in each major landform element • Identify priority native vegetation complexes in each major landform element • Determine priority natural diversity areas for inclusion to CAR reserve system • Determine priority natural diversity areas for protection to be retained outside the CAR reserve system

NHTFunded Activities	Non-NHT Funded Activities
➢ Perth Biodiversity Project (ALL) ➢ Perth Plant Biodiversity Project. ➢ PBP Steering Committee (also 1.2, 1.3). ➢ Conservation Auctions – other region, Bush Tender (NHT funded?) ➢ Foreshore Condition Assessment.	➢ Bush Forever (ALL). ➢ System 6 Update (ALL). ➢ Wildflower Society – Plant Survey. ➢ System 6 Update. ➢ Sub-regional group – reserve assessment. ➢ State Biodiversity Audit (CALM). ➢ WWF Wetland Watch – threatened species grants. ➢ Fungi Map. ➢ Funding schemes – grants – Ribbons of Blue. ➢ In preparation: WA Biodiversity Strategy. ➢ Conservation Reserves. ➢ WALIS Project – data. ➢ DIA – Asset audit of ALT (Aboriginal Lands Trust). ➢ Covenanting schemes. ➢ Perth Urban Bushland Fungi Project (also 1.2). ➢ Bush Brokers. ➢ State of the Environment Reporting (Local Government) (also 1.2, 1.3).

2.2.1.2 Adequacy

- Not currently adequate
- Timeframe is way too short.
- Quality of data collected.
- No set method for condition assessment at the regional level.

2.2.1.3 Gaps

- Timeframe for the assessment framework (ie: 2005) is too short;
- Natural diversity condition – how do you assess it? (this will determine how much time you need to meet the target).
- Lack of adequately skilled people to do this.
- Tertiary institutions, etc. need to increase their skill base in this area.
- Don't know yet exactly what we are trying to manage.

2.2.1.4 Responses

Regional Natural Diversity Strategy Project:

- Prepare Regional Natural Diversity Strategy.
- Input from State Biodiversity Strategy and Sub-regional Biodiversity Plans.
- Include cross regional activities (with State Biodiversity Strategy).
- Standard methodology for monitoring and evaluation.
- Framework.
- Not static, based on adaptive management.
- Outcome focussed.
- Depends on in-kind input from State, experts etc.

Audit and Stock-take Project:

- Map and stock-take/audit of existing plans, strategies and documents.
- Web accessible: not static; interface needed; to be updated by Biodiversity Network; GIS format – both biodiversity and management information layers; spatial representation to show gaps and overlays.
- Online database needed.

Coordination Project:

- Need stakeholder involvement and buy–in.
- Link for access to funding sources.
- Roles and responsibilities of key biodiversity stakeholders and program outcome.
- Organisational diagram with links and connections.

2.2.2 **BM1.2 25% of priority areas in each IBRA sub-region have natural diversity conservation plans developed by 2006.**

BM1.2	MAT	25% of priority areas in each IBRA sub-region have natural diversity conservation plans developed by 2006	• Review and prioritise existing conservation management actions for natural diversity areas, significant species populations, and threatened ecological communities • Identify new reserves for locally and regionally significant natural diversity areas based on biodiversity values and principles of ecological viability • Review area management plans and threat abatement plans and practices for the reserve system (including formal reserves and off-reserves) • Develop guidelines and plans for sustainable natural diversity management • Commence Bush Forever Phase II

NHT-Funded Activities	Non-NHT Funded Activities
➢ CALM Threatened Species. ➢ Indigenous start-up grants (partially NHT funded). ➢ Bush Bank.	➢ Urban Nature Ecoplan. ➢ Bush Forever Plan. ➢ Volunteers – "Friends Of", Green Corps. ➢ Private efforts – land managers (EnviroFunded). ➢ Indigenous Protection Area Program (possibly in management category). ➢ Indigenous Land Corps Enviro Program (management category?).

2.2.2.1 Adequacy

- Include Local Government as land managers in increasing their capacity.
- All land managers (not just community) need to have increased capacity.
- "Community" means more than just volunteers, eg: all land managers.
- 30% is it just community – what community?
- Lots of projects happening but gaps of skilled people and uncertainty about scope of community.

2.2.2.2 Gaps

- Lack of skilled people to understand natural ecosystems and manage them on-ground in this region.

2.2.2.3 Responses

2.2.3 **BM1.3 Legislation & Policy Review**

100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's natural diversity by 2006. **Not Currently Adequate**

- Targets are felt to be ambitious.
- Potential for greater coordination.
- Lots of work progressing legislation but not likely to be achieved in tight timeframe.

Current Activities

BM1.3	MAT	100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's natural diversity by 2006	• Establish and gain agreement on an urban growth boundary • Review land planning process and identify cleared land suitable for development • Review design codes for new urban areas • Develop recommendations for local and regional structure planning processes • Develop mechanisms to preferentially locate new developments on previously cleared land • Develop area management plans • Prepare local natural diversity strategies and action plans in accordance with *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region*

NHT-Funded Activities	Non-NHT Funded Activities
➢ Perth Biodiversity Project Guidelines – Local Government.	➢ NRM Policy Project ➢ State Sustainability Strategy. ➢ Local government – local management plans (also 1.2, 1.4). ➢ Local Government - district conservation strategies, enviro plans (also 1.1, 1.2). ➢ WA Urban Bushland Council. ➢ City of Belmont Natural Area Assessment. ➢ Shire of Mundaring Town Planning Scheme. ➢ Planning and Policy – Aboriginal Heritage Act legislation, EPBC Act. ➢ WALGA Enviro Policy Branch. ➢ Statutory Process – assessment process. ➢ Swan Coastal Wetland EPP – needs to be passed. ➢ Network City – Neighbourhood. ➢ Review: Swan River Trust Legislation. ➢ Town Planning Scheme provisions – zoning and vegetation protection. ➢ Environmental Offset Discussion Paper.

2.2.4 **BM1.4 Management response for Priority Protected Areas**

100% of priority protected areas have an active conservation management response by 2006.

BM1.4 *Not adequate*	MAT	100% of priority protected areas have an active conservation management response by 2006	• Preparation and implementation of management plans and/or threat abatement plans where required

NHT-Funded Activities	Non-NHT Funded Activities
➢ Perth Biodiversity Project – devolved grants, technical officer. ➢ Dieback Working Group (also 1.5).	➢ Urban Nature. ➢ Tuart and Wandoo Response Group. ➢ Bushland Management Plans by local government, approximately 20/year. ➢ CALM Nature Reserve Plans. ➢ Regional Park Plans.

2.2.4.1 Adequacy

- Not Adequate
- Target is completely unrealistic (2006?).
- Not sure what the priorities are?
- Cannot put anything in place that will meet that target adequately.

2.2.4.2 Gaps

- Lack of knowledge, standards and agreed methodology for bush management plans.
- Lack of standards for contract management, ie: Bush Regeneration and Herbicide Contracts for both LGA's and State Government, eg: need for development of Australian Standards system for contract design.

2.2.4.3 Responses

Active Conservation Management (covering BM 1.4 and BM 1.5)

- Resource assessment – standards
- Management planning – consistency
- Implementation (best practice) for on-ground results.
- Monitoring and evaluation – feedback to region.

2.2.5 **BM1.5 Local natural diversity strategies**

10 local natural diversity strategies for priority areas outside the CAR reserve system implemented by 2006.

2.2.5.1 Current activities

BM1.5 *Not adequate*	MAT	10 local natural diversity strategies for priority areas outside the CAR reserve system implemented by 2006 (*PBP definition?*)	• Develop and implement local natural diversity strategies for priority areas • Complete implementation of Bush Forever Phase I *(move to 1.4?*)

NHT-Funded Activities	Non-NHT Funded Activities
	➢ Environment Strategies by local government (various stages of implementation).

2.2.5.2 Adequacy

- Not Adequate
- There are other plans not related to CAR system that will help achieve this MA.
- Depends on definition of natural diversity strategies.
- For the timeframe of 2006 – not adequate.
- MA - "Complete implementation of Bush Forever Phase 1" should be in BM1.4.

2.2.5.3 Gaps

- Biodiversity not recognised as core business for Local Government.
- Lack of standards and knowledge for on-ground management works, including research on weed management, fauna management, etc.
- Resources and State Government commitment for 1.5.2. (Bush Forever).

2.2.5.4 Responses

On-ground Works

- Large gap.
- Link to education and increasing skills and knowledge.
- Priority funded biodiversity conservation sites.
- Targeted and supported by action plan.
- Funded by NHT.

- Providing incentives for land managers to undertake biodiversity conservation (eg: funding, information, community support).

2.2.6 BM 1.6 30% Increase in Community Participation

30% increase in community participation in education, restoration, protection and management activities for high priority native vegetation in the Region by 2009.

Current Activities

BM1.6 *Adequate but need to address skills gap*	MAT	30% increase in community participation in education, restoration, protection and management activities high priority native vegetation in the Region by 2009 (*include land managers e.g. local government?*)	• Develop and implement incentive mechanisms for private landholders to protect natural diversity (*including formal mechanisms, such as conservation covenants, and informal agreements, such as Land for Wildlife*) (*Gap: focus motivation*) • Develop regional information system to enhance natural diversity planning, management, monitoring and evaluation • Continue and expand community natural diversity training programs (*e.g. Skills for Nature Conservation, Urban Nature, Land for Wildlife, Greater Gardens, Grow Us A Home*) • Promote inclusion of natural diversity restoration and management training through tertiary institutions and TAFE's • Develop natural diversity management operational policy and training programs for Local Government Authorities and State agencies with bushland management responsibilities

NHT-Funded Activities	Non-NHT Funded Activities
➢ Community Education and Training. River Restoration (NHT). ➢ Incentive mechanism – WWF's Wetland Watch Program. ➢ Eco Plan. ➢ Skills for Nature Conservation Program. ➢ Local Landowner Incentive Packages (local biodiversity strategies). ➢ Local government Biodiversity Training Project (PBP). ➢ WA Herbarium (flora base). ➢ WA Museum (fauna base and database).	➢ Regional Information Systems: Perth Region Plant Biodiversity Project; Flora Base; Flora Bank. ➢ Tertiary Institutions Nat. Div. Training - TAFE Greenskills etc. "Conservation Land Management" Training Package. ➢ Wildflower Society, Bushland Plant Survey. ➢ Great Gardens. ➢ Perth Urban Bushland Fungi Project. ➢ Urban Nature. ➢ Wandoo Response Group; Tuart Response Group. ➢ Land for Wildlife. ➢ Tertiary Inst. Nat. Div. Training – Challenger TAFE Weed Short Course. ➢ Biodiversity Hotspots Program. ➢ Regional Herbarium Network. ➢ Bold Park EM Plan (also BM 1.1). ➢ Training in Nat. Div. – CALM – Urban Nature's Weed Management short course (in house). ➢ Birds Australia Birds Survey. ➢ National Trust Covenanting. ➢ CALM Covenanting Program. ➢ CALM Recovery Plans. ➢ Training – APACE – Bush regeneration and seed collection courses.

2.2.6.1 Adequacy

- Generally adequate

2.2.6.2 Gaps

- Needs to address skills gap

2.2.6.3 *Responses*

- Provide increased funding and support for existing programs that are effective.
- Cross promotion of existing education and skills programs.
- Review existing extension programs.
- Skills audit and needs assessment of existing NRM biodiversity practitioners.
- Coordinate education programs.
- Establish working opportunities for biodiversity.
- Need to gain high-level commitment from State Government and land managers for partnership development
- Need to raise the profile of biodiversity.
- Need more promotion events.
- Local Government needs to be more involved.

2.3 Significant Species and Ecological Communities

2.3.1 **BM2.1 Critical habitat identified**

Current Activities

BM2.1 *Not adequate*	MAT	100% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005	• Develop methodology to identify significant species populations for monitoring, protection and habitat management • Initiate program for prioritisation of significant species and their conservation and management , including • all vegetation complexes with less than 10% of original extent; • Threatened Ecological Communities (TECs); • habitats of threatened species; • list of wetlands of international importance, ie Ramsar Convention; and - migratory bird habitat.

NHT Funded Projects
➢ Perth Biodiversity Project: Local Government Biodiversity planning guidelines - field assessment methodology - process for prioritisation at all levels (includes significant species). ➢ Recovery plans written and being written for species and ecological communities – not all - resources needed - at population/site level (part NHT funded).

2.3.1.1 Adequacy

- Not currently adequate

2.3.1.2 Gaps

- There is a difference between Commonwealth and State TSC (Threatened Species and Communities) lists. NHT funds are not available for writing plans for TSC that are not Commonwealth listed (writing plans and implementing).
- There is inadequate predictive mapping for threatened species and communities.
- There is a CALM process to identify and rank threatened species and EC's; and there is recovery planning for population levels; but this is not the case for other significant species.
- Most information is available but resources are needed to carry out site assessments
- Gap is insufficient knowledge on microbiology and fungi relationships to TEC's.

2.3.1.3 Responses

Reconciliation of WA and Commonwealth Threatened Species and Communities Lists

- Reconciling TSC lists across Commonwealth and State.
- 2 FTE's required.
- This should be a national program of NHT2.

Predictive mapping of threatened species and communities

- Identifying those natural areas likely to have threatened species or communities, to allow detailed survey of target areas to identify threatened species or communities.
- This can include identification and mapping of buffers and linkages.
- Process or project to ensure and assist decision makers at Local Government and State Agency level to access information on TSC and request proponents to provide appropriate information to allow decisions (as part of B7 and/or B8?).

2.3.2 **BM2.2 Legislation & Policy Reviewed**

100% of all relevant NRM legislation and policy in State and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006

Current Activities

BM2.2 *Not adequate*	MAT	100% of all relevant NRM legislation and policy in State and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006	• Prepare local natural diversity strategies and action plans in accordance with *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region* • Review and prioritise existing conservation management actions for significant species and threatened ecological communities, and threat abatement plans • Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority significant species and ecological communities

NHT-Funded Projects
➢ PBP – 2 pilot projects to prepare local biodiversity strategies. ➢ NHT2 funding assistance for writing plans for some TSC. ➢ Recovery plans written for most listed flora and CR TEC and fauna – resources to implement? (part NHT) (Dot point 3).

2.3.2.1 Adequacy

2.3.2.2 Gaps

- There are conflicts within statutory planning processes.
- The Perth Biodiversity Project is good, but how many LG's are involved and what resources are needed?
- Process and resources need to be established for a review of conservation management actions.

2.3.2.3 Responses

Statutory Planning Protection Mechanisms for Conservation Outcomes

- Resolving conflict and issues between statutory planning protection and conservation outcomes (TSC and vegetation) e.g. covenants, TPS zoning, land tax and incentives.
- Needs real commitment from State Government to make change:
- therefore driver from DPI or DPC;
- has relevance to BR1 and others;
- other regions, therefore Strategic Reserve Funding.

2.3.3 **BM2.3 25% of all significant indigenous species have viable linkages established between populations over their original geographical extent by 2009**

2.3.3.1 Current Activities

BM2.3 *Not adequate*	MAT	25% of all significant indigenous species have viable linkages established between populations over their original geographical extent by 2009	• Establish a regional ecological linkage program • Establish mechanisms to protect areas required for ecological linkages • Revegetate cleared areas designated as ecological linkages • Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority species and ecological communities • Implement local natural diversity strategies and action plans prepared in accordance with *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region*

NHT-Funded Activities
➢ PBP – Regional Ecological linkages identified. ➢ NHT2 funded project to implement IRPs for some TECs.

2.3.3.2 Adequacy

- Not currently adequate

2.3.3.3 Gaps

- Bush Forever and the Perth Biodiversity Project are important programs, but no regional ecological linkage program or mechanisms currently exist to guide it.
- Recovery plans have been done for most *critical* species and ecological communities, but there is no funding for implementing recovery plans for a number of critically endangered species, and there are no projects in Swan Region for recovery of *threatened* species, or for *non-critical* TEC's or any flora.
- A regional threatened flora plan has been prepared.
- Resources are needed to write and implement further recovery plans eg: 7 critical flora - $30,000-$40,000 each year.

2.3.3.4 Responses

New funded projects are needed for

- Critical fauna;
- Carnaby's Black Cockatoo (Swan or Cross Regional: Swan component $50,000-$80,000);
- several endemic invertebrates;

- other threatened fauna;
- all threatened flora, ie: 7 critical species = $30,000-$40,000 each year; 30 other DRF species;
- other TEC's.
- other significant species and ecological communities:
- migratory, etc,
- <10% vegetation.

Recovery Plans for Remaining Species

- Writing recovery plans for other threatened species and communities that currently don't have plans.
- 16 plans - $200,000.
- National Program.

Perth Fungi Project

- Additional Support for Soil Microbiology Studies in Support of Threatened Species Activities

2.3.4 BM2.4 Buffers reconstructed

100% of priority areas to be reconstructed as buffers to threatened ecological communities/ vegetation complexes determined by 2006

2.3.4.1 Current Activities

BM2.4 *Not adequate*	MAT	100% of priority areas to be reconstructed as buffers to threatened ecological communities / vegetation complexes determined by 2006	• Develop and implement revegetation plans for reconstruction of buffers to threatened ecological communities / vegetation complexes

No current activities were identified against this MAT

2.3.4.2 Adequacy

- Not Adequate.

2.3.4.3 Gaps

- Inability to specify adequate buffers and maintain them for TSC.
- Lack of identification of critical habitat for TSC and need to get this on database of DEH (EPBC).

2.3.4.4 Responses

Expanded Threatened Species Network for Site-Specific Management Plans

- Competitive program for management plans for individual sites and implementation of them.
- Linked to Recovery Planning.

Regional delivery of grants and incentives for private land conservation

- Priority is to implement existing Recovery Plans and Threat Abatement Plans.
- Protect existing habitat.
- Regeneration through bushland management.
- Then reconstruction for linkage or buffers, etc.

2.3.5 BM 2.5 30% increase in community participation

(30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008.)

2.3.5.1 Current Activities

BM2.5 *Not adequate*	MAT	30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008	• Coordinate, facilitate and support community involvement • Establish collaborative partnerships to ensure the conservation management and recovery planning of significant species and significant ecological communities • Develop partnerships to determine research project to develop a landscape plan for ecological linkages

NHT-Funded Projects
➢ Biodiversity officers – 1FTE per sub-region (NHT). ➢ TSN Projects re: TSC.

2.3.5.2 Adequacy

- Not Adequate.

2.3.5.3 Gaps

- Missing overall prioritising and coordination.

2.3.5.4 Responses

Ecology support for Local Government

- There is a need to assist Local Government to verify ecological information provided by development proponents where natural areas are to be affected.

2.4 Ecologically Significant Invasive Species

2.4.1 BM3.1 Set targets for significant threatening species

Identify, prioritise and set targets for the management of significant threatening species to natural diversity by 2005.

2.4.1.1 Current Activities

BM3.1	MAT	Identify, prioritise and set targets for the management of significant threatening species to natural diversity by 2005 (*sharing and prioritising information will help to identify gaps*).	• Identify priority weed species and determine percentage elimination, reduction and containment targets for priority weed populations (*Gap*) • Determine percentage elimination, reduction and containment targets for Phytophthora cinnamomi (dieback) (*continued funding – expanded?*) • Identify priority pest/feral species (*Gap*) • Determine of percentage elimination, reduction, containment targets for priority ferals and pests (*Gap*)

NHTFunded Activities	Non-NHT Funded Activities
➢ Perth Biodiversity Project (also BM3.4).	➢ APB? ➢ Enviro-Weeds Strategy. ➢ State Weed Plan. ➢ State Coordinating Committee (Weeds). ➢ Bird Atlas. ➢ Urban Nature, EWAN, Research Weeds. ➢ LGA trials on weeds. ➢ Rainbow Lorikeet monitoring (Birds Australia). ➢ Rural Weed Priority (done) (AgWA). ➢ List of garden escapees? ➢ Feral Pigeon Study, Rockingham Environment. ➢ Marine pests identification. ➢ Aquatic and Riparian Weed Control Group (AgWA). ➢ CALM Florabase.

2.4.1.2 Adequacy

- Not yet adequate

2.4.1.3 Gaps

- State Weed Strategies need 'action' component; no larger picture to fit management.
- No real picture of feral species identification and prioritisation.
- Dieback project is good, needs continuing funding.
- Loss of knowledge from Department of Agriculture (WA) due to retirements.
- Critical gap is sharing and prioritising the information that is already there.

2.4.1.4 Responses

Discovery Program (ie: covering BM3.1 and BM3.2)

- Person to develop situational analysis (desktop, talking to people) with regional groups (SW only) to define what we know, and how it relates to each region.
- Identify gaps.
- Strategic Reserve funding?
- This will allow prioritisation in the Swan region.
- Scope stakeholders, ie: right person in organisations.
- Include MA's from BM3.2 and any information on capacity building.
- CRC or CSIRO project?

2.4.1.5 General

- Gather information on feral animal control programs and effectiveness.
- Develop targets and implementation plan for State Weed Plan and Environmental Weeds Strategy.
- Strategic Reserve funding.

2.4.2 **BM3.2 Threat abatement plans for priority feral pests and diseases**

100% of all priority feral pests and diseases have Threat Abatement Plans established by 2006.

2.4.2.1 Current Activities

BM3.2	MAT	100% of all priority feral pests and diseases have threat abatement plans established by 2006	• Develop and implement threat abatement plans for feral animals and pests linked to National Threat Abatement Strategies (Probably gap, need situation analysis) • Develop management response improvements to ensure no new introduction of potential feral/pest animals/plants/disease (Gap)

NHTFunded Activities	Non-NHT Funded Activities
	➢ 1080 Baiting Program. ➢ Biosecurity Plan Template (AgWA). ➢ Methodology for Weed Prioritisation (AgWA). ➢ "Weedwatcher" Weed Mapping Tool (AgWA). ➢ CRC Methodology for identifying new pests. ➢ Quarantine controls. ➢ Frogwatch. ➢ Heavenly Hectares Property Planning.

2.4.2.2 Adequacy

- Not yet adequate

2.4.2.3 Gaps

- Need to know what has been done, what has worked

2.4.2.4 Responses

2.4.3 **BM3.3 Reduce use of exotic species**

15% reduction in the use of exotic species in urban landscaping by 2008.

2.4.3.1 Current Activities

BM3.3	MAT	15% reduction in the use of exotic species in urban landscaping by 2008	• Develop and implement guidelines for rural landscapers (Gap) • Support implementation of *Local Plants Landscaping Policy and Landscaping with local plants guidelines for Local Government* (continue support) • Implement priority programs for feral animal control by State and Local Government and other stakeholders (eg western shield, and identified priority local and site feral animal control) (Gap – more info) • Regional implementation of State Weed Plan and Environmental Weed Strategy for Western Australia (Gap) • Continued implementation of Dieback management programs in the Region at Local regional, and State Government levels (continue to expand funding)

NHTFunded Activities	Non-NHT Funded Activities
➢ Dieback Working Group (also 3.2, 3.4)	➢ Bridal creeper, heat hopper and rust (CSIRO) (also 3.4). ➢ Patterson's Curse bug (AgWA) (also 3.4). ➢ Community Weed Control (SALP, Enviroweed, LGA). ➢ Private landscaping training. ➢ Local Plants Landscaping (NECC, EMRC) (also 3.4). ➢ CRC Weeds for information, training and research (also 3.1, 3.2, 3.4). ➢ LGA Weed Control. ➢ Declared species grants (AgWA). ➢ CALM Weed Control. ➢ Western Shield (CALM).

2.4.3.2 Adequacy

- Not yet adequate

2.4.3.3 Gaps

2.4.3.4 Responses

Guidelines for Rural Landscapes

- Develop guidelines for rural landscapers (based on the Local Plants Education Strategy and LGA Policy for landscaping).
- Needn't be restricted to LGA laws.
- Could also include things like common template on managing (weed) contractors effectively (ie: Kingsley Dixon model in Kate Brown's book).
- Link to Heavenly Hectares.
- NHT funded.

2.4.4 **BM 3.4 Improve effectiveness of control programs**

30% increase in the effectiveness of control programs for feral animals, pests and diseases by 2009.

2.4.4.1 Current Activities

BM3.4	MAT	30% increase in the effectiveness of control programs for feral animals, pests and diseases by 2009 (needs coordination, promotion and increased funding)	• Facilitate, coordinate and support community and stakeholder involvement in mitigation and remediation actions • Promote wider regional community, land manager and Local Government education and awareness and training programs on feral animal, pest and disease management • Provision of training in feral, pest animal and disease identification, mapping and management

NHTFunded Activities	Non-NHT Funded Activities
➢ Perth Biodiversity Devolved Grants. ➢ SFNC Skills for Nature.	➢ Support to community on weeds (AgWA). ➢ TAFE training ➢ Toolkit for community weed control (future) (AgWA). ➢ Australian Association of Bush Regenerators. ➢ LGA Vermin Control and Education Program.

2.4.4.2 Adequacy

- Probably addressed but may benefit from more coordination.
- Adequate.

2.4.4.3 Gaps

2.4.4.4 Responses

Overall

- Critical gap is sharing and prioritising information, leading to identified gaps in knowledge.
- Prioritise issues and Implementation Plan for Weed Strategies for the Swan Region (possibly work with SWCC).
- Prioritise feral species; pull together what's happening.
- Model local law on weed and pest control (and landscaping).

- Coordination of BMP's and identification of gaps.
- Minimising duplication.
- Develop synergies and linkages.
- Incentives for weed and pest control.
- Training may just need better promotion and communication (Communication Strategy).

Capacity Building

- Provide increased funding for community training and networking.
- NHT funded.

3. INTEGRATED WATER MANAGEMENT DELIVERY PROGRAM

3.1 Summary of Recommended Projects

The recommended set of projects for **NHT Regional Funding** for this Regional Delivery Program is shown in Table 4.

Table 4: Integrated Water Management Projects recommended for NHT2 funding

	Matter for Target/Description	Indicative Budget
	Aquatic Ecosystems Integrity: Major Rivers and Waterways	
1.	Appoint staff to implement existing management plans: on-ground works and volunteer coordination.	
2.	Fund a position to investigate and set up environmental service units / arm of sub-regional groups.	NHT seed funding.
3.	Develop a regional information system.	NHT seed funding $500,000 over 3 years
	Aquatic Ecosystems Integrity: Priority Wetlands	
1.	WM2.1 – Decide on priority wetlands for conservation, restoration and protection at sub-regional level.	Federal and Commonwealth
2.	WM2.5 – Broaden Perth Biodiversity Program to include wetlands.	1 x FTE $80,000
3.	Continue Wetland Watch and include an incentive for protection and conservation of wetlands (2.4 on-ground management and 2.5 building capacity).	1 x FTE $90,000 $100,000+
4.	Funding for SALP for wetlands.	$100,000+
	Nutrients in Aquatic Environments	
1.	Behavioural change in the household.	$100,000
	Turbidity/Suspended Particulate Matter in Aquatic Environments	
1.	Monitoring and evaluation framework project. (NB: for all RCT's including water and marine).	Approx $300,000
2.	Sediment sourcing study	$150,000
3.	River Bank Extension (with external funding).	
	Surface Water Salinity in Freshwater Aquatic Environments	
1.	Regional information system (all programs).	$250,000
2.	Community participation benchmark.	$20,000
3.	Scoping educational institutions partnerships.	$25,000

The recommended set of projects for Other Sources Funding for this Program is shown in Table 5.

Table 5: Integrated Water Management Projects recommended for non-NHT funding sources

	Matter for Target/Description	Indicative Budget
	Aquatic Ecosystems Integrity: Priority Wetlands	
1.	WM2.2 – Audit and review of environmental planning process for protection of priority wetlands.	
2.	WM 2.5 – Officer to liaise with developers and consultants and link DoE and WSCD.	
3.	Jandakot groundwater work (WM2.3.1)	
4.	ASS mapping.	
	Nutrients in Aquatic Environments	
1.	Review / assessment of existing BMP demonstration sites to a standardised criteria.	
2.	Publish information on design standards for engineers, drainage practitioners and planners.	
3.	Groundwater monitoring program.	
4.	Drainage Reform finalisation.	
5.	Legislative controls.	
	Turbidity/Suspended Particulate Matter in Aquatic Environments	
1.	Sediment controls in Avon.	See Avon Investment Plan
2.	Legislation, policy and codes of practice review.	$60,000
	Surface Water Salinity in Freshwater Aquatic Environments	
1.	Cross sub-regional groundwater monitoring. (2 years)	$250,000
2.	Review NRM legislation.	$100,000
3.	Regional information system.	$250,000
4.	Large scale remediation project. (4 – 5 years)	$2,000, 000

Table 6: Suggested Fund Sources for non-NHT2 Integrated Water Management Projects

No	Name of Project	Funding Required	Tick Likely Fund Sources					
			Strategic Reserve	Cross-Regional	Enviro Fund	NLP	Other Public	Private Sources
1.	WM2.2 – Audit and review of environmental planning process for protection of priority wetlands.						✓	
2.	WM 2.5 – Officer to liaise with developers and consultants and link DoE and WSCD.						✓	
3.	Jandakot groundwater work (WM2.3.1)						✓ DoE	
4.	ASS mapping.						✓ DoE	
1.	Review / assessment of existing BMP demonstration sites to a standardised criteria.			✓	✓		✓	
2.	Publish information on design standards for engineers, drainage practitioners and planners.		✓				✓	✓
3.	Groundwater monitoring program.						✓	✓
4.	Drainage Reform finalisation.						✓	✓
5.	Legislative controls.							
1.	Sediment controls in Avon.	See Avon Investment Plan		✓				
2.	Legislation, policy and code of practice review.	$60,000	✓					
1.	Cross sub-regional groundwater monitoring. 2 years	$250,000		✓ NAP				
2.	Review NRM legislation. 1 year	$100,000	✓					
3.	Regional information system. 1 year	$250,000		✓ NAP		✓	✓ Lotteries NAP	
4.	Large-scale remediation project 4 – 5 years)	$2,000, 000		✓ NAP		✓	✓ Lotteries	SALP

3.2 Aquatic Ecosystem Integrity: Rivers and Waterways

3.2.1 WM 1.1 100% of priority rivers and waterways in the Region identified for protection by 2005.

3.2.1.1 Current Activities

WM1.1 *Not adequate*	MAT	100% of priority rivers and waterways in the Region identified for protection by 2005	• Consolidate baseline data and analyse priority rivers and waterways condition (*Gap: inconsistent*) • Continue Foreshore Condition assessment project • Investigate extent and impact of marine pests in the Swan-Canning estuary and develop appropriate management response mechanisms • Determine water and flow dependency for surface and groundwater ecosystems (*Gap: Accessible and useable knowledge*) • Establish baseline and consolidate ecosystem integrity condition (*Gap re: ecosystem*) • Consolidate and analyse water quality monitoring baseline and trend data for priority rivers and waterways • Develop and implement catchment report card program to monitor changes in resource condition over time

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Consolidate basline data – CoA monitoring in 2004 of drains flowing into Canning and Wungong Rivers. ➢ Foreshore Condition Assessment – SRT/AGLG. ➢ EMCMP (NHT/EMRC) – sub-catchment implementation plans (SCIP) to establish baseline data re: condition of sub-catchment. ➢ AGLG-UCSWCT Management Plan NHT/CoA/CoG funded. Done for our area (Gosnells and Armadale) Also in CoA SoE Report.	➢ SCCP Water Quality trends – 15 of 31 catchments (SCCP). ➢ DPI resumption of riverfront property. ➢ Water Quality Monitoring Programs – Sub-regions, SRT/DoE, LGA's, ROB, Universities. ➢ Local Government State of Environment and Green Plan Monitoring. ➢ DoE Catchment Management Branch – EWPs, Gnangara and Jandakot wetlands and groundwater. ➢ Catchment Report Cards for SCCP priority catchments (SCCP).

3.2.1.2 Adequacy

- Not Adequate.

3.2.1.3 Gaps

- The need for further extension into additional ecosystem health indicators needs to be established such as macro-invertebrate, fish studies and carbon cycling. With the vast amount of catchment focus that has previously occurred within the region throughout many projects (SCCP, SALP etc), there is a gap in knowing if the rehabilitation of river foreshores and stream realignment is reducing nutrient input to the river systems. Nutrient reduction and sediment loss may take some time to be detected by the conventional way of water quality monitoring, but increased habitat and biodiversity may be detected sooner rather than nutrient reduction. It is important that baseline data is collected in this area to be able to quantify improvement and a benchmark or target be set for this work, until nutrient reduction is detected.
- Lots of water monitoring but gaps in the data that indicates baseline ecosystem integrity.

- Lack of consistency in water quality monitoring across the region – methodology.
- Inconsistent water quality monitoring across sites in the region.
- Foreshore condition assessment needs to be expanded.
- Gap in accessing knowledge and how to use knowledge in flow dependency for surface and groundwater ecosystems.

3.2.1.4 Response

3.2.2 **WM1.2 100% of all relevant NRM legislation and policy reviewed and amendments recommended**

Current Activities

WM1.2 *Not adequate*	MAT	100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's major rivers and waterways by 2006 (*Ambitious*!!)	• Support the review of the policy and legislation, including Environmental Protection Policies and, Statements of Planning Policy (*Consolidation of information required, and assessment against criteria/forcefeed analysis*) • Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts (*Gap re: planners, land use change*) • Continue to develop and implement subregional and local action plans (*Gap re: implement*) • Assess and establish need for additional EWPs (*Caring for the Canning*) • Continue the implementation of Riverplan (*Yes: Framework exists, time issues*)

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Brockman River Management Plan. ➢ Two Rivers ICM Plan (also 1.1)(part NHT). ➢ Action: implement sub-regional and local action plans. NHT1/COA/COG funded Plan is UCSWCT Management Plan – implemented by AGLG.	➢ Wetland EPPs. ➢ Local Government NRM Policy Manual (SCCP, EMRC). ➢ Water Resources SPP. ➢ Currently reviewing NRM plans and NIMPs for priority sites (CoB). ➢ Environmental Guidelines for Planners – Draft since 1997. ➢ Ellen Brook Management Plan. ➢ LASCAM model by DoE (SCCP). ➢ Sub-regional and local action plans – facilitated by sub-regional groups and LGAs.

3.2.2.1 Adequacy

- Not Adequate.

3.2.2.2 Gaps

- 100% is ambitious for the timeframe.
- Information needs to be consolidated:
- Absence of decision support tools;
- EWPs need to be considered in this;
- Caring for Canning leads the way for other plans to be established.
- funding is needed for the implementation of plans.

- Riverplan needs to be speeded up and implemented; framework is there but not the capacity.

3.2.2.3 Response

3.2.3 **WM1.3 Implementation of Environmental Water Provision (EWP) projects in the Canning, Helena and Brockman River catchments by 2007.**

Current Activities

WM1.3 *Not adequate*	MAT	Implementation of Environmental Water Provision (EWP) projects in the Canning, Helena and Brockman River catchments by 2007 (*too slow compared with commercial development)(re: Canning: gap in implementation of target. Urgency for Canning due to influences*).	• Continue to develop and implement sub-regional and local action plans. • Continue Canning River EWP project (*short term funding is a priority*) • Establish and implement project for Helena River EWP • Establish and implement project for Brockman River EWP

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Caring for Canning, Environmental Flows Project. NHT/SCCP.	➢ Continue to develop and implement sub-regional plans. UCSWCT Management Plan, NHT1/CoA/CoG funded. ➢ SALP, SCULP. ➢ Lotteries.

3.2.3.1 Adequacy

- Not Adequate

3.2.3.2 Gaps

- The Canning EWP project is currently being operated through SCCP and NHT contributions. The project is a response to a recommendation from the Caring for the Canning River Management Plan, and has been running for the past ~2 years. Additional support and funding needs to be provided to this project to increase its progress and to get water releases for environmental purposes. It is known that the system is being significantly affected by the reduction of flows and aquatic diversity will continue to decline unless this matter is addressed. As outlined in the MAT actions, further rivers such as the Helena and the Brockman are dependent on the findings of the Canning EWP to produce guidelines that can be implemented into these other river systems. This project needs to be addressed so the other rivers can benefit before their ecosystem health declines further.

3.2.3.3 Response

- Continue, and if possible accelerate, the Canning EWP project and broaden its funding base

3.2.4 **WM1.4 Develop and implement management and restoration programs for the Region's major rivers and waterways by 2007**

Current Activities

WM1.4 *Not adequate*	MAT	Develop and implement management and restoration programs for the Region's major rivers and waterways by 2007	• Implement strategic programs in areas identified in WM1.1 to manage and restore priority rivers and waterways (*Gap: prioritising existing plans*) • Continue the implementation of the Swan-Canning Cleanup Program Action Plan (*Gap: capacity*) • Implement prioritised actions from Swan River Trust Foreshore Condition project (*Links to 1.1 time issue – match time frames*) • Continue large scale implementation of Riverbank and Swan Alcoa Landcare Program foreshore projects (*Gap: funding inadequate. Community support*)

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Implement strategic river restoration and riverland projects. AGLG doing it. NHT1/CoA/CoG. ➢ NIP Program. ➢ City of Armadale to do river revegetation as "compensation" for Champion Drive Bridge (about 300m of river). ➢ Reviewing CoB Foreshore Management Plan in 2005/2006 financial year. ➢ Local rehabilitation/restoration projects: Living Streams, Drainage/wetlands (Sub-regional groups and LG). ➢ Implementation of SALP and SCCUP projects by Community Catchment Groups. ➢ South Perth ICM Management Plan (also 1.5). ➢ CALM Regional Park Grants.

3.2.4.1 Adequacy

- Not Adequate

3.2.4.2 Gaps

- All Management Actions inadequate.
- Existing management plans need reviewing and prioritisation of recommendations is still occurring
- Foreshore condition needs to be finished: the Management Action timing needs to be linked to progress with the foreshore condition project.
- No funding for implementation. SCCP – needs more funding needs to be doubled to meet demand for this work;

Response

3.2.5 **WM 1.5 30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in the Region by 2009.**

3.2.5.1 Current Activities

WM1.5 *Not adequate*	MAT	30% increase in community participation in education, restoration, protection and management activities of the	• Coordinate, facilitate, support and motivate community groups (*links with 1.5.3 re: teaching, mentoring*) • Support development, resourcing and implementation of restoration plans to protect major rivers • Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program (*LG support, frameworks – implementation, resourcing*) • Continue existing strategic community training programs such as SCCP

		major rivers and waterways in the Region by 2009 *(1. Baseline required – Gap* *(2. Staffing, wider community awareness* *(3. Information sharing* *(4. Rural/urban interface* (5. *Burnout*)	Education program, Ribbons of Blue, Waterwise, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program (*Consolidate across region. Gap: mentoring skills, community education. Is it meeting the needs?)* • Develop and implement industry awareness BMP's for priority sectors of small-medium sized industries (SME's) • Support water resources restoration and management training through tertiary institutions and TAFE's (and other. *Gap: what is available? Is it applicable? Learning providers – jobs at end*) • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of the waterways (*Gap: important to form strategic partnerships*) • Develop a Memorandum of Understanding between the Council and Swan River Trust to implement Riverplan (*by 2009*!)

NHT-Funded Projects	Non-NHT-Funded Projects
➢ SCCP/NHT/EMRC: Creekline Restoration Workshop. Support catchment groups/friends groups through on-ground work and Bush Skills for Hills Workshop. ➢ Light Industry: NHT/SCCP – geographic/ catchment based projects, industry specific.	➢ AGLG doing all dot points except MOU between Council and SRT. NHT1/CoA/CoG funded. ➢ Ribbons of Blue. ➢ CoB: Environmental Fact Sheets (website and hard copy), Revegetation Days, Carbon Neutral Program. ➢ Regs, Manuals – stormwater. ➢ COSN. ➢ SCCentre. ➢ River Restoration, Groundwater, Community Education & Training sub-projects. ➢ SCCP/EMRC Yellowfish Road on-campus program for schools. ➢ Victoria Park Storm Water Management Plan. ➢ Waterwise Schools, CALM Bush Rangers, Greening, etc. (other school and community education programs). ➢ PAG. ➢ CoB: Reviewing CoB foreshore management plan; Water ICLEI Campaign, Waterwise Schools Program. ➢ SERCUL organisation for community support/capacity. ➢ Light Industry. Group Programs: Greenstamp, Pilot Projects (BMP), Industry Fact Sheets, Audit Programs. ➢ Two Rivers ICM Plan. ➢ Naregubup NMCG, EMRC, SMRC, WESROC. ➢ Public Service group talks, SRA kit. ➢ WESROC Stormwater Education Strategy (LG other funded). ➢ Friends Groups, especially Eastern Hills (130+ groups, 20,000 hours/year). ➢ Local Plants Community Education Strategy. ➢ Catchment Groups – FoGs, LCDCs. ➢ Corporate Care Days; Drain Game. (SCCP). ➢ **Industry Sector Programs** ➢ Clean sites building industry (DOE). ➢ Turf Sustain (SCCP). ➢ Industry based education and accreditation, e.g. NIA. ➢ Waterwise – Plumbers and Nurseries (Water Corporation). ➢ Greenstamp Accreditation Program. ➢ **Bigger Policies and Groups** ➢ Light Industry Working Group (SCCP). ➢ Green Smart (HIA). ➢ WESROC Storm Water Strategy.

	➢ Stormwater Management Manual (DOE). ➢ Green Procurement. ➢ LGA, NRM Policy Manual. ➢ **Training and Information** ➢ Cleaner Production Centre for Excellence. ➢ Fertilise Wise (SCCP, PAG). ➢ Southern Wungong Implementation Workshop (Water Corporation). ➢ TAFE training for industry. ➢ BMP for Air Conditioner Discharge. ➢ Water Quality Protection Notes (DOE). ➢ Fertiliser Types – BMP (Water Corporation). ➢ **Geographic Programs** ➢ Local Government Industry Capacity Building, Wangara and Bayswater. ➢ Cleaner Streams, South River. ➢ Neighbourhood Industry Project, Bayswater. ➢ Industry Precinct Waste Project, Bellevue. ➢ **Monitoring** ➢ Water Quality Monitoring of Industry Outfalls. ➢ **Capacity and Involvement** ➢ Corporate Care Days (SRT). ➢ **Regulations** ➢ Licensing and permitting. ➢ UDRs.

3.2.5.2 Adequacy

- Not Adequate.

3.2.5.3 Gaps

- Human resources and therefore capacity to coordinate on-ground works. Engaging the wider community eg: church, 4WD groups can only be done through paid coordinators. School and university students and new volunteers want to get experience but regional groups don't have the capacity to facilitate this.
- Lack of funding for: human resources (staff); capacity building and training of staff and mentors; coordinating volunteers; marketing and promotion of upcoming on-ground works (especially through Universities); administration costs, including employment costs. Consolidation of existing information feeding into addressing gaps.
- Usability and accessibility of existing information and knowledge. Knowledge gap: there is no database of existing information in one place – GIS, Web-based, interactive, with consolidated and cross sector accessible information. But there are already information sources including GIS and Riverplan, which need to be gathered in one place and updated regularly. No consistency in database use across Agencies.
- Lack of information sharing – how to keep growing without burning out?
- There is a gap in the capacity of regional groups to monitor and evaluate capacity building projects.
- Need to measure baseline community involvement so 30% increase can be measured. "Friends of groups" – 5% of Mundaring population involved in one event a year,

20,000 volunteer hours and their contribution is increasing. No way of monitoring activities on private land – this is not captured. Industry awareness – captured at industry workshop. Existing programs: tend to attract the converted not most land owners or the unconverted. We do not teach people how to manage natural areas

- Issue with capacity of new NRMO structure to manage and implement projects.
- Reduce dependency on volunteers, more paid staff. SCMC groups eg: EBICG work one-on-one, therefore, don't have the capacity to significantly increase community involvement eg: they don't have "Friends of" groups?

3.2.5.4 Issues

- Managing point source threats and diffuse source threats such as insecure job tenure and burnout.
- Frameworks exist that we can use, need to be utilised.
- Knowledge of what is being offered by universities, TAFE's and other providers.
- No jobs at end of TAFE/university degrees, no work experience available.
- Partnership to UDIA needs to be strengthened.
- MOU on Riverplan - very soft, should be met by 2005.

3.2.5.5 Response

Human Resources and Organisation

- Appoint staff to implement existing management plans, ie: do on ground work and coordinate volunteers *(seed funding from NHT)* and set up on-ground Works Business Units in sub-regions (similar to NMCG / EMRC models).
- Work in balanced partnership with volunteers.
- Models: business unit integrated with sub-regional groups, eg: North Metropolitan Catchment Group; EMRC – employing local, skilled people to do on-ground (economic opportunities) philanthropy.
- Mixed funding (including NHT)

Information

- Consolidate existing information
- Select target audience carefully so that a database can be designed properly, and address specific gaps.
- Develop and design the database.
- Set up MOUs, agreements.
- Maintain, manage and update the database

3.3 Aquatic Ecosystems Integrity: Wetlands

3.3.1 WM 2.1 100% of priority wetlands in the Region identified for protection by 2005

3.3.1.1 Current Activities

WM2.1 *Not adequate*	MAT	100% of priority wetlands in the Region identified for protection by 2005 (Category CCW need to be ground proofed (??))	• Consolidate baseline data and analyse priority wetland condition (*Category CCW need to be ground proofed*). • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation • Continue to update the Dept of Environment's Geomorphic Wetland Mapping data set for classification and evaluation of wetland resource condition • Survey priority groundwater dependent ecosystems of the Region • Conduct research into acid sulfate soil risk potential and existing groundwater contamination plumes • Support the further development of groundwater-modelling programs for priority areas (*needs further work; only being done for very specific sites*)

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Identify areas for increased stormwater pollution education by BCCG, City of Melville and Canning, e.g., Blue Gum Lake. ➢ Identify stormwater basins/drains that could benefit from increased management in Bannister Creek Catchment (e.g. weed management) (BCCG). ➢ Southern Wungong Hydro modelling (Water Corporation). ➢ Limited Risk Assessment and site surveys for acid sulphate soils (DoE).

3.3.1.2 Adequacy

- Not Adequate.
- Gnangara Mound project will identify priority wetlands.
- Won't be achieved by end of 2005.

3.3.1.3 Gaps

- EPP should cover this; still a gap to prioritise the wetlands. Need to put resources into ground truthing EPP/CC wetlands.
- CC wetlands a priority; are restoration wetlands a priority?
- Gap in Hills re geomorphic mapping
- Targeted groundwater modelling needs more funding and manpower to cover regional survey adequately. ASS mapping and groundwater plumes not done adequately.

3.3.1.4 Response

- Decide on a process needed to recognise priority wetlands: e.g RAMSAR, layered DoE
- Consider relevant assessment criteria eg: conservation value; which under threat; "bang for buck".
- Sub-regions could do this, as it is a part of sub-regional planning.
- Check existence of wetlands: ground truth already (role of DoE).

3.3.2 **WM 2.2 100% of all relevant NRM legislation and policy reviewed and amendments recommended**

Current Activities

WM2.2 *Not adequate*	MAT	100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's priority wetlands by 2006	• Undertake a strategic review of Planning Policies (*and legislation*) and include requirements for hydrological assessments of development proposals near priority wetlands (*Not being addressed*) • Finalise and implement Environmental Protection Policy (Swan Coastal Plain Wetlands)

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Bannister Creek Reserve Management Plan (BCCG, City of Canning). ➢ LG NRM Policy Project (Wetland Policy Guidelines) (Manual) (SRT/EMRC). ➢ NRM included in Local Planning Strategy and TPS Land Use Control. ➢ Cottesloe: Development of policies/5 year programs for control of reticulation, reduction of bore water use, reduced verge watering. ➢ City of Canning Town Planning Scheme Review – including wetland conservation status land. ➢ SPP for water resources (DPI). ➢ Licensing near wetlands requires hydro assessment. ➢ Environmental Protection Policy on wetlands being finalised (EPA). ➢ Ellen Brook, Brockman River Management Plans (EBICG).

3.3.2.1 Adequacy

- Not Adequate.
- Challenge the timeframe as the process for this moves very slowly; 2006 is unrealistic.
- Planning processes are failing to adequately protect wetlands.
- The need to review planning policies vis a vis hydrological requirements is not being addressed.

3.3.2.2 Gaps

- Not enough resources have been allocated for the Environmental Protection Policy for Swan Coastal Plain Wetlands to be implemented correctly i.e. policing, evaluation, influencing LGAs and private landholders

3.3.2.3 Response

- Need to prioritise gaps in legislation.
- Increase funding
- Coordinate DPI; WALGA; DoE; WAPC; EPA; Environment and Planning Ministers.
- Review current legislation and policy
- Review subdivision development process
- State Wetlands Coordinating Committee.

- Conduct an independent audit and review to find where the gaps are in current environmental protection and planning policies and processes for the protection of "priority" wetlands and generation of recommendations.

WM 2.3 Develop, adapt and/or review allocation limits and management plans for groundwater areas by 2008.

Current Activities

WM 2.3 *Limited viewpoint Not adequate*	MAT	Develop, adapt and/or review allocation limits and management plans for groundwater areas by 2008	• Incorporate sustainable limits and allocations for resource use through new Water Source Protection Plans and Land Use and Water Management Strategies (*Gnangara is the focus as present – does not include other areas*) • Monitor commercial bores to ensure the development of sustainable allocations (*all bores, not just commercial*) • Review and document allocation limits, and include the principles of sustainable natural resource management.

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Canning EWP (NHT).	➢ Canning Plain CMP and Investigation into MSMD (Rachel Spencer). Recommendations for CB and wetlands. ➢ Gnangara Mound Metering Project (DoE) (large private bores, target Carabooda) (also 2.4). ➢ LG License re-applications for bores require strategic plan (City of Belmont). ➢ NLP Waterwise on farm – target water use efficiency/nutrients large horticultural users. ➢ WSP Plans for hills sources drinking water. (water quality protection only) (DoE/Water Corporation). ➢ DoE Gnangara Mound Groundwater Management Planning – sustainable limits EWR/EWP. ➢ Development of Council GIS layer for road drainage, soak pits, sumps (Cottesloe). ➢ Cottesloe Council monitoring of salt levels and volumes pumped for Council bores and wells. Gap: private bores? ➢ DoE – formation of Gnangara Mound WRM Committee

3.3.2.4 Adequacy

- Not Adequate– limited view point.
- Gnangara project (DOE) will address this in one area (North of the River), but not in this timeframe.

3.3.2.5 Gaps

- Needs to look at all bores not just commercial: extraction from other private bores and unlicensed bores needs attention.
- Monitoring of private/household bores for volume removed.

3.3.2.6 Response

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3.3.3 **WM 2.4 Develop and implement management restoration plans for priority wetlands by 2008.**

3.3.3.1 Current Activities

WM 2.4 *Not adequate*	MAT	Develop and implement management restoration plans for priority wetlands by 2008	• Implement strategic programs in areas identified in WM2.1 to protect, manage and restore priority wetlands • Further development and implementation of Wetland Watch program (*Only going until 2005. Landcarers looking after their own wetlands*) • Compliance surveys of licenses in priority groundwater areas (*Focusing C3 and C4 – over-allocated resources*) • Metering implementation in priority groundwater areas

NHTFunded Activities	Non-NHT Funded Activities
	➢ Licensing and abstraction/surface water use compliance with water allocations (DoE) (also 2.3). ➢ LG management plans for EPP listed wetlands being implemented, e.g., Tomato Lake, Garvey Park (City of Belmont). ➢ Liege Street wetland - riparian restoration, wetland creation. ➢ Strategic programs to protect, manage etc. – Coolgardie Living Stream. ➢ Liege Street – DNIP – Drainage Nutrient Intervention Program (SRT)($1m/year). ➢ DoE priority inspections of C3/C4 areas. ➢ DoE/Gnangara Mound Groundwater Management Plan. ➢ Wetland Watch Project (WWF). 12 month Project April 2004-5 (1FTE). Wetland conservation project providing assistance to private landholders with wetlands to achieve improved conservation management and protection of wetlands. Not funded after April 2005. ➢ Envirofund for wetland rehabilitation in floodplain of Canning River – Pioneer Park ($27,000). ➢ TRCG sits on WAC (Westralia Airport Corporation) Environmental Committee (also 2.1). ➢ Voluntarily metering bores to assess groundwater use (City of Belmont). ➢ Revegetation and weed control of Bannister Creek floodplain (BCCG & City of Gosnells) (also 2.5). ➢ Hydrocotyl control and looking at research into its biology (in Bannister Creek Reserve). ➢ Bannister Creek Streamlining Project with City of Canning and Bannister Creek Catchment Group. ➢ Compensating Basin revegetation Canvale Lake – working with Bannister Creek Catchment Group. ➢ Station Street Wetland (other funding) with previous SCULP funding. Includes Friends of Queens Park Bushland. Local Government and Main Roads funded. ➢ SRT Riverbank Program. ➢ SALP funding Wilson Lagoon CRAWLS Project with Wilson Wetland Action Group. Within Canning River Regional Park.

3.3.3.2 Adequacy

- Not Adequate.
- Timeframe too short to implement change to "initiate implementation".
- Metering is happening at priority areas of the Gnangara Mound.
- Have not defined priority: is it conservation or resource enhancement?
- Planning system needs to protect areas we know are priority now.

- Wetland conservation priority has not been a major driver for current programs.
- Groundwater licenses don't cover all bores, e.g., private bores.
- There is usually a 3-year period once license issued before management plan is needed for that groundwater license.

3.3.3.3 Gaps

- Wetland Watch currently not funded for 2006.

3.3.3.4 Response

- Ensure Wetland Watch is adequately funded

3.3.4 **WM 2.5 20% increase in community participation in wetlands education, restoration, protection and management activities by 2009.**

3.3.4.1 Current Activities

WM 2.5 *Not adequate*	MAT	20% increase in community participation in wetlands education, restoration, protection and management activities by 2009	• Facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to conserve and protect wetlands • Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program • Continue and expand existing community-training programs such as Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • Support wetland restoration and management training through tertiary institutions and TAFE's • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for protection of wetlands • Implement a framework for incentive schemes and revolving funds for protection and conservation of priority wetlands by 2005

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Community input to water resource management (also 2.3). ➢ Wetland Workshop in partnership with WWF Australia, GA(WA) and AGLG (other funded). ➢ Wetland Mitigation (MRWA) Tonkin Highway Extension (other funded). ➢ Wetland Watch Project (WWF) (1FTE). Unfunded beyond April 2005. Promote incentive schemes, strong community awareness component regarding values of wetlands, and wetland management issues and skills. ➢ BCCG Part-time Project Officer. Funding and technical support for landholders and "Friends Of…" groups. ➢ City of Belmont involved in educating schools in wetland protection and drainage restoration. ➢ City of Belmont LG officers supporting Water Corporation Waterwise Program for Schools. ➢ Points 1-7 all done through SERCUL and TRCG. ➢ Stormwater and N/P pollution intervention into Whaleback Lake/BCR (Bannister Creek CG, City of Canning). ➢ SRT Swan River Action Kit – adult education. ➢ SFNC Training Program – ASS, Groundwater Management. ➢ Regional action for public education to improve drainage water quality before soakage into groundwater (WESROC). ➢ Yellow Fish Drain Stencilling (AGLG)(other funded). ➢ Swan Alcoa Landcare Program (funding for restoration). ➢ City of Belmont employ Landcare trainees through Agencies whilst

	they are at TAFE (on-job training). ➢ Ribbons of Blue (SRT/DoE). ➢ City of Belmont – LG's actively restoring priority wetlands in partnership with catchment groups (TRCG).

3.3.4.2 Adequacy

- Not Adequate.
- Where did 20% come from?
- Do we know where we are starting from?
- There is still a lack of understanding about wetlands by private landholders

3.3.4.3 Gaps

- Need input into planning stage.
- Targeted education is needed for developers, consultants, private landowners and Local Government (town planners) on locations, importance and management of wetlands and associated groundwater systems.
- Adequate staffing and knowledge to support community capacity.
- No incentive schemes for wetland protection and conservation.
- Stormwater education, not across entire Swan Region.

3.3.4.4 Response

- Local Government: Structure Plans; PBP link – broaden the focus of PBP to address wetlands.
- Developers and consultants: UDIA: Project Officer to liaise with their members; links to water sensitive urban design, DoE and DPI.
- Private landowners: Wetland Watch – could include incentive (SALP Incentive).
- Establish a comprehensive groundwater monitoring program to determine groundwater quantity and quality entering the priority waterways and wetlands in the region.

3.4 NUTRIENTS IN AQUATIC ENVIRONMENTS

3.4.1 WM 3.1 100% of the 1-5 year actions of the reviewed Swan-Canning Cleanup Program (SCCP) implemented by 2010

3.4.1.1 Current Activities

WM3.1 *Adequate*	MAT	100% of the 1-5 year actions of the reviewed Swan-Canning Cleanup Program (SCCP) implemented by 2010	• Continue implementation of SCCP including priority actions related to resource assessment, research and monitoring and evaluation • Support identification of point-source nutrient export in priority areas to identify existing and potential sources of nutrients (*inadequate – gaps – not linked to MAT*)

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Foreshore Condition Assessment (NHT & SCCP) (Dot point 1) .	**Dot Point 1** ➢ SCCP Catchment Report Card. ➢ Catchment snapshots (SCCP). ➢ SCCP Decision Support Modelling. ➢ Estuary monitoring (SCCP). ➢ Tributary Monitoring Program (SCCP). ➢ SCCP – Monit. & Eval. Framework. **Dot Point 2** ➢ Catchment Groups Monitoring. ➢ Ellen Brook ICM Plan. ➢ Claise Brook Historical Land-use Mapping (SRT). ➢ Water Corporation Monitoring Main Drain. ➢ Drainage Reform, Aquatic Science Branch – DoE. ➢ Local Government (WESROC). ➢ DPI Land Assessment. ➢ Contaminated Sites EPA. ➢ Liege Street. ➢ Mill Street Main Drain (SCCP).

3.4.1.2 Adequacy

- Adequate

3.4.1.3 Gaps

- Monitoring of surface and groundwater must include diffuse pollution sources
- Baseline data – needs co-ordination

3.4.1.4 Response

3.4.2 **WM 3.2 100% of all relevant NRM legislation and policy reviewed and amendments recommended to address nutrient enrichment by 2006**

3.4.2.1 Current Activities

WM3.2 *Not adequate*	MAT	100% of all relevant NRM legislation and policy reviewed and amendments recommended to address nutrient enrichment by 2006	• Support the review of the policy and legislation, including Environmental Protection Policies and, Statements of Planning Policy • Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts • Continue to develop and implement sub-regional and local action plans • Adoption by Local Government Authorities of the Local Government NRM Policy Manual • Swan River Trust legislation review and implementation • Implementation of Riverplan – Swan and Canning River EPP

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Legislation – new – Swan and Canning Rivers (Discussion Paper to Minister, 4 months feedback).	➢ Catchment Groups Policy Manuals. ➢ State Water Strategy. ➢ Drainage Reform Process. **Dot Point 1** ➢ SPP, EPP. ➢ River Plan. ➢ Sustainability Strategy. **Dot Point 2** ➢ Darling Range (Jim Davies). ➢ SCCP Decision Support (Lascam). ➢ Ag? MUSIC?. ➢ Ag Maps. ➢ Stormwater Management Manual. **Dot Point 3** ➢ Catchment Groups. ➢ Sub-Regional Planning Process. ➢ Underway (Dot points 4, 5 and 6). ➢ Unauthorised discharge regulations. ➢ Light Industry Survey – local governments (Wangara, Bayswater, Armadale). ➢ Swan and Canning River SPP. ➢ MOU – Refining Water Resources SPP, Southern River (also addresses turbidity). ➢ Industry Survey (done). ➢ Water Quality Protection Notes (DOE/SRT). ➢ Decision Support Modelling – Landuse and Impact. ➢ Local Government Policy Development Project (SRT) (includes a BMP guidelines for SME's). ➢ Canning Plain CMP. ➢ Riverplan – assessing CRG, environmental values, criteria and targets. ➢ Greenstamp (also turbidity). ➢ New version of Industry Working Group (also turbidity).

3.4.2.2 Adequacy

- Not adequate

3.4.2.3 Gaps

- Need improved legislative land use controls

3.4.2.4 Response

3.4.3 WM 3.3 Implement identified remedial actions to address nutrient enrichment by 2007

3.4.3.1 Current Activities

WM3.3 *Not adequate*	MAT	Implement identified remedial actions to address nutrient enrichment by 2007	• Implement strategic programs, including nutrient intervention structures, in priority areas identified in WM3.1 to remediate nutrient enrichment • Incorporate Water Sensitive Design and Total Water Cycle management principles in all new developments and/or retrofits • Incorporate Water Sensitive Design into priority areas of the drainage network • Design, develop and implement nutrient intervention structures • Completion of the Sewerage In-fill Program

NHT-Funded Projects	Non-NHT-Funded Projects
➢ NHT, WESROC, SCC.	➢ Water Cycle Project (all). ➢ SCC Information/Motivator. **Dot Point 1** ➢ Drainage Nutrient Intervention Program (Canning Plain). ➢ Local Government Intervention (Structures). ➢ Catchment Management Plans. **Dot Point 2** ➢ DPI. ➢ Water Corporation Southern River Integrated Implementation Plan. ➢ Water Corporation Mosman Park. ➢ Claisebrook Drainage Improvement Program. ➢ Catchment groups providing information. **Dot Point 3** ➢ Baseline data. ➢ Southern River. **Dot Point 4** ➢ Tony Wong Workshop. ➢ Southern River. ➢ Rachel Spencer.

3.4.3.2 Adequacy

- Not adequate

3.4.3.3 Gaps

- Riverplan implementation
- Lack of evaluation/data of effective nutrient intervention BMP's
- Stakeholder involvement in preparation of action plans

- Raising awareness of benefits of water sensitive design.
- Parameters for good TWC management have not been set (BMP tool box needed).
- Suite of options to produce the RCT outcome is not available.
- Sewerage infill.
- Nutrient intervention structures (no real evidence of the effectiveness) (tool box). Structures need work.

3.4.3.4 Response

BMP Demonstration Sites

- Review of existing BMP demonstration sites to standardised criteria.
- Ability for sub-regions to establish BMP's specific to their areas with EnviroFunds.
- Design Standards
- Publish information on design standards for easy, useable access for engineers, drainage practitioners, developers, planners and community.

3.4.4 **WM 3.4 20% increase in community participation in nutrient intervention education, restoration, protection and management activities by 2009**

3.4.4.1 Current Activities

WM 3.4 *Adequate*	MAT	20% increase in community participation in nutrient intervention education, restoration, protection and management activities by 2009	• Facilitate, coordinate, support and motivate community groups • Develop and implement industry awareness BMP's for priority sectors of small-medium sized industries (SME's) • Continue implementation of rural landholder education and support programs such as Heavenly Hectares, property planning to address nutrient export in high risk areas • Include stormwater education, water use efficiency and water conservation into the regional training and education program • Continue and expand existing community training programs such as Swan-Canning Cleanup Program education initiatives, Great Gardens workshops, Ribbons of Blue, Wetland Watch and Skills for Nature Conservation, through the integrated regional education and training program • Continue to provide incentives for landholders and land managers such as the Swan Alcoa Landcare Program • Support wetland restoration and management training through tertiary institutions and TAFE's

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Environmental Information Sheets for SMEs – under development (Tony Soterious). ➢ LG, Volunteers, SCCP, NHT.	➢ Nutrient Research Group (Department of Agriculture) (Rob Summers). ➢ Best Practice Manual and Guidelines Manual for vegetable industry. ➢ BMPs for industry, Greenstamp program. ➢ Light Industry Project from Cleanup Program. ➢ State Water Strategy. ➢ Statutory Assessments and creation of NIMPs. ➢ Tifix – phosphate binding (by Tiwest). ➢ Water Quality Protection Notes. ➢ Swan Canning Cleanup Program continued projects, e.g., Great Gardens, Ribbons of Blue, SALP. ➢ DoE Stormwater Management Manual. ➢ Waterwise Schools (program). ➢ Waterwise. ➢ Gardening Gurus. ➢ Water Campaign. ➢ Heavenly Hectares & Property Program (Dot point 3).

	➢ Skills for Nature (Dot point 4). ➢ WESROC Community (Dot point 4). ➢ Great Gardens (Dot point 4). ➢ Groundwater Festival (Dot point 4). ➢ Catchment Groups TAFE (Dot point 7). ➢ Drain Management – Liege Street, Mills Street – drainage intervention (also turbidity). ➢ Centre for Excellence – Large Industry, Training for Local Government (University). ➢ WA Sustainable Industry Group – learning by sharing, best practice.

3.4.4.2 Adequacy

- Adequate

3.4.4.3 Gaps

- Lack of funding.
- Lack of ability of co-ordinators to assist community
- Lack of effective evaluation or data on BMP's for nutrient reduction and TWC management
- SALP – oversubscribed
- Fertiliser supplier and retailer education
- Small and medium enterprises - inadequately addressed.

3.4.4.4 Response

Behavioural Change

- Personalised Marketing – community based social marketing.
- Behavioural change (like TravelSmart) for nutrient (household) reduction (possible link to Waterwise) (NHT funded).

Drainage Reform

- Drainage reform finalisation to incorporate Swan NRM Strategy.
- SCC funded to ensure that this is bought to finalisation.

Other Suggested Initiatives

- Balance – reuse of water, grey water; develop a risk map on re-use of grey water taking account of the potential impact of grey water on groundwater.
- Provide more funding to provide support to local groups and community education.
- Upscale Heavenly Hectares.
- Decision Support tool.
- Household actions
- SCCP should include broader ecological monitoring.
- Monitoring of surface and groundwater must include diffuse pollution sources.
- Legislate land use controls for nutrient reduction

3.5 TURBIDITY / SUSPENDED PARTICULATE MATTER IN AQUATIC ENVIRONMENTS

3.5.1 General Activities

W4	RCT	• Maintain and improve condition of aquatic environments in the Region, as measured at representative sites, by 2020 (with quantified targets for turbidity / suspended particulate matter set by 2005)

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Catchment Management Plans. Protection of wetlands and streamlines (also WR3). ➢ Groundwater allocation (also WR3, LR2). ➢ Using roaded catchments (Department of Agriculture) (Neil Lantzke). ➢ Turf sustainability project with local government (also W3). ➢ Canning Environmental Water Provisions (Matt Vis…) Water Flow Surveys (also WR3).

3.5.2 WM 4.1 Establish monitoring systems to develop Resource Condition Targets for turbidity / suspended particulate matter by 2005.

3.5.2.1 Current Activities

WM4.1 Not adequate	MAT	Establish monitoring systems to develop Resource Condition Targets for turbidity/ suspended particulate matter by 2005	• Establish baseline and trends and set targets • Facilitate the integration of water quality monitoring programs • Support the inclusion of biological indicators and an index of river condition in the development of monitoring systems • Support undertaking of a sediment sourcing study to identify and assess active erosion areas and their impact on the Swan-Canning River system

NHT-Funded Projects	Non-NHT-Funded Projects
➢	➢ Ribbons of Blue – snapshots. ➢ SRT monitoring of major tributaries. ➢ Aquatic Science (DoE) & SRT Riverplan working on consistent, Integrated Water Quality monitoring program. ➢ City of Armadale study of erosion sites, Darling Scarp and coastal plain. ➢ DoE/SRT 15 sub-catchments monitored fortnightly (Turbidity & TSS). ➢ Sub-catchment implementation plans – Eastern Hills – Erosion/sediment sources (Dot point 4).

3.5.2.2 Adequacy

- Not adequate

3.5.2.3 Gaps

- Water Corporation and Health Department don't monitor everything that's needed for NRM.
- Coordination and data sharing including Water Corporation.
- Monitoring of minor tributaries and drains.
- Don't know ecological impacts of different levels of turbidity (large sediment loads are coming from Avon and Upper Canning)

3.5.2.4 Response

3.5.3 **WM 4.2 100% of all relevant NRM legislation and policy reviewed and amendments recommend to address turbidity / suspended particulate matter by 2006.**

3.5.3.1 Current Activities

WM4.2 Not adequate	MAT	100% of all relevant NRM legislation and policy reviewed and amendments recommended to address turbidity / suspended particulate matter by 2006	• Adoption by Local Government Authorities of the Local Government NRM Policy Manual and Darling Range Erosion Manual • Assessment of existing regulations for minimising erosion from urban and rural land uses • Develop decision-making tools for land use planners to identify and address turbidity/particulate matter impacts

NHT-Funded Projects	Non-NHT-Funded Projects
➢	➢ LG NRM Manual is being continued as part of Cleanup Program. ➢ Local Government ICM plans. ➢ Local Planning Strategy – based on environment. ➢ Town Planning Schemes, Land Use Power (lots of power). ➢ Retention of productive soils for agriculture/horticulture. ➢ Prevention of non-compatible land uses impinging on agricultural practices. ➢ Waterway Management and Modelling (LAMCAM, SRT/DoE) (also WR3, W4). ➢ Local Government NRM Policy Development Project (Guidelines). ➢ City of Armadale Town Planning – Erosion Policy for new development.

3.5.3.2 Adequacy

3.5.3.3 Gaps

- Regulations and legislation are non-existent, eg: developments and infrastructure construction, fire breaks.
- Erosion manual for coastal plain as well.

3.5.3.4 Response

3.5.4 **WM 4.3 Implement identified remedial actions to address turbidity / suspended particulate matter by 2007.**

3.5.4.1 Current Activities

WM4.3 Adequate	MAT	Implement identified remedial actions to address turbidity / particulate matter by 2007	• Implement strategic programs in priority areas identified in WM4.1 to remediate turbidity / particulate matter • Develop and implement program foreshore and riparian restoration on waterways • Develop and implement best management practice for minimising waterways and land erosion

NHT-Funded Projects	Non-NHT-Funded Projects
➢	➢ Riverbank (SRT) Swan/Canning foreshore assessment and rehabilitiation. ➢ SALP foreshore revegetation. ➢ Foreshore Management Policy and Guidelines for Local Government. ➢ Local Government stormwater management plans and infrastructure. ➢ DoE Stormwater Manual (Dot point 3). ➢ Local Government Foreshore Management Plans (Dot point 2).

3.5.4.2 Adequacy

- Adequate Existing programs good but need expansion, increased resources and legislative backing.
- Key targets are stock access to streambanks, riparian vegetation and erosion controls.

3.5.4.3 Gaps

3.5.4.4 Response

3.5.5 **WM 4.4 20% increase in community participant in education, restoration, protection and management activities for managing turbidity / suspended particulate matter by 2009.**

3.5.5.1 Current Activities

WM4.4 Not adequate	MAT	20% increase in community participation in education, restoration, protection and management activities for managing turbidity / particulate matter by 2009	• Coordinate, facilitate and support community groups (need to ensure funding continues) • Develop and implement restoration plans to conserve and protect waterways and wetlands • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation. • Continue and expand existing community training programs such as River Restoration training, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • Support waterways and wetland restoration and management training through tertiary institutions and TAFE's • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) and the Stormwater Industry Association (SIA) for best practice management

NHTFunded Activities	Non-NHT Funded Activities
	➢ M&E Framework being established for Cleanup Program (to be developed). ➢ SRT – Riverbank Project; restore, rehabilitate waterway. ➢ Country Lifestyle magazine – Countryman – new information services. ➢ Small Landholder Information Service (also LM2.5). ➢ Soil Preservation Workshops. ➢ Four day River Restoration Course. ➢ Eastern Hills GIS and Resource Condition Assessments. ➢ NRM Regional Coordinators and NRM Officers. ➢ BWCG Inc. 5-Year River Management Plan. ➢ Natural Area Managers – Local Government ("Friends Of" Group Coordinators). ➢ Bush Skills for the Hills Environmental Workshop Series. ➢ SCC River Restoration. ➢ Wetland Watch – limited wetlands; address causes; TSS doesn't monitor. ➢ AGLG & SERCUL – both actively support community group formation and development, as does City of Armadale BEAC (Dot point 1). ➢ SRT Riverplan – gathering and making available on database information on existing activities, programs by everyone in relation to river management (Dot point 3). ➢ SRT funding of Heavenly Hectares Property Planning Workshops (Dot point 4). ➢ Foreshore restoration – river bank. Funding for local government, industry. ➢ DoE Stormwater Manual. ➢ SALP Gap – funding for industry.

3.5.5.2 Adequacy

- Not adequate

3.5.5.3 Gaps

- BMP development not very advanced.
- Adequate set of activities, but needs more resourcing, eg: community groups are losing NHT funding.
- Three communities need to be targeted: action on revegetation by urban; development industry and utilities and Government, rural landowners.
- Incentives needed in some places (rural).
- Can achieve with community volunteers but need new and stronger guidelines.
- Need incentives?

3.5.5.4 Response

3.6 SURFACE WATER SALINITY IN FRESH WATER AQUATIC ENVIRONMENTS

3.6.1 WM 5.1 Establish monitoring systems to develop Resource Condition Targets for surface water salinity in the Avon Upper Swan Region by 2005

3.6.1.1 Current Activities

WM5.1 *GAP*	MAT	Establish monitoring systems to develop Resource Condition Targets for surface water salinity in the Avon Upper Swan Region by 2005	• Evaluate and coordinate available data and establish adequate monitoring systems • Evaluate extent of rising water tables, salinisation of currently freshwater bodies, area affected by secondary salinity, and the risk of further salinity in the Ellen Brook, Brockman River, Wooroloo Brook and Helena River catchments • Identify, map and develop mgt plans for all salinity risk areas

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ State Salinity Strategy (also 5.2, 5.3, 5.4). ➢ Brockman River Catchment NRM Management Plan. ➢ Waterwise/Saltwise Rural Towns Program (Department of Agriculture). ➢ Risk areas mapped. "Salinity in Chittering Shire". ➢ WBLCDC Salinity Project. ➢ DoE Helena Study. ➢ Gauging stations on Wooroloo/Ellen (DoE) and snapshots DoE data. ➢ List of bores that DoE have but don't collect. ➢ CALM Piezometers – but not accessible. ➢ Margaret Smith Hydrogeological Report, Brockman Salinity. ➢ Margaret Smith Report on Ellen Brook Catchment.

3.6.1.2 Adequacy

- Not Adequate

3.6.1.3 Gaps

- New NAP MOU needs signing (to include Helena River) between SCC & ACC
- Monitoring of groundwater and rising water tables to evaluate salinity risk to freshwater bodies not being done.
- Data and information system to develop a decision making tool for planners, land use managers and landholders, related to improving surface water salinity.

3.6.1.4 Response

Cross-Regional groundwater project (WM 5.1)

- Establish a cross-regional program to monitor changes in the quality and quantity of groundwater.
- Includes: drilling; piezometers; quarterly monitoring; evaluate existing data.
- Monitoring design.
- Expertise and analysis.
- Contractors.
- Responsibility – Project Manager, DoE.
- Partners: Department of Agriculture, Western Australia; Sub-regional groups.
- Link: water allocation; Avon CC Strategy.

- Funding: NAP – Avon CC; $250,000.

3.6.2 **WM 5.2 100% of all relevant NRM legislation and policy reviewed and amendments recommended to address surface water salinity in the Avon Upper Swan Region by 2006**

3.6.2.1 Current Activities

WM5.2 *GAP*	MAT	100% of all relevant NRM legislation and policy reviewed and amendments recommended to address surface water salinity in the Avon Upper Swan Region by 2006	• Assessment of existing regulations for addressing surface water salinity in the Avon Upper Swan Region • Decision-making tools for land use planners to identify and address surface water salinity impacts

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Native vegetation legislation, DoE. ➢ State Salinity Strategy. ➢ Swan Canning EPP. ➢ Avon Arc Planning Strategy. ➢ Land Monitor. ➢ EPP, SPP, Salinity Action, EPBS, Ag Management.

3.6.2.2 Adequacy

- Not Adequate

3.6.2.3 Gaps

- No current scheduled review of NRM legislation and policy.
- Data and information system to develop a decision making tool for planners, land use managers and landholders, related to improving surface water salinity.

3.6.2.4 Response

Cross Regional Project

- Review of NRM-related legislation and policy covering Acts, Policy and Regulations
- $100,000 Strategic Reserve funding.
- Project Manager Environmental Defenders Office;
- Reporting to NRM Council, Regional Chairs and Regional Groups.

3.6.3 WM 5.3 Implement identified remedial actions to address surface water salinity in the Avon Upper Swan Region by 2009

3.6.3.1 Current Activities

WM5.3 *GAP*	MAT	Implement identified remedial actions to address surface water salinity in the Avon Upper Swan Region by 2009	• Implement strategic large-scale surface water salinity remedial actions in priority areas identified in WM5.1 • Implement strategic large-scale surface water management programs in priority areas identified in WM5.1

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ SALP Projects. ➢ Gordon Reid Foundation (Lotteries). ➢ Envirofund Projects. ➢ See also 1.3.

3.6.3.2 Adequacy

- Not Adequate

3.6.3.3 Gaps

- There is a lack of funding for large scale projects

3.6.3.4 Response

Large-scale on-ground Salinity Remediation (WM5.3 and WM 5.4)

- Partners: Sub-regional groups; Swan Catchment Council; Avon Catchment Council
- Includes Surface water control; Strategic revegetation; Incentive schemes (remnant vegetation, alternative tree cropping, property planning, perennial pastures)
- Funding: $2,500,000 over 5 years; NAP and Lotteries; NLP SALP

General Comment

- Use contractors/professionals to implement restoration plans

3.6.4 **WM 5.4 20% increase in community participation in salinity education, mitigation and remediation activities by 2009.**

3.6.4.1 Current Activities

WM5.4 *GAP*	MAT	20% increase in community participation in salinity education, mitigation and remediation activities by 2009	• Coordinate, facilitate and support community groups • Develop and implement restoration plans to address surface water salinity • Develop an integrated regional information system to enhance planning, implementation, monit'g and eval'n. • Continue & expand existing community training programs eg River Restoration training, Ribbons of Blue, Wetland Watch, Skills for Nature Conservation, Urban Nature & Land for Wildlife thru' integrated regional education & training program • Support land mgt, waterways and wetland restoration and management training through tertiary institutions and TAFEs

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Ribbons of Blue SCCP & NHT.	➢ Sub-Regional Catchment Coordinators/Officers. ➢ SALP Projects. ➢ Waterwise & Saltwise (Department of Agriculture, Water Corporation). ➢ Community Training Programs. ➢ Salinity Education Package (Department of Agriculture). ➢ TAFE Land Management courses. ➢ Waterwise Schools Program. ➢ See also LM1.4.

3.6.4.2 Adequacy

- Not Adequate

3.6.4.3 Gaps

- No community participation benchmark.
- Data and information system to develop a decision making tool for planners, land use managers and landholders, related to improving surface water salinity.
- Training: Links between sub regions and tertiary institutions/TAFE's (coordinated). Need to establish pathways, partnerships. Crucial to maintain and retain linkages/partnerships.

3.6.4.4 Response

Integrated regional information system (Refer to LM1.3 Project)

- GIS using existing data sets; including monitoring data and information linkages (see AgMaps model)
- This will provide a decision support tool for landholders and Local Government to assist in project evaluation, project reporting etc
- Web based and landholder friendly
- Links: Department of Agriculture, Western Australia; DoE; SCC
- Funding – multiple funding sources: NHT, NLP, NAP, GRF

Evaluation of community participation to set benchmark

- Links with all other Regional Programs.
- Needs one person for two months to collect data.
- $20,000.

Partnership and capacity building project with tertiary institutions and TAFEs, Education Department

- Mapping exercise to identify gaps.
- Partnerships to fill gaps.
- $25,000 – contractor.

General Comments on Required Approach for Salinity

- Support training through tertiary institutes/TAFE's.
- Should be delivered through development of partnerships.
- Evaluate the effectiveness of community participation in salinity education.
- Look nationally for how salinity education has been evaluated.

4. SUSTAINABLE PRODUCTION DELIVERY PROGRAM

4.1 Summary of Recommended Projects

The recommended set of projects for **NHT Regional Funding** for this Program is:

Table 7: Sustainable Production Projects recommended for NHT2 Funding

No	Matter for Target	Indicative NHT Regional Funding
	Salinity	
1.	Multi-user information system decision-making support tool for salinity and land management.	$110,000
	Nutrients in the Aquatic Environment: Industry	
1.	Promote NRM Manual for Local Government to Local Governments.	
2.	Industry to continue and increase Information Sheets.	
	Estuarine, Coastal & Marine Habitat	
1.	Assessment Gaps:	Current
	– behavioural change caused by current programs	new project
	– audit;	(Commonw
	– designed program.	ealth)

The recommended set of projects for **Other Sources Funding** for this Program is:

Table 8: Sustainable Production Projects recommended for non-NHT2 Funding

	Project Title	Indicative Funding
	Nutrients and Sediments	
1.	Risk Mapping in Eastern Hills.	$150,000
2.	Alternative revegetation method for workshops and other issues (information sharing).	$60,000
3.	BMPs for Bush Foods, Sandalwood.	$10,000
4.	Baseline data collation to monitor 30% increase (benchmarking).	$5,000
5.	"Big project" multifaceted approach to a recovery catchment.	$2,000,000
6.	Resources to work with stakeholders.	$100,000 per annum
7.	Information coordination. (One Stop Shop for business, farmers and industry sector.)	
8.	Onsite farm / business audits.	
9.	Business demonstration sites.	
10.	Incentive scheme for business to purchase monitoring equipment.	
11.	Regional baseline data for groundwater.	
12.	Economic assessment for productivity.	
13.	BMP Nutrient Management Plans for farmers.	
14.	Industry change – Technology Officers and expanded Greenstamp program.	
	Air Quality	
1.	Benchmark survey to establish sustainable light industry attitudes about best management practices. (Sustainable light industry to assess knowledge and attitudes, to help promote behaviour change.)	Budget very dependent upon scope $20,000 to $50,000
2.	Establish environmental values for existing coastal environments that have not yet been identified. (CMR1 and CMR2.)	$50,000

3.	Point source light industry emissions study (air).	$200,000 per year for 3 years
4.	Education and awareness raising project.	$100,000 per year
5.	Stakeholder engagement workshops to progress issue.	$50,000 per year

Table 9: Suggested Fund Sources for Non-NHT2 Sustainable Production Projects

No	*Name of Project*	*Funding Required*	*Tick Likely Fund Sources*					
			Strategic Reserve	*Cross-Regional*	*Enviro Fund*	*NLP*	*Other Public*	*Private Sources*
1.	Risk Mapping in Eastern Hills.	$150,000					✓ Ag W/C	
2.	Alternative revegetation method for workshops and other issues (information sharing).	$60,000		✓				
3.	BMPs for Bush Foods, Sandalwood.	$10,000			✓			
4.	Baseline data collation to monitor 30% increase (benchmarking).	$5,000						
5.	"Big project" multifaceted approach to a recovery catchment.	$2,000,000	✓	✓			✓	✓
6.	Resources to work with stakeholders.	$100,000 per annum						
	Benchmark survey to establish sustainable light industry attitudes about best management practices. (Sustainable light industry to assess knowledge and attitudes, to help promote behaviour change.)	Budget very dependent upon scope $20,000 to $50,000					✓	✓ (industry already)
	Establish environmental values for existing coastal environments that have not yet been identified. (CMR1 and CMR2.)	$50,000					✓	✓
	Point source light industry emissions study (air).	$200,000 per year for 3 years		✓			✓	✓
	Education and awareness raising project.	$100,000 per year				✓	✓	✓
	Stakeholder engagement workshops to progress issue.	$50,000 per year					✓	✓
	Assessment gaps – comparison, "what, who, where, is happening now". (Survey audit.)						✓	
	Co-ordination gaps – One Stop Shop (can also be SCC Program Manager).						✓	

	Incentive Scheme; possible devolved grant; champions.				✓			✓ (NB: investigate private sources to provide funds – legislative change)
	Review Industry Pilot Survey to target industries and continue incentive programs.						✓	
	Unauthorised Discharge Regulations training and resourcing (investigate way that this can occur).						✓	
	Develop program for Local Government to ensure that owners provide tenants with proper facilities that relate to the industry involved.							

4.2 SURFACE WATER SALINITY IN FRESH WATER AQUATIC ENVIRONMENTS

4.2.1 LM1.1 Priority areas for salinity risk management established in the Avon Upper Swan Region by 2005

4.2.1.1 Current Activity

LM1.1	MAT	Priority areas for salinity risk management established in the Avon Upper Swan Region by 2005	• Facilitate salinity risk mapping, integrated surface and groundwater water quality monitoring and establishing salinity trends • Assist interpretation of results and ground-truthing with land managers • Identify priority areas for protection and remedial actions based on risk assessment, including areas of high biodiversity value, high value water resources, and land of high value for primary production • 1-5 year priority Salinity Actions from the WA State Salinity Strategy (2000) implemented by 2009 • Develop and implement an integrated regional information system to enhance planning, implementation, monitoring and evaluation

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Salinity Risk Mapping (Martin Wells, Land Capability). ➢ Hydrogeological, Woorooloo Brook Demonstration sites (Alinta Gas, Water Authority). ➢ Ken Angel Salinity Report. ➢ Salinity Risk to Road Infrastructure (Main Roads Department). ➢ Helena River (Water Corporation). ➢ Integrated Regional Information (Ag Maps). ➢ North East Corridor (DPI). ➢ Avon Arc (DPI). ➢ Risk Mapping (Fetdozew, CSIRO).

4.2.1.2 Adequacy

4.2.1.3 Gaps

- Research into alternative crops – alternative to annual agriculture and grazing.
- Possibility of Agriculture having information but human resources do not allow the time to find information.

4.2.1.4 Response

Salinity Risk Mapping (ie: covering LM1.1)

- Salinity risk mapping for Woorooloo Brook area (including Helena River Catchment and Talbot area).
- One third of catchment has been mapped.
- Potential in 50% of catchment for salinity, so additional mapping required, approximately $150,000.
- Link to MA which talks about high biodiversity, water resources and land of high production value.
- Check if Rapid Catchment Assessment is covering Woorooloo.

4.2.2 LM1.2 All Local and State Government planning agencies using local area land capacity and suitability information by 2009.

4.2.2.1 Current Activity

LM1.2	MAT	All Local and State Government planning agencies using local area land capability and suitability information by 2009	• Facilitate the inclusion of land salinity risk assessments as a component of the planning approval process • Support the review of the policy and legislation, including Environmental Protection Policies and, Statements of Planning Policy • Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Shire Chittering Town Planning Scheme & Ellen Brook Management Plan. ➢ Advice to Chittering Shire on development and land management. ➢ SPP 2.

4.2.2.2 Adequacy

4.2.2.3 Gaps

4.2.2.4 Response

Decision Support Tool (ie: covering LM1.2)

- Decision support tool to enable plans to be developed for surface water management and remedial action (affects land).
- Tool for land use planners, managers and landholders.
- Identifier for areas for targeting landholders for high effort.
- This needs to lead to the establishment of a centralised (sub regional) data base accessible by all – community and government.
- Web based "tool kit" to allow a landowner to access risk for salinisation.

4.2.3 LM1.3 MAT Implementation of actions to address land salinity in priority areas of the Avon Upper Swan NAP Region by 2009.

4.2.3.1 Current Activity

LM1.3	MAT	Implementation of actions to address land salinity in priority areas of the Avon Upper Swan NAP Region by 2009	• Implementation of large scale land salinity remedial actions in priority areas identified in LM1 • Implement land use and management support programs (e.g. planning decision support tools, best practice guidelines, workshops, education and training, demonstrations) addressing land salinity and restoration. • Assist development and implementation of management strategies for saline sites or those at risk, including property and catchment planning
			➢ Grassed waterways. ➢ Perennial pastures.

	➢ Tree planting. ➢ SCULP, SALP. ➢ Awareness raising. ➢ Property planning and catchment planning. ➢ Surface water control.

4.2.3.2 Adequacy

4.2.3.3 Gaps

4.2.3.4 Response

- Forest Products Commission.

4.2.4 **LM 1.4 30% increase in community participation in land salinity education, mitigation and remediation actions by 2009.**

4.2.4.1 Current Activity

LM1.4	MAT	30% increase in community participation in land salinity education, mitigation and remediation actions by 2009	• Facilitate, support and motivate community and stakeholder involvement in land salinity actions • Facilitate best practice training in land salinity management, through community-training programs such as Property Planning and Heavenly Hectares through the integrated regional education and training program • Develop a landholder information service on sustainable land management • Develop and implement two new sector specific primary and secondary industry best management practice

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Fencing waterways (SCCP/SALP, NHT). ➢ Forest Production Commission; Grove planting to achieve water table reduction (NHT).	➢ Landcare Group Field Days. ➢ Field Days. ➢ Heavenly Hectares. ➢ BMP – through Landcare Groups. ➢ Schools. ➢ Catchment Groups. ➢ BMP Manuals by Catchment Group. ➢ On Property Field Days (LCDC, Landcare Centre staff). ➢ New Sector: Native Grasses, Perennial Pastures, Floriculture, Sandalwood.

4.2.4.2 Adequacy

- Not adequate.

4.2.4.3 Gaps

- Resources (human) to enable willing participants to be assisted in remedial and other work.
- Include co-ordination of information available on alternative methods of revegetation.

4.2.4.4 Response

- Commitment to undertake rehabilitation.
- Smaller landholders do not have tree planters/machinery so need assistance to plant.
- Larger landholders can undertake rehabilitation and do.

- Baseline data would be relatively easy to establish but time commitment to do this is unavailable.
- Lack of resources.
- Although the community is willing to be involved, there is a constraint in terms of coordinator capacity.

Additional staff – there will be a 0.4 FTE available next year.

Information Sharing (ie: covering LM1.4)

- Information service development across regions on workshops, training, ideas, etc. (sharing of information across regions on all programs).

Bush Foods (ie: covering LM1.4)

- Developing BMP's for new crops, and demonstration sites, eg: bush foods, etc.

Monitoring Participation (ie: covering LM1.4)

- Baseline data is available on community participation.
- Time and human resources are not available to collate.
- New Landcare Coordinator (0.4) next year may fill this role.

Recovery Catchment (ie: covering LM1.4)

- A major remediation project to reverse the salinisation of the Wooroloo/ Brockman (Upper Avon).
- It would incorporate all the issues of:
- surface water control mechanisms;
- strategic drainage revegetation;
- incentive schemes for landholders to retain or enhance remnant vegetation;
- biodiversity revegetation;
- ground water pumping;
- alternative tree cropping;
- perennial pastures;
- farming (property planning) to soil types;
- evaporation basins (disposal).
- Can we identify this as a Recovery Catchment?

4.2.5 WM 1.5 30% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in the Region by 2009.

4.2.5.1 Adequacy

- Not Adequate

4.2.5.2 Gaps

- Perhaps need more industry specific programs.
- Resourcing issue (human and informational)
- Little understanding of how effective each program is in bringing about behavioural change.
- Assessment needed on a number of businesses involved.
- Timescales necessary for programs to meet their objectives.
- Resources spread too thinly to be effective.
- Co-ordination of all programs is a gap.
- Gap in number of industries and industry sectors .
- Incentives

- Disincentives.
- To get a 30% increase, the baseline has not been established.

4.2.5.3 Response

Assessment of effectiveness (ie: covering WM 1.5)

- Assessment gap:
- defined outcomes;
- behavioural change;
- number of businesses involved;
- timescales;
- ongoing m&e plan.
- Vegemite approach?
- Set outcomes and deliverables.
- Consistent monitoring and auditing of existing programs and behaviour change.
- Existing NHT project on behaviour change monitoring and barriers.

Coordination of existing programs and projects (ie: covering WM 1.5)

- Coordination gap:
- involve more industry sectors;
- involve more industry numbers.
- Program Manager at SCC can fill this role – Web information potential.
- Existing NHT project.
- compliance and move beyond.

BMPs (ie: covering WM1.5)

- Incentives:
- green procurement;
- UDR's.
- BMP's dissemination and collation; ability to assess cumulative impact.
- Review and ground-truth the industries in SCCP Light Industry Report to re-prioritise industry sectors.

Local Government (ie: covering WM1.5)

Investigate options to resource LGA's to enforce UDR's and assist SME's to reach

4.2.6 **WM 5.1 Establish monitoring systems to develop Resource Condition Targets for surface water salinity in the Avon Upper Swan Region by 2005.**

4.2.6.1 Current Activity

4.2.6.2 Adequacy

4.2.6.3 Gaps

4.2.6.4 Response

- No adequate coordinated database.
- Monitoring inadequate.
- Data collected but not dispensed.
- Would be a very useful tool if information gathered was collated.

4.2.7 **WM 5.2 100% of all relevant NRM legislation and policy reviewed and amendments recommended to address surface water salinity in the Avon Upper Swan Region by 2006.**

4.2.7.1 Current Activity

4.2.7.2 Adequacy

4.2.7.3 Gaps

4.2.7.4 Response

- Decision making tool.

4.2.8 **WM 5.3 Implement identified remedial actions to address surface water salinity in the Avon Upper Swan Region by 2009.**

4.2.8.1 Current Activity

4.2.8.2 Adequacy

4.2.8.3 Gaps

- Large scale surface water remedial action not happening.
- Management action happening.

4.2.8.4 Response

4.2.9 **WM 5.4 20% increase in community participation in salinity education, mitigation and remediation activities by 2009.**

4.2.9.1 Current Activity

4.2.9.2 Adequacy

- Plenty of programs happening.
- Willing participants.

4.2.9.3 Gaps

- Lack of resources, human and funding.

4.2.9.4 Response

4.3 SOIL CONDITION: NUTRIENTS IN AQUATIC ENVIRONMENTS

4.3.1 WR3 Nutrients in Aquatic Environments

4.3.1.1 Current Activity

4.3.1.2 Adequacy

4.3.1.3 Gaps

- 20% increase, but what is the starting point?
- Industry awareness of BMP's needs further support to the Greenstamp program.
- Better understanding of groundwater nutrient movements.
- Dissemination of information
- Collection of information from all sources.
- Passing of information between industry, state and local government and vice versa
- Service Providers to rural Industry (contractors and suppliers) need to be educated about the right products.
- Best Practice Demonstration Farms
- Financial impact
- Understanding of nutrient export from different land uses.

4.3.1.4 Response

Information Coordination

- Seek all relevant information.
- Package information in a user friendly format.
- Extension of environmental assessment.
- Pull together information.
- Learn from South West Region's Nutrient Smart project.
- Plain language.
- One Stop Shop: physical shop, not just internet (Web and / or GIS).

Onsite farm audits

- business (horticulture, light industry);
- private (lifestyle):
- consultant business – upper end,
- farm audit – lower end.

Business Demonstration sites.

- Commercial Best Practice (eg: 5 farm demonstration sites).

Incentive Scheme

- Incentive scheme to support business to purchase monitoring equipment (data to community and organisations).

Nutrient Management Plans

- In particular, it would be beneficial to have an understanding of total nutrient and water budget for different land uses (predominantly agriculture) throughout the region. This may involve extensive site specific demonstration farms that can determine inputs of water/nutrients, fertiliser application rates, utilisation of nutrients by the relevant crop types and export of nutrients via surface runoff, sediment loss, and groundwater leaching. Could build on existing information, for example work done on dairy farms import and export rates for the Peel Harvey area.
- BMP - Nutrient Management Plans for farms to meet targets.
- Currently driven by fertiliser applications for economic and productivity gains.

Environmental Nutrient Management in Irrigation Farms

- There is information available to farmers on best practice for fertiliser type and usage relevant to the crop type (would be collated in the information project) with the focus being economic (eg: wastage of fertiliser is loss of money to farmers). A nutrient irrigation management plan needs to be developed to provide farmers and land users (eg: turf aligning river edging) the suitable fertiliser type and application rate to meet the resource condition target of meeting 0.1mg/L of TP and 1mg/L of TN. An extension to this project would be then to provide best practice for herbicide and pesticide usage, although this does not directly meet this RCT but rather other water resource targets such as aquatic integrity.

Economic Assessment

- Economic summary of gross productivity / yield to give an understanding of different land uses for the Swan Region (eg: horticulture, viticulture, forestry, semi-rural).

Groundwater Research

- Better understanding of groundwater nutrient movement.
- Region-wide baseline data.

4.3.2 **WM 3.2 10% of all relevant NRM legislation and policy reviewed and amendments recommended to address nutrient enrichment by 2006.**

4.3.2.1 Current Activities

4.3.2.2 Adequacy

- Adequate

4.3.2.3 Gaps

4.3.2.4 Response

- NRM Manual (ie: covering WM3.2)
- Councils adopting NRM Manual for Local Government.
- Officer to talk to Councils and sell policies.

4.3.3 **WM 3.4 20% increase in community participation in nutrient intervention education, restoration, protection and management activities by 2009.**

4.3.3.1 Adequacy

- Not Adequate

4.3.4 **WM 3.2 All relevant NRM legislation and policy reviewed and amendments recommended to address nutrient enrichment by 2006**

4.3.4.1 Current Activities

4.3.4.2 Adequacy:

- Adequate
- Depends on legislation

4.3.4.3 Gaps

- Needs coordination and financing.
- Needs commitment at Ministerial level.Getting Councils to adopt NRM Manual (In progress)
- No enforcement.
- Water quality targets but no BMP or Management targets.
- Need a better approach to improving performance in existing light industry areas.

4.3.4.4 Response

Information Sheets (ie: covering WM3.2)

- Information Sheets continued.
- Properties leased – landlords need to take responsibly.
- Site specific management needed.
- Trucks – haulage is a problem.
- MRD and Transport.

4.3.5 **WM 3.4 20% increase in community participation in nutrient intervention education, restoration, protection and management activities by 2009**

Adequacy:

- Not adequate.
- Can't get away from their work place.
- Too busy making money – industry
- Local Government officers – to pick up powers of UDRs

Gaps:

- Face to face approach for industry awareness
- BMP stimulation; pick key areas first.
- Compliance first, then go on to BMP (Local Government limited to compliance).
- Not enough resourcing going into implementation.
- Baseline data for 20% community participation.
- State and Local Government to provide technical support for BMP implementation of intervention of nutrient and other contaminants.

Response

Industry Change (ie: covering WM3.4)

- Technical support for face-to-face industry awareness; changing industry behaviour.
- Industry change:
- one on one – face-to-face;
- talk to industry peak bodies.
- Leveraging off existing programs.

4.4 TURBIDITY / SUSPENDED PARTICULATE MATTER IN AQUATIC ENVIRONMENTS

4.4.1 W4 Turbidity/Suspended Particulate Matter in Aquatic Environments.

4.4.1.1 Current Activity

4.4.1.2 Adequacy

- Not Adequate

4.4.1.3 Gaps

- Monitoring of sediment.
- WM 4.2 – 100% of all NRM legislation by 2006; setting up to fail as NRM policies changing etc.; should prioritise what legislation or policies will be relevant to the RCT.
- Concern that targets will be met by 2005; known information for TSS but not turbidity.
- 'Representative sites' - have they been set now and if so, is there enough data or information to set the targets by 2005?
- WM4.2 – Landuse planner overload.
- WM4.3 – unsure of any current projects.

4.4.1.4 Response

Possible Projects – no consensus reached:

- Landuse Planner Overload.
- Succession planning.
- Certification guidelines for industry and local government agencies.

4.4.2 WM 4.4 20% increase in community participation in education, restoration, protection and management activities for managing turbidity / particulate matter by 2009.

4.4.2.1 Current Activities

4.4.2.2 Adequacy

- Not adequate.
- A lot of the current activities for WM3.2 and WM3.4 will address WM4.4.

4.4.2.3 Gaps:

- Refer to WM3.4.
- Acceptable level of turbidity.

4.4.2.4 Response

4.5 LR2 Soil Condition.

4.5.1 LR2 Maintain and improve soil condition as measured at representative sites, including extent of water erosion, waterlogging and acid sulfate soils, by 2020 (with a quantified targets set by December 2005)

4.5.1.1 Current Activities

LM2.1	MAT	Establish benchmarks and monitoring at representative sites for water erosion, waterlogging and acid sulfate soils by 2005	• Identify areas of agricultural land affected by water erosion and waterlogging and the level of application of best management practice • Identify priority areas for remedial actions based on risk assessment, including areas of high biodiversity value, high value water resources and land of high value for primary production • Assessment of areas of acid sulfate soils risk, and implementation of Framework for Acid Sulfate Soils • Support and integrate development of monitoring systems to analyse and set baseline and trend information for land condition parameters • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation
LM2.2	MAT	100% of all relevant current NRM policy and legislation reviewed and recommended amendments to minimise risk of water erosion, waterlogging and acid sulfate soils made by 2006	• Support the review of the policy and legislation, and recommend changes to Environmental Protection Policies, Statements of Planning Policy local planning policies to address water erosion, waterlogging and acid sulfate soils risk • Facilitate the inclusion of ASS risk assessments as a component of the Local and State Government agencies planning approval process • Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts

	NHT-Funded Projects	Non-NHT-Funded Projects
LM2.1		➢ DoE – measuring of loads from 4 sites within Swan Region. ➢ DoE – mapping with WAPC on acid sulphate soils. ➢ Land capability analysis – appropriate land uses over soil types. ➢ Statement of Planning Policy for Acid Sulphate Soils. ➢ Acid sulphate soil modelling and workshops on mapping.
LM2.2		➢ SRT – foreshore assessment of Swan-Canning Rivers, identifying erosion and water erosion.

4.5.1.2 Adequacy

- Partly adequate

4.5.1.3 Gaps

- Education of decision makers.
- Information reticulation by authorities and organisations (between authorities and land owners).
- Regional approach needed but keep contact with landowners.
- Poor appreciation by authorities of land users.
- Lip service to sustainability model (economy, social and environment).
- Concern to set targets by 2005.
- ASS is a major issue throughout Swan Canning Rivers system, unknown to set target by 2005 (environmental impacts).
- Setting targets like 100% (LM2.2)
- Planning – TPS and land use modelling are major gaps.

- Information on waterlogging?
- Evaluation of industry initiatives and programs as well as developing education package for local government to understand industry drivers, business realities and environmental improvements.
- Awareness between decision makers and industry.

4.5.1.4 Response

BMPs (ie: covering LR2)

- Usage of BMP's by industry: question usefulness; question attitude (behaviour change).
- Need professional marketing of BMPs.
- Need support by Local Government - By-laws and business associations (not a shared responsibly approach). State and local cost shifting.

Education

- Establish and expand education programs.

4.5.2 **LM 2.3 Regional soil health program developed, with implementation of identified remedial and preventative actions in identified priority areas by 2009.**

4.5.2.1 Current Activities

LM2.3		Regional soil health program developed, with implementation of identified remedial and preventative actions in identified priority areas by 2009	• Develop and implement programs for priority areas for water erosion control, waterlogging remediation and management of acid sulfate soils risk, including implementing industry best practice guidelines • Implementation of State Weed Strategy (2001)

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Stormwater Manual currently being developed (DOE) (also LR2).	➢ ASS mapping in the Swan Coastal Region and limited inland area. ➢ LMBE project for inland acidity, funded by Commonwealth. ➢ Sub-catchment Implementation Plans – identify erosion and waterlogging. ➢ Perth Groundwater Atlas (contaminated sites mapping) (also LR2). ➢ Local government policy re: contaminated sites, etc. ➢ Local Government Industry Audit Program. ➢ SPP for Acid Sulphate Soils. ➢ Wetlands nutrient stripping assists in the prevention of river contamination.

4.5.3 **LM2.4 Industry Best Management Practices (BMP's) defined with benchmarks for implementation established by 2009 for eight land use / industry sectors.**

4.5.3.1 Current Activities

LM2.4	MAT	Industry Best Management Practices (BMP's) defined with benchmarks for implementation established by 2009	• Define current industry BMP's and support implementation of sustainable BMP programs for primary industry and small-medium enterprise sectors • Define current industry BMP's and support implementation of sustainable BMP programs for secondary industry sectors

		for eight land use / industry sectors	

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Part-funded: Nursery Fact Sheets; Bayswater Local Government Audit Program (NHT). ➢ Pilot projects – Wangara Catchment (NHT).	➢ BMP for vegetable crops. Nutrients and irrigation (plus works with pests R&D)(DAWA). ➢ A Web-based expert system for efficient vegetable irrigation on sands(WAVGA). ➢ Greenstamp: Motor, cleaners, printers (also LR2). ➢ Oil contamination of soil and stormwater. ➢ River contamination. ➢ Develop stormwater health.

4.5.3.2 Adequacy

4.5.3.3 Gaps

- Item 2.4 lacking.
- BMP's limited to membership of organisations on non related industry organisations.
- Conflicting BMP's?
- Who takes responsibility for implementing BMP's?
- Who monitors BMP's?

4.5.4 LM 2.5 30% increase in land managers, planners and community participation in soil condition education, mitigation and remediation activities by 2009

4.5.4.1 Current Activities

LM2.5	MAT	30% increase in land managers, planners and community participation in soil condition education, mitigation and remediation activities by 2009	• Facilitate, coordinate, support and motivate community groups • Develop and implement a training and support program for best management practices relating to soil condition and remediation, including through tertiary institutions and TAFEs • Facilitate implementation of soil health management protocols, guidelines and training • Continue and expand existing community training programs such as Property Planning and Heavenly Hectares through the integrated community education and training program • Rural, semi-rural and special rural zone landholders have access to market based instruments/incentives for sustainable land management by 2007 • Form strategic partnerships with the Urban Development Institution of Australia (UDIA) for protection of land assets • Assist identification of information needs / gaps in quality of land resource information

➢	➢
➢ Small landholder project (SCCP).	➢ BCCG, TRCG, SERCUL Stormwater and Nutrient Education across City of Canning and Melville (also 2.4).

Questions from discussion

- Impact of drainage into marine environment?
- Construction sector?
- Small scale waste disposal (eg. BMP for small industry)

4.6 Sustainable Production Aspects of Air Quality

4.6.1 AR 1 Continue to progress towards improved air quality, with Resource Condition Targets to be set for air quality by 2005

4.6.1.1 Current Activities

AM1.1	MAT	Establish set of monitoring systems to collect/analyse baseline and trend information, to enable setting of Resource Condition Targets for air quality by 2005	• Collect/analyse baseline and trend information • Work with DoE and associated partners to set Resource Condition Targets for air quality
AM1.2	MAT	Establish a partnership framework to assist in the implementation of the Air Quality Management Plan 1–5 year actions by 2008	• Initiate inventory of small-medium sized enterprise emissions linked to the National Pollution Inventory by 2008 • Establish partnership linkages with Air Quality Coordinating Committee (AQCC) Working Group for information transfer and progress reporting • Support wider regional community and stakeholder participation in programs relating to air quality improvement

4.6.1.2 Adequacy

- Probably Adequate (subject to the Perth Air Quality Management Program being implemented)

4.6.1.3 Gaps

- Lack of jointly developed projects – not based on partnerships.
- Who should be monitoring air quality data?
- Gap in knowledge / data of point source light industry emissions.

4.6.2 AR 2 Set Resource Condition Targets to manage climate risk and reduce risk of major environmental, economic or social outcomes from drought or coastal land impacts

4.6.2.1 Current Activities

AM2.1	MAT	Undertake risk assessment of impacts and develop priority actions for climate change impacts on NRM by 2009	• Support research risk of climate change to NRM • Support Research into climate variability • Support an education program on Climate Change and long-term climate variability

Non-NHT Projects
➢ DOE (EPA Act) Air Quality Branch. ➢ Perth Air Quality Management Plan. ➢ CALM burn-offs and car emissions.

4.6.2.2 Adequacy

4.6.2.3 Gaps

4.6.2.4 Response

4.6.3 **AM 1.2 Establish a partnership framework to assist in the implementation of the Air Quality Management Pan 1-5 year actions by 2008**

4.7 Sustainable Production Aspects of Coastal and Marine

4.7.1 **CMR1 Maintain and improve the condition of marine habitats in the Region, as measured at representative sites by 2020 (with a quantified target set by 2005).**

? (low priority)

4.7.2 **CMR2 Maintain and improve the condition of marine habitats in the Region, as measured at representative sites by 2020 (with a quantified target set by 2005). Action plan developed to manage the impacts on marine water quality and monitor and evaluate remediation programs by 2006.**

4.7.2.1 Current Activities

4.7.2.2 Adequacy

- Not adequate

4.7.2.3 Gaps

4.7.2.4 Response

4.7.3 **CMM1.5 30% increase in community participation in biodiversity education, mitigation and remediation actions by 2009.**

4.7.3.1 Current Activities

4.7.3.2 Adequacy

- CMM1.5 – Question whether it is relevant to light industry targets given that there is almost no light industry on the coast within the Swan Region and highly unlikely to ever be, so very little point source pollution. (This contrasts with the interpretation of CMM 1-5 to mean light industry impact from the region, on the coast and marine.)

- Sewerage treatment plant and Water Corporation release of effluent into marine environment – not captured in targets. Future urban development is likely to have an impact if not managed now.
- Mineral sand mining – still pressure to mine areas along the coast that must be managed.

4.7.3.3 Gaps

- Resource Condition Targets are interpreted differently.

4.7.3.4 Response

4.7.4 **CMM2.3 Action Plan developed to manage the impacts on marine water quality and monitor and evaluate remediation programs by 2006.**

4.7.4.1 Current Activities

4.7.4.2 Adequacy

4.7.4.3 Gaps

- Where there are no standards available – there should be.

4.7.4.4 Response

Social, Economic, Environmental Values in Strategy.

5. COASTAL & MARINE DELIVERY PROGRAM

5.1 Recommended projects

The recommended set of projects for **NHT Regional Funding** for this Program is:

Table 10: Coastal and Marine Projects recommended for NHT2 Funding

	Name of Project	***Indicative NHT Regional Funding***
1.	Monitoring and information systems projects	$80,000
2.	Protection and restoration targets for coastal areas.	$100,000
3.	Maps of existing information of marine fauna.	
1.	Maps of existing information on marine fauna.	

The recommended set of projects for **Other Sources Funding** for this Program is:

Table 11: Coastal and Marine Projects Recommended for Funding from Non-NHT2 Sources

	Name of Project	***Indicative Funding***
1.	Monitoring and information systems project (m&e part).	$100,000
2.	Situational analysis of marine habitats.	$100,000
3.	Key indicator species.	
4.	Listing of threatened species.	
5.	Collaborative research on the impacts of recreational fishing.	
6.	Framework for sustainable aquaculture.	

Table 12: Suggested Funding Sources for non-NHT2 Coastal and Marine Projects

No	*Name of Project*	*Funding Required*	*Tick Likely Fund Sources*					
			Strategic Reserve	*Cross-Regional*	*Enviro Fund*	*NLP*	*Other Public*	*Private Sources*
1.	Monitoring and Information Systems project (m&e part).		$100,000					
1.	Situational analysis of marine habitats (CMM2.1, 2.2, 2.5 + 2.6)	$100,000	✓		✓		✓	✓
1.	Key indicator species (highest priority)		✓	✓				
2.	Collaborative research on impacts of recreational fishing		✓	✓				
3.	Framework for sustainable aquaculture (lowest priority)		✓	✓				
4.	Listing of threatened species (highest priority)		✓	✓				

5.2 Maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites, by 2020 (with a

5.2.1 CMM 1.1 100% of priority natural coastal areas identified and assessed by 2005.

5.2.1.1 Current Activities

CMM 1.1	MAT	100% of priority natural coastal areas identified and assessed by 2005	• Establish monitoring systems to collect/analyse baseline and trend data • Identify adequate buffer zones to protect coastal biodiversity from predicted sea level rise • Identify areas requiring wide setbacks, where ecosystem processes may be impaired by sea level rise • Compile, document and forecast current and predicted human usage of coastal resources • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Perth Coastal Planning Strategy is looking at 1.1. (DPI - $300,000) by December 2005. ➢ Bush Forever has identified 1.1 coastal priority areas (P&R) – (DPI / CALM / DoE $10 million per year). ➢ PBP – more detailed (NHT). ➢ Local Council Biodiversity Strategies, eg: Wanneroo, Cambridge, Joondalup, Kwinana.

5.2.1.2 Adequacy

- Not adequate for the integrated regional information system.
- WALIS is being reviewed.

5.2.1.3 Gaps

Action point one:

- Monitoring systems to collect and analyse data.
- Quantified target for 2005 is needed soon

Action point five:

- Needs integration.

5.2.1.4 Response

Monitoring and Information Systems Project (i.e. covering CMM1.1)

- Current and existing data, what exists, where held, formats, review of information – Cathy Ronald's meta database.
- Vegetation condition mapping and weed mapping exists for some Local Governments; Northern metropolitan suburbs have more areas completed; this information needs to feed into something.
- Review of WALIS is currently occurring.
- More guidance for this may come from the terrestrial biodiversity targets and program.
- What needs to be monitored?
- Statewide database?
- Develop logical framework for data.
- Identify custodian for data.

5.2.2 **CMM 1.2 100% of priority coastal areas have five year protection and restoration targets defined for wind erosion by 2005.**

5.2.2.1 Current Activities

CMM 1.2	MAT	100% of priority coastal areas have five year protection and restoration targets defined for wind erosion by 2005	• Determine extent of wind eroded coastline • Develop strategies to meet targets to reduce coastal dune areas affected by coastal wind erosion

No current activities were identified.

5.2.2.2 Adequacy

- Not Adequate
- Needs to be modified to capture all issues. New wording suggested as: "100% of priority coastal areas have five year protection and restoration targets by 2005 to determine the extent of degraded coastline and develop strategies to meet targets to reduce coastal dune areas affected by degradation". This modification will allow for priority areas to be identified.

5.2.2.3 Gaps

- Other pressures **cause** wind erosion and related degradation (eg weeds), therefore: remove 'wind'; remove 'for wind erosion'; change 'wind erosion' to 'degradation'.

5.2.2.4 Response

Protection and Restoration Targets for Coastal Areas (ie: covering CMM1.2)

- Use PBP framework.
- Add in social information.
- Ideas: possibility of (i) delivery through PBP and grant program to get Local Government to do work; delivery through PBP – use PBP framework, maybe PBP staff or contract work out;
- $100,000 would mean one officer full time for twelve months to do this work.

5.2.3 **CMM 1.3 100% of Councils adopting or updating local coastal plans and policies by 2009.**

5.2.3.1 Current Activities

CMM 1.3	MAT	100% of Councils adopting or updating local coastal plans and policies by 2009	• Support National and international effort into sea level rise modelling and research • Promote the Coastal SPP 2.6 widely to Councils to ensure consideration is given to issues such as sea level rise when establishing appropriate setbacks for new developments • Develop and implement Perth Coastal Planning Strategy

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Bureau of Meteorology. ➢ ICAG. ➢ UWA. ➢ CSIRO.

5.2.3.2 Adequacy

- Adequate
- Local governments are undertaking coastal plans and policies but not addressing sea level rise.

5.2.3.3 Gaps

- Adequate.

5.2.3.4 Response

5.2.4 CMM 1.4 20% increase in on-ground community environmental restoration programs addressing coastal dune wind erosion in priority areas by 2007.

5.2.4.1 Current Activities

CMM 1.4	MAT	20% increase in on-ground community environmental restoration programs addressing coastal dune wind erosion in priority areas by 2007	• Develop and implement local natural diversity strategies and revegetation works for priority areas

NHT-Funded Projects	Non-NHT-Funded Projects
➢ EnviroFunds (NHT).	➢ Coastwest (DPI). ➢ SALP (SRT / Alcoa). ➢ Local Government (individuals). ➢ Corporate. ➢ Management of terrestrial portions of Island Reserves: • CALM Reserves; • Rottnest Island; • Garden Island. ➢ Includes: • implementation of Management Plans; • erosion mitigation and repair.

5.2.4.2 Adequacy

- Adequate
- Needs to be modified to capture all issues.
  New wording suggested as:
- "20% increase in on-ground environmental restoration programs addressing coastal degradation in priority areas by 2007".
- There is concern that this MAT won't acknowledge large projects towards meeting the 20% increase. For example, one large program may be better than 10 small programs but won't necessarily be acknowledged as a 20% increase.

5.2.4.3 Gaps

- Local government should be included: for example 'community and local government'; **or** cross out 'community' as too specific. (*preferred*.)
- Remove 'dune wind erosion' and change to 'degradation' to fill gap of degradation.

5.2.4.4 Response

5.2.5 **CMM 1.5 30% increase in community participation in biodiversity education, mitigation and remediation actions by 2009.**

5.2.5.1 Current Activities

CMM 1.5	MAT	30% increase in community participation in biodiversity education, mitigation and remediation actions by 2009	• Coordinate, facilitate and support community and stakeholder involvement • Training and capacity building for Local Government Authorities and community on coastal biodiversity/ecology • Include stormwater education, water use efficiency and water conservation into the regional training and education program • Continue and expand existing community training programs such as Swan-Canning Cleanup Program education initiatives, Great Gardens workshops, Ribbons of Blue, Wetland Watch and Skills for Nature Conservation, through the integrated regional education and training program • Continue to provide incentives for landholders and land managers such as the Swan Alcoa Landcare Program

NHT-Funded Projects	Non-NHT-Funded Projects
➢ NRM Officers – NHT. ➢ Beach Health, Stormwater, DoE, SCC, NHT, Water Corporation and Department of Health.	➢ Great Gardens (SRT). ➢ ICLEI Water Use Efficiency - Water Campaign for LG. ➢ Water Resources SPP (DPI, DOE).

5.2.5.2 Adequacy

- Adequate
- Existing training programs need modification so they include coast and marine.
- Remove the word 'community' from the MAT.

5.2.5.3 Gaps

- Extend Skills for Nature program to include coast or new program focusing on coast.

5.2.5.4 Response

5.3 Maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020 (with a quantified target set by 2005)

Situational Analysis Project (i.e. covering all of RCT2)

- General observation: lack of coordination between projects.
- The gaps across all 6 Management Actions point to one key project that is a Situational Analysis Project, to assist project management, scoping and coordination.
- First need is for map of what is happening – a project?
- High priority research project for Program Manager and Reference Group to inform this process.

5.3.1 CMM2.1 100% of priority marine habitats identified for protection by 2006.

5.3.1.1 Current Activities

CMM 2.1	MAT	100% of priority marine habitats identified for protection by 2006	• Identify regionally representative marine habitat types using the Comprehensive Adequate Representative (CAR) approach • Develop habitat map and undertake threat analysis to those habitats, including critical habitats for significant species • Determine priority areas for management/protection based on threat analysis. • Develop an ecological monitoring program • Review and expand ecological reference sites • Compile, document and forecast current and predicted human usage of estuarine and marine resources, focusing on priority marine habitats

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Literature Review conducted for SCC on previous and existing coastal and marine research; should be considered for more information.	➢ CALM marine conservation reserve program. Swan, Shoalwater, Marmion - $41,500. ➢ Development of management plans with MATs specific to each Marine Park. ➢ Murdoch University Benthic Habitat Project (ARC grant 4 years). ➢ CSIRO – Habitat Mapping Project (Strategic Research Fund for Marine Environment) – ($7 million – 2007). ➢ Coastal CRC / UWA / FUGRO Habitat and Sea Floor Mapping Project. ➢ Current Marine **Monitoring** Programs: • CALM established sites in Shoalwater Island Marine Park, Swan Estuary, Marmion Marine Park (including sanctuary zone effectiveness). • ECU monitoring, DALSE (Cockburn Cement – Owen Anchorage) and Marmion Marine Park (Water Corporation). ➢ Indigenous Fishing Strategy.

5.3.1.2 Adequacy

- Probably not adequate.
- Cross check with literature review.
- How much collaboration between these projects?
- Who are the key contacts?

5.3.1.3 Gaps

- Need map.
- Need more information on scope (gap is our knowledge)

5.3.1.4 Response

- Speed up existing projects.
- Timeline needed for the recording of baseline data.
- Need to clearly scope what the MAT actually means.

5.3.2 CMM 2.2 100% of all marine habitat areas affected by introduced marine pests in 'at risk' areas identified by 2007.

5.3.2.1 Current Activities

CMM 2.2	MAT	100% of all marine habitat areas affected by introduced marine pests in 'at risk' areas identified by 2007	• Identify 'at risk' areas and sources with potential for infestation and establish monitoring program (in collaboration with Action Plan for marine water quality) • Support the preparation of the State framework for management response to marine pests • Respond to suspected incursions in accordance with the National and State framework for management response to marine pests

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Introduced Marine Pests. Fred Wells (F&FHP). Fisheries (?). ➢ CSIRO (National). Centre for research of Introduced Marine Pests (5 years prior, now published).

5.3.2.2 Adequacy

- Clearly insufficient.
- Component of CMM 2.1.

5.3.2.3 Gaps

5.3.2.4 Response

- Coast and Marine Reference Group to coordinate project with key agencies.
- scoping;
- set parameters;
- set time lines;
- how to resource.

5.3.3 **CMM2.3 Action Plan developed to manage the impacts on marine water quality and monitor and evaluate remediation programs by 2006.**

5.3.3.1 Current Activities

CMM 2.3		Action Plan developed to manage the impacts on marine water quality and monitor and evaluate remediation programs by 2006	• Develop a monitoring and evaluation action plan consistent with the Perth Coastal Waters (2000) • Develop research and monitoring to define natural variability of marine quality measures in conjunction with existing monitoring programs (ongoing) using priority and reference sites • Develop regional information system to enhance planning, management, monitoring and evaluation • Update the Contaminated Inputs Inventory annually • Define the impacts of stormwater on nearshore marine habitat • Define the impacts of boat sewage discharge in heavily used areas

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Beach Health Project. NHT @ $230,000. (second last dot point). ➢ Waste oil and boat battery recycling project at Hillaries Boat Harbour (NHT).	➢ CCL (DALSE) WQMP for Owen Anchorage (Dec.- Mar.) ➢ CSMC: WQMP for Cockburn Sound (December. – March.) ➢ UWA / CWR groundwater flux to Cockburn Sound (Alicia Loveless PhD.) ➢ Water Corporation: WQM Sepia Depression Swanbourne, Ocean Reef. ➢ SRT: WQM Swan Estuary. ➢ Rottnest Island Authority: Impacts of boat sullage on WQ (SRFME?). ➢ Cockburn Sound Seagrass Mapping and Management (also CMR2).

5.3.3.2 Adequacy

- **Not Adequate**
- Monitoring

5.3.3.3 Gaps

- Coordination needed of existing programs in relation to SCC and gap analysis.

5.3.3.4 Response

- Focus on 2.1 and 2.2, then 2.3 will flow from these prior steps.

5.3.4 **CMM 2.4 100% of Local Governments with ocean outfalls have stormwater action plans established by 2008.**

5.3.4.1 Current Activities

CMM 2.4	MAT	100% of Local Governments with ocean outfalls have stormwater action plans established by 2008	• Facilitate the development of a Memorandum of Understanding (MoU) between Local Governments to ensure stormwater is managed collaboratively • Implementation of existing stormwater management plans (including the WESROC's Strategy) • Establish partnerships with Agencies and Local Government for implementation of the Beach Watch program

NHT-Funded Projects	Non-NHT-Funded Projects
➢ Beach Health Project. [excludes Water Corporation drain outfalls] $230,000 (approx.)	➢ Local Governments (various specific and individual stormwater activities.) (More information needed).

5.3.4.2 Adequacy

- Not Adequate (caveats)
- Beach Health project: does it do CMM 2.3 (last dot point)? It's a trigger.
- Diffuse versus point source – needs to be carefully considered.

5.3.4.3 Gaps

5.3.4.4 Response

- Is dependent upon outcomes of the Beach Health project.

5.3.5 **CMM 2.5 20% increase in marine habitat restoration programs by 2007**

5.3.5.1 Current Activities

CMM 2.5	MAT	20% increase in marine habitat restoration programs by 2007	• Implement 1-5 year groundwater quality targets outlined in the Cockburn Sound Management Plan • Implement the remaining recommendations for the State Marine Parks and Reserves Authority (MPRA) marine conservation reserve system • Support the extension of Shoalwater Islands Marine Park • Develop and implement management program for priority areas, including protection and restoration of habitat for significant species • Provide management facilities to reduce the impacts of boat sewage discharge in heavily used areas

NHT-Funded Projects	Non-NHT-Funded Projects
	➢ Cockburn Cement – seagrass restoration project. Work done by Murdoch University. $120,000 per year. Ongoing – 3 years. ➢ CALM – priority; • Swan Estuary Marine Park. Protection of wader bird habitat for migratory species; • On-ground works including fencing, Management Plan, implementation (and other wildlife – little penguins, sea lions). ➢ RIA study (see note under 2.3).

5.3.5.2 Adequacy

- Adequate (check CALM).
- A lot of on-ground action.
- CALM works closely with Local Governments.
- With CALM management plans – if CALM is OK – then OK.

5.3.5.3 Gaps

5.3.5.4 Response

- Scope MAT.
- Check with CALM.
- Questions on the achievability of existing management plans.
- Link to 2.1 + 2.2.
- Option: use Reference Group to action.
- Need to assess logic flow for this process.

5.3.6 **CMM 2.6 30% increase in community and stakeholder participation in education, mitigation and remediation activities related to marine habitat protection by 2008.**

5.3.6.1 Current Activities

CMM 2.6	MAT	30% increase in community and stakeholder participation in education, mitigation and remediation activities related to marine habitat protection by 2008	• Coordinate, facilitate and support community and stakeholder involvement in protection of marine habitat • Support community initiatives to protect marine habitat, through Marine Community Monitoring Program and Fish Habitat Protection Areas • Establish partnerships with agencies and Local Government for implementation of the Beach Watch program • Increase community and boat user understanding about introduced marine pests • Promote inclusion of marine habitat restoration and management training through tertiary institutions and TAFE's • Investigate and promote mechanisms for Local Government to support management of marine habitat

NHT-Funded Projects	Non-NHT-Funded Projects
➢ CALM (NHT funded) Marine Community Monitoring Program (end 2004).	➢ Community involvement and education, eg: Marine Community Monitoring Program through CALM. ➢ DOF – Fish and Fish Habitat Protection Program. ➢ Community DOF involvement in F & FHP areas (COASTWEST funded – may just be for SW). ➢ Capacity building for sustainable fisheries and marine conservation – Conservation Council.

5.3.6.2 Adequacy

- Not Adequate.

5.3.6.3 Gaps

5.3.6.4 Response

- First step: measure benchmark/baseline of community stakeholders' participation (potential that MAT is difficult to achieve).
- Establish project team.
- Prioritise. Which 30% to target? eg: particular programs.
- Investigate the role of Local Governments in managing marine habitats (to achieve CMM 2.6).

5.4 Maintain and improve the condition of marine fauna in the Region, as measured at representative sites, by 2020 (with a quantified target for key indicator species set by 2005

5.4.1 CMM3.1 Determine key indicator species to protect and conserve viable populations of marine fauna by 2006.

5.4.1.1 Current Activities

CMM 3.1	MAT	Determine key indicator species to protect and conserve viable populations of marine fauna by 2006	• Develop scientific methodology to identify key indicator species • Develop marine fauna mapping project, including significant species and fish, for use as a decision-making support tool • Develop and implement integrated marine wildlife management and monitoring program including threatened species • Develop regional information system to enhance planning, management, monitoring and evaluation

➢	➢
➢ CALM recently completed the NHT funded fauna mapping project. Wildlife ONLY, not fish. 200 page DRAFT document and map produced (Belinda Cant, CALM-GIS): • need for other marine fauna, invertebrates and fish.	➢ Each of the management plans – Swan Estuary, Shoalwater Island and Marmion Marine Park have strategies and targets for wildlife management. Other marine fauna are covered in Biodiversity Management Targets.

5.4.1.2 Adequacy

- Not Adequate

- More work needed.

5.4.1.3 Gaps

- Identify key indicator species from **all** functional groups (invertebrates, birds, recreational and other fish species, marine mammals).
- Gap in mapping project includes: invertebrates, fish (recreational species **and** others), birds (waders and migratory). (Swan Estuary only).
- Little Penguins, whales, Australia sea lions have been done (CALM/NHT Draft report).
- Dot point 3 – priority.
- Dot point 4 – regional system in place (CALM part of).
- Needs populating with data (Dot points 1-3 above).

5.4.1.4 Response

Key Indicator Species Project (i.e. covering CMM 3.1)

- Identify key indicator species from different functional groups, access suitability and implement monitoring and evaluation framework.
- Digitise and produce maps of existing information on marine fauna (should not be limited to commercially viable species but all species for biodiversity considerations).
- Partners:
- CALM;
- Universities;
- CSIRO;
- Department of Fisheries.
- Other stakeholders: Department of Tourism, WAFIC, RecFish West, Conservation, (WWF, Conservation Council).
- NHT funding required for production of maps.

5.4.2 CMM3.2 Determine level and impact of recreational fishing catch by 2007.

Current Activities

CMM 3.2	MAT	Determine level and impact of recreational fishing catch by 2007	• Consolidate existing information to better understand the combined effects of recreational and commercial fishing • Investigate recreational fishing catch on the Swan-Canning River (**NB: Resulting data feeds into second dot point of CMM3.1 MAT**). • Investigate the boat and on-shore line catch of recreational fishers across Perth metropolitan waters • Investigate fish stocks and populations that are under threat (Perth Herring, Dhufish, Bream) from human impacts (**NB: Resulting data feeds into second dot point of CMM3.1 MAT**). • Compile existing information about fish biology and ecology

Non-NHT Projects
➢ Swan River Recreational Fisher Log Book Surveys (DOF) Kim Smith. ➢ CREEL Survey Recreational Fishers Rottnest Island. (Murdoch University and Rottnest island Authority). ➢ Recreational Fisher Human Usage Survey (Rottnest Island Authority and Murdoch University). ➢ Need to ask DOF and Murdoch University about other work. Fred Wells DOF, Lynath Beckley, Murdoch University. ➢ CALM – studies (including one PhD) looking at the effectiveness of sanctuary zones (BAKI study) on fish populations. Also Shoalwater Water Islands Marine Park and Marmion Marine Park. Similar studies form a component of the Management Plan Action Targets (MATs).

5.4.2.1 Adequacy

- Not adequate.

5.4.2.2 Gaps

- Needs coordination between stakeholders (Department of Fisheries., CALM, Murdoch University, RecFish West).
- Need for research on effects of sanctuary zones in Swan Region (i.e. Shoalwater Island MP, Marmion, MP & Rottnest) – CALM & CSIRO currently monitoring.

5.4.2.3 Response

Impacts of Recreational Fishing (i.e. covering CMM3.2)

- Collaborative research program to establish the level of impacts of recreational fishing.
- Assess current research activities into the level of impact of recreational fishing and identify the best approach.
- Identify priority areas for ongoing research (eg: above and beyond Rottnest and Swan estuary).
- Map level of impacts (from existing and ongoing research).
- Develop a database of information on regional fish biology and ecology (to be publicly available).
- Project Partners:
- Department of Fisheries;
- Murdoch University;
- RecFish West;
- CALM.

5.4.3 CMM3.3 Establish a framework for sustainable aquaculture by 2007.

5.4.3.1 Current Activities

CMM 3.3	MAT	Establish a framework for sustainable aquaculture by 2007	• All future proposals of land based aquaculture to Local Government Authorities to undergo land capability assessment • Support ongoing research into sustainable aquaculture • Consider suitable area/s for land based aquaculture with land/sea areas zoned for special use for aquaculture activities

Non-NHT Project
➢ Aquaculture proposals in Marine Parks (3 metro parks) require independent assessment through MPRA (CALM).

5.4.3.2 Adequacy

- Not adequate.
- Consider the Federal framework.
- Should be State Government assessment.

5.4.3.3 Gaps

- Social assessments need consideration in assessments of aquaculture proposals (eg: conflict of interest with well used recreational beaches – swimming and families versus fish farms).
- Consider involvement with Indigenous Aquaculture Unit (DAFF) and Aquaculture Council of WA (WAFIC).

5.4.3.4 Response

Framework for Sustainable Aquaculture (i.e. covering CMM3.3)

- Scope existing frameworks for sustainable aquaculture.
- Review of WA processes and gap analysis (eg: social issues).
- Produce draft framework; consult on.
- Finalise with consultation.
- Project Partners:
- Department of Fisheries;
- CALM;
- Indigenous Aquaculture Unit (DAFF).
- Funding from NHT under Strategic Reserve.

5.4.4 CMM3.4 100% of marine threatened species identified with recovery plans established by 2009.

5.4.4.1 Current Activities

CMM 3.4	MAT	100% of marine threatened species identified with recovery plans established by 2009	• Implement existing recovery plans for threatened species (State and Federal-listed species) • Support the development of recovery plans for threatened and significant species • Establish regional agreement about future suitable locations and practices/guidelines of marine based aquaculture activities **(NB: should this be under third dot point of CMM 3.3?)**.

Non-NHT Projects
➢ DEM (Commonwealth) / CSIRO / CALM.
➢ Of concern in Swan: Little Penguin monitoring, migratory bird populations and Australian Sea lions.

5.4.4.2 Adequacy

- Not adequate.

5.4.4.3 Gaps

- Currently very few WA species are listed as threatened.
- Priorities would be to **get** WA endemics and threatened species actually **listed**.
- Regional agreement for future suitable locations, practices and guidelines for marine based aquaculture activities belongs in MAT CMM3.3 above.

5.4.4.4 Response

Marine Threatened Species Project

- Get suspected threatened species listed. (Do this through baseline data collection to determine status).
- Develop recovery plans.
- Propose implementation methods for recovery plans.
- Project partners:
- all state agencies; Aquaculture Council, DPI, CALM, Department of Fisheries, Universities, Conservation Council, WWF, TSN, SeaNet.
- Funding from NHT under Strategic Reserve**.**

Swan Region Strategy for Natural Resource Management

INVESTMENT PLAN TECHNICAL REPORT No 5

PROJECT FUNDING PRIORITIES WORKSHOP

CONTENTS

TABLES

PROJECT FUNDING PRIORITIES WORKSHOP
Dec 17th 2004

1. INTRODUCTION

The methodology of the *Swan Region Strategy for Natural Resource Management Investment Plan* is set out in the *Investment Plan Main* Report, Part B Section 3.

This volume presents results of the *Projects Funding Priorities Workshop* held on December 17th 2004. A report on the full Workshop Proceedings, including all comments received, has been supplied to the Swan Catchment Council.

Previous workshops had:

- Assessed the relative returns from investment across assets and threats identified in the Strategy (Technical Report No 2)
- Assessed overall priorities for investment across the seven Strategy Themes (Technical Report No 3)
- Compared the Management Actions listed in the Strategy with current activity, identified gaps and proposed projects to address gaps and inadequacies. Appropriate fund sources were identified for the projects. (Technical Report No 4)

Thus, the *Projects Funding Priorities Workshop* was the culmination of an intensive process that led to a candidate set of projects for NHT2 funding. Project abstracts used in the workshop are given later in this report. Technical Report No 6 has a full set of Project Statements.

The workshop was attended by Swan Catchment Council members, Sub Regional Coordinators, plus a small number of key stakeholders from the three tiers of government.

The aim of the workshop was to determine a suite of projects suitable for development for NHT2 funding. By the end of the workshop, participants had:

- become aware of the technical reviews of existing NHT projects and the project areas generated from the Investment Planning Program Workshops;
- determined priorities for projects within programs;
- determined a suite of projects across programs; and
- provided comment on the further development of the selected projects.

Participants received a full briefing on each of the project areas that had been developed, as a result of the previous investment planning workshops.

The briefing included:

- title and management action target addressed;
- project description;
- budget;
- attributes; and
- technical assessment rating.

Participants were asked to select a "shopping basket" of projects to a maximum of $1,142,000 in Year 1 and to a maximum of $2,508,000 in Year 2.The conditions set for the selection of the recommended suite of projects were that:

- Must be at least one project from each program.
- Must total to within 10% of the maximum funding for each year.
- Consider impact, sequencing and other attributes.
- Choose whether to start a project in Year 1 or Year 2 (as funds for the current financial year will be received in May 2005 and funds for Year 2 can be accessed in July 2005).

The results were tallied for all projects in order to:

- Give the recommended suite for NHT funding proposals.
- Establish a priority beyond the NHT suite for other sources of funding, including Strategic Reserve, Cross Regional funding and Investment Plan funding.

2. PROJECTS CONSIDERED AND THEIR COSTS

A total of 30 projects were considered in the Funding Priorities Workshop, of which five had NHT2 funding guaranteed for 2004-05. One further project -*Education, Training and Technical Support Water*- was a replacement for two projects currently funded by NHT (*Ribbons of Blue* and *Community Education for River Restoration and Groundwater Protection*).

Another NHT-supported project, *Beach Health*, is funded separately by NHT2 and was not considered in the Funding Priorities Workshop.

Table 1 shows the projects and their costs in the first two years (2004-05 and 2005-06), as presented at the workshop. Subsequently, following the workshop, project budgets were adjusted in response to a revision in total NHT2 funding, so the project costs shown below differ in some cases from the final cost data given in the Investment Plan Main Report.

Table 1: Costs of Candidate Projects to NHT2 Regional Funds in 2004-05 and 2005-06 ($)

No	Title	Year 1	Year 2
Coastal & Marine:			
1	Coastal Condition Evaluation	80,000	20,000
2	Coastal Targets	100,000	
3	Marine Fauna Mapping	120,000	200,000
	*Total Coastal & Marine****	*300,000*	*220,000*
Integrated Water Management:			
4	Canning Environmental Flows*	0	152,000
5	Swan-Canning Foreshore Assessment*	0	150,000
6	Water Quality Monitoring & Evaluation Framework	350,000	350,000
7	Wetland Watch Continuation, plus Incentives through SALP	190,000	190,000
8	Extension to Perth Biodiversity Project to Wetlands	80,000	80,000
9	Education, Training & Technical Support – Water**	0	165,000
10	Sediment Sourcing Study	75,000	
	Total Integrated Water Management	*695,000*	*1,087,000*
Natural Diversity:			
11	Western Swamp Tortoise Recovery Plan* (a)	0	120,000
11	Western Swamp Tortoise Recovery Plan (b)	0	240,000
12	Threatened Ecological Communities of the Swan Coastal Plain*	0	196,000
13	Perth Biodiversity Project*	0	355,000
14	Dieback Working Group*	0	106,000
15	Biodiversity Action Learning Program	100,000	300,000
16	Predictive Mapping Tool for Threatened Species & Communities	160,000	160,000
17	Weeds & Pests Officer	0	100,000
18	Carnaby's Cockatoo Recovery Project	65,000	65,000
19	Recovery of Threatened Terrestrial Fauna of the Swan Region	70,000	90,000
20	Recovery of Threatened Flora of the Swan Region	110,000	100,000
21	Perth Fungi Project	175,000	175,000
22	Guidelines for Rural Landscaping	30,000	*0*
23	Soil Microbiology Studies	170,000	170,000
30	Skills for Nature Conservation		101,000
	Total Natural Diversity	*880,000*	*2,158,000*

Cont:

No	Title	Year 1	Year 2
Sustainability – Light Industry:			
24	Waste Management Survey Benchmarking	50,000	*0*
25	Light Industry Emission Study	50,000	50,000
26	SME Tracking & Auditing	30,000	
	Total Light Industry	*130,000*	*50,000*
Broad Acre Agriculture and Intensive Horticulture:			
27	Multi-User Decision Support Tool for Salinity	110000	20000
28	Large Scale Remediation Project in the Avon-Upper Swan	500,000	500
29	Linking Best Management Practices with Property Planning	250,000	120
	Total Broadacre & Horticulture	*860,000*	*20,620*
	TOTAL PROJECT COSTS ABOVE	2,865,000	3,415,620
	TOTAL INDICATIVE BUDGET	1,142,000	2,508,000

Notes:

* Denotes projects with NHT2 support guaranteed for 2004-05.

** Replaces two Projects with NHT2 support guaranteed for 2004-05: (i) Ribbons of Blue, and (ii) Community Education for River Restoration and Groundwater Protection.

*** Excludes the Beach Health project, which has NHT2 support guaranteed for 2004-05.

3. PARTICIPANT RATINGS

Table 2 through Table 5 give project rankings according to the number of participants selecting each project.

The first two of these tables give the overall rankings in Year 1 (2004-05) and Year 2 (2005-06). The results are self-explanatory. Some general observations are as follow.

- Overall, there is a strong correlation between the rankings obtained for the two years, because most of the projects required selection in both years. This applied even if in some cases the funding required in Year 1 was zero: e.g. existing NHT2 projects that required no further funds for 2004-05. The explanation for a high ranking in one column and a low ranking in another is that some projects only required one year's funding, or could be delayed. Participants then had the choice of placing the project either in Year 1 or Year 2. Usually, more chose Year 2, because the available total budget was larger.
- All existing NHT2-funded projects were ranked equal to or higher than the median score in both years (this was 10 votes in Year 1, and 11 votes in Year 2).
- Proposed extensions of existing NHT2-funded projects that were supported above the median score were (i) *Perth Biodiversity Project* extension to deal more effectively with wetland environments, (ii) *Wetland Watch* extensions to link to the Swan-Alcoa Landcare Program and incorporate incentives
- Strongly supported projects that are ***not*** currently receiving NHT2 funding were (i) *Water Quality Monitoring & Evaluation Framework*, (ii) *Small and Medium Enterprise Tracking and Auditing*, (iii) *Multi-User Decision Support Tool for Salinity*, (iv) *Coastal Condition Evaluation*, (v) *Marine Fauna Mapping*, (vi) *Predictive Mapping Tool for Threatened Species and Communities*, (vii) *Recovery of Threatened Flora of the Swan Region, and (viii) Biodiversity Action Learning Program*

Table 2: Projects Ranked by the Number of Participants Selecting the Project for Year 1

No.	Projects	**Yr1**	Yr 2
6	Water Quality Monitoring & Evaluation Framework	**19**	19
7	Wetland Watch continuation with inclusion of incentives through SALP	**19**	21
13	Perth Biodiversity Project	**19**	20
14	Dieback Working Group	**18**	19
5	Swan-Canning Foreshore Assessment	**17**	18
4	Canning Environmental Flows	**16**	18
26	SME Tracking and Auditing	**16**	1
9	Education, Training & Technical Support	**15**	17
30	Skills for Nature Conservation	**15**	17
27	Multi-user Decision Support Tool for Salinity	**14**	13
1	Coastal Condition Evaluation	**13**	14
3	Marine Fauna Mapping	**13**	14
11 a	Western Swamp Tortoise Recovery Plan (a)	**11**	11
16	Predictive mapping planning tool for threatened species and communities	**11**	13
20	Recovery of Threatened Flora of Swan Region	**11**	11
2	Coastal Strategies and Plans	**10**	4
12	Threatened Ecological Communities of the Swan Coastal Plain	**10**	15
19	Recovery of Threatened Terrestrial Fauna of Swan Region	**10**	11
24	Waste Management Survey – Benchmarking	**10**	2
15	Biodiversity Action Learning Program	**9**	11
25	Light Industry Emission Study	**9**	9
8	Extension of Perth Biodiversity Project to include wetlands	**8**	11
18	Carnabys Cockatoo Recovery Project	**7**	7
21	Perth Fungi Project	**4**	6
29	Linking Best Management Practices with Property Planning	**4**	10
10	Sediment Sourcing Study	**2**	4
22	Guidelines for Rural Landscaping	**2**	0
11 b	Western Swamp Tortoise Recovery Plan (b)	**1**	3
23	Soil Micribiology Studies	**1**	1
28	Large Scale Remediation Project in the Avon-Upper Swan	**1**	10
17	Weeds and Pests Officer	**0**	9

Table 3: Projects Ranked by the Number of Participants Selecting the Project for Year 2

No.	Projects	Yr 1	**Yr 2**
7	Wetland Watch continuation with inclusion of incentives through SALP	19	**21**
13	Perth Biodiversity Project	19	**20**
6	Water Quality Monitoring & Evaluation Framework	19	**19**
14	Dieback Working Group	18	**19**
4	Canning Environmental Flows	16	**18**
5	Swan-Canning Foreshore Assessment	17	**18**
9	Education, Training & Technical Support	15	**17**
30	Skills for Nature Conservation	15	**17**
12	Threatened Ecological Communities of the Swan Coastal Plain	10	**15**
1	Coastal Condition Evaluation	13	**14**
3	Marine Fauna Mapping	13	**14**
16	Predictive mapping planning tool for threatened species and communities	11	**13**
27	Multi-user Decision Support Tool for Salinity	14	**13**
8	Extension of Perth Biodiversity Project to include wetlands	8	**11**
11 a	Western Swamp Tortoise Recovery Plan (a)	11	**11**
15	Biodiversity Action Learning Program	9	**11**
19	Recovery of Threatened Terrestrial Fauna of Swan Region	10	**11**
20	Recovery of Threatened Flora of Swan Region	11	**11**
28	Large Scale Remediation Project in the Avon-Upper Swan	1	**10**
29	Linking Best Management Practices with Property Planning	4	**10**
17	Weeds and Pests Officer	0	**9**
25	Light Industry Emission Study	9	**9**
18	Carnabys Cockatoo Recovery Project	7	**7**
21	Perth Fungi Project	4	**6**
2	Coastal Strategies and Plans	10	**4**
10	Sediment Sourcing Study	2	**4**
11 b	Western Swamp Tortoise Recovery Plan (b)	1	**3**
24	Waste Management Survey – Benchmarking	10	**2**
23	Soil Micribiology Studies	1	**1**
26	SME Tracking and Auditing	16	**1**
22	Guidelines for Rural Landscaping	2	**0**

Table 4 and Table 5 show the results of rankings within programs. Notable are:

- A preference for delaying the *Coastal Strategies and Plans* Project (setting of marine targets) until the Coastal Condition and Marine Fauna Mapping projects are completed
- Strong support for the new Water Quality Monitoring and Evaluation Project in the Water Program, but otherwise a strong preference to keep or extend the existing NHT2 projects rather than embark on new projects such as the proposed Sediment Sourcing Study.
- There was a similar preference to keep and/or extend existing NHT2 projects in the Natural Diversity area, except that a proposed extension of the Western Swamp Tortoise project received little support. Three new projects received strong support (above the median) : (i) *Predictive Mapping Tool for Threatened Species and Communities,* (ii) *Recovery of Threatened Flora of Swan Region,* and (iii) *Recovery of Threatened Terrestrial Fauna of Swan Region.* The first of these three is an attempt to be pro-active in protecting natural diversity within the planning process, and the other two are extensions of the existing NHT2-funded *Threatened Ecological Communities* Project, to deal with individual species on- and off reserves. Two further Natural Diversity projects scored just below the median, namely: (i) *Carnabys Cockatoo Recovery Project*, and (ii) *Perth Fungi Project*.
- Sustainable Production initiatives in the area of small and medium industrial enterprises were supported for Year 1, at around the median level The air emission study was mandatory for participants to choose, because of the rule that at least one project should be selected for each Strategy Theme. There was also support at around the median level for the initiatives in broad acre and intensive agriculture.

Table 4: Projects Ranked Within Programs, According to the Number of Participants Selecting Each Project in Year 1

No.	Projects	**Yr 1**	Yr 2
COASTAL AND MARINE			
1	Coastal Condition Evaluation	**13**	14
3	Marine Fauna Mapping	**13**	14
2	Coastal Strategies and Plans	**10**	4
INTEGRATED WATER MANAGEMENT			
6	Water Quality Monitoring & Evaluation Framework	**19**	19
7	Wetland Watch continuation with inclusion of incentives through SALP	**19**	21
5	Swan-Canning Foreshore Assessment	**17**	18
4	Canning Environmental Flows	**16**	18
9	Education, Training & Technical Support	**15**	17
8	Extension of Perth Biodiversity Project to include wetlands	**8**	11
10	Sediment Sourcing Study	**2**	4
NATURAL DIVERSITY			
13	Perth Biodiversity Project	**19**	20
14	Dieback Working Group	**18**	19
11 a	Western Swamp Tortoise Recovery Plan (a)	**11**	11
16	Predictive mapping planning tool for threatened species and communities	**11**	13
20	Recovery of Threatened Flora of Swan Region	**11**	11
12	Threatened Ecological Communities of the Swan Coastal Plain	**10**	15
19	Recovery of Threatened Terrestrial Fauna of Swan Region	**10**	11
15	Biodiversity Action Learning Program	**9**	11
18	Carnabys Cockatoo Recovery Project	**7**	7
21	Perth Fungi Project	**4**	6
22	Guidelines for Rural Landscaping	**2**	0
11 b	Western Swamp Tortoise Recovery Plan (b)	**1**	3
23	Soil Micribiology Studies	**1**	1
17	Weeds and Pests Officer	**0**	9
SUSTAINABILITY – LIGHT INDUSTRY			
26	SME Tracking and Auditing	**16**	1
24	Waste Management Survey – Benchmarking	**10**	2
25	Light Industry Emission Study	**9**	9
BROADACRE & INTENSIVE HORTICULTURE			
27	Multi-user Decision Support Tool for Salinity	**14**	13
29	Linking Best Management Practices with Property Planning	**4**	10
28	Large Scale Remediation Project in the Avon-Upper Swan	**1**	10
OTHER			
30	Skills for Nature Conservation	**15**	17

Table 5: Projects Ranked Within Programs, According to the Number of Participants Selecting Each Project in Year 2

No.	Projects	Yr 1	**Yr 2**
COASTAL AND MARINE			
1	Coastal Condition Evaluation	13	**14**
3	Marine Fauna Mapping	13	**14**
2	Coastal Strategies and Plans	10	**4**
INTEGRATED WATER MANAGEMENT			
7	Wetland Watch continuation with inclusion of incentives through SALP	19	**21**
6	Water Quality Monitoring & Evaluation Framework	19	**19**
4	Canning Environmental Flows	16	**18**
5	Swan-Canning Foreshore Assessment	17	**18**
9	Education, Training & Technical Support	15	**17**
8	Extension of Perth Biodiversity Project to include wetlands	8	**11**
10	Sediment Sourcing Study	2	**4**
NATURAL DIVERSITY			
13	Perth Biodiversity Project	19	**20**
14	Dieback Working Group	18	**19**
12	Threatened Ecological Communities of the Swan Coastal Plain	10	**15**
16	Predictive mapping planning tool for threatened species and communities	11	**13**
11 a	Western Swamp Tortoise Recovery Plan (a)	11	**11**
15	Biodiversity Action Learning Program	9	**11**
19	Recovery of Threatened Terrestrial Fauna of Swan Region	10	**11**
20	Recovery of Threatened Flora of Swan Region	11	**11**
17	Weeds and Pests Officer	0	**9**
18	Carnabys Cockatoo Recovery Project	7	**7**
21	Perth Fungi Project	4	**6**
11 b	Western Swamp Tortoise Recovery Plan (b)	1	**3**
23	Soil Micribiology Studies	1	**1**
22	Guidelines for Rural Landscaping	2	**0**
SUSTAINABILITY – LIGHT INDUSTRY			
25	Light Industry Emission Study	9	**9**
24	Waste Management Survey – Benchmarking	10	**2**
26	SME Tracking and Auditing	16	**1**
BROADACRE & INTENSIVE HORTICULTURE			
27	Multi-user Decision Support Tool for Salinity	14	**13**
28	Large Scale Remediation Project in the Avon-Upper Swan	1	**10**
29	Linking Best Management Practices with Property Planning for Intensive Agriculture	4	**10**
OTHER			
30	Skills for Nature Conservation	15	**17**

4. COSTS OF RECOMMENDED PROJECTS

4.1 Procedure

The procedure for selecting projects for inclusion in the NHT2 bid was:

- Projects were ranked according to their votes and their costs were accumulated, then
- A cut-off point was defined where the cumulative costs reached the budget constraint, set equal to the balance of NHT2 indicative funds available in 2004-05 and the indicative total regional funds in 2005-06.

4.2 Results

The resulting financial requirement at Delivery Program Level is shown in Table 6, and projects selected within each Program are shown in Table 7 through Table 10.

Table 6: Recommended NHT2 funding for projects selected by the Funding Priorities Workshop ($)

Delivery Program	Year 1	Year 2
Coastal and Marine	200,000	220,000
Integrated Water Management	540,000	1,087,000
Natural Diversity	270,000	1,528,000
Sustainable Production	140,000	20,000
Cultural Heritage		
Total	1,150,000	2,855,000

Note: Excludes NHT2 funds that have already been allocated for 2004-05.

Table 7: Project Selections for Coastal and Marine Delivery Program

Project No	Title	Cost of Selected projects		Number of Participants Selecting the Project	
		Year 1	Year 2	Year 1	Year 2
1	Coastal Condition Evaluation	80,000	20,000	13	14
2	Coastal Targets	0	0	10	4
3	Marine Fauna Mapping	120,000	200,000	13	14
	Total Coastal and Marine	200,000	220,000		

Note: Excludes Beach Health project (funded from other NHT source)

Table 8: Project Selections for Integrated Water Management Delivery Program

	Title	Cost of Selected Projects ($)		Number of Participants Selecting the Project	
		Year 1	Year 2	Year 1	Year 2
4	Canning Environmental Flows	0	152,000	16	18
5	Swan-Canning Foreshore Assessment	0	150,000	17	18
6	Water Quality Monitoring & Evaluation Framework	350,000	350,000	10	19
7	Wetland Watch Continuation, plus Incentives through SALP	190,000	190,000	19	21
8	Extension to Perth Biodiversity Project to Wetlands	0	80,000	8	11
9	Education, Training & Technical Support - Water	0	165,000	15	17
10	Sediment Sourcing Study	0	0	2	4
	Total Integrated Water Management	540,000	1,087,000		

Table 9: Project Selections for the Natural Diversity Delivery Program

Project No	Title	Cost of Selected projects		Number of Participants Selecting the Project	
		Year 1	Year 2	Year 1	Year 2
11	Western Swamp Tortoise Recovery Plan (a)	0	120,000	11	11
11	Western Swamp Tortoise Recovery Plan (Expanded) (b)	0	0	1	3
12	Threatened Ecological Communities of the Swan Coastal Plain	0	196,000	10	15
13	Perth Biodiversity Project	0	355,000	19	20
14	Dieback Working Group	0	106,000	18	19
15	Biodiversity Action Learning Program	0	300,000	9	11
16	Predictive Mapping Tool for Threatened Species & Communities	160,000	160,000	11	13
17	Weeds & Pests Officer	0	0	0	9
18	Carnaby's Cockatoo Recovery Project	0	0	7	7
19	Recovery of Threatened Terrestrial Fauna of the Swan Region	0	90,000	10	11
20	Recovery of Threatened Flora of the Swan Region	110,000	100,000	11	11
21	Perth Fungi Project	0	0	4	6
22	Guidelines for Rural Landscaping	0	0	2	0
23	Soil Microbiology Studies	0	0	1	1
30	Skills for Nature Conservation	0	101,000	15	17
	Total Natural Diversity	270,000	1,528,000		

Table 10: Project Selections for the Sustainable Production Delivery Program

Project No	Title	Cost of Selected Projects ($)		Number of Participants Selecting the Project	
		Year 1	Year 2	Year 1	Year 2
	Light Industry:				
24	Waste Management Survey Benchmarking	0	0	10	2
25	Light Industry Emission Study	0	0	9	9
26	SME Tracking & Auditing	30,000	0	16	1
	Total Light Industry	30,000	0		
	Broadacre Agriculture & Intensive Horticulture:				
27	Multi-User Decision Support Tool for Salinity	110,000	20,000	14	13
28	Large Scale Remediation Project in the Avon-Upper Swan	0	0	1	10
29	Linking Best Management Practices with Property Planning	0	0	4	10
	Total Broadacre Agriculture & Intensive Horticulture	110,000	20,000		
	Total Sustainable Production	140,000	20,000		

Swan Region Strategy for Natural Resource Management

INVESTMENT PLAN TECHNICAL REPORT NO 6

Project Statements

CONTENTS

INTRODUCTION

Overview

This Volume contains Project Statements for all projects that are proposed for NHT2 funding. At an early stage in development of the Investment Plan the Statements were used to make an assessment of existing NHT-funded projects. Following the "Gaps" Workshops (see Technical Report No 4) a number of new projects were put forward. Project abstracts were written for these after discussion with Technical Panels. These were presented to the Swan Catchment Council's *Project Funding Priorities Workshop* held on December 17th 2004. Full Project Statements were then developed for successful the new projects, and are included in this Volume. Statements have been included only for those projects proposed for NHT2 funding within the 100% Indicative Allocation limit. Projects that could be brought forward for an increased allocation are described in the Investment Plan Main Report Part C: *Regional Delivery Programs*. In the event of increased funding full Statements will be prepared as a part of the Swan Catchment Council's procedure for approval.

The Table of Contents, above, lists the projects, which are grouped within Regional Delivery Programs. The Implementation Frameworks for each Regional Delivery Program are also included as "projects".

Financial Data

Financial data given in this Volume are as supplied by the project proponents.

Template

Each Project Statement follows a standard template, which was used by the Investment Plan development team and Technical Assessment Panels to advise the Swan Catchment Council Workshops. The template was as follows.

1. Project Title

2. Summary

Provide a brief summary of the project. What assets and threats does it address, by what means, and in what locations. What are the expected results?

3. Why is this a Priority Project?

Say how the project relates to the prioritised management actions in Chapters 7 to 12 of the *Swan Region Strategy for Natural Resource Management: Investment Plan.* Briefly explain the "big picture" and whether this project either complements or is essential to other governmental, private sector or community activities that are underway to protect the particular asset. What "leverage" does the project exert?

4. Past Achievements

How long has the project been running? What are its achievements so far? Emphasise substantive *outcomes* (e.g. species or hectares protected, km of foreshore rehabilitated, better organisational arrangements effected, plans produced) rather than *outputs* (e.g. number of workshops, open days held).

5. Incorporation of NHT Principles

Describe how this project incorporates the NHT2 Investment Principles given in the table below.

(1) Generates the greatest public benefits per dollar of public investment.	
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	
(3) Investment should not exceed the public benefits that result.	
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback	
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	

6. Work Program

7. How the project has been designed and developed

8. Partners

List all partners who contribute in cash or kind. What other activities are *directly* linked to this project in an operational sense?

9. Management Structure

10. Outputs and Timelines

11. Milestones

12.Expected Outcomes for Natural Resource Condition

Be as specific as you can.

13. Risk Factors

Describe both “internal” risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and “external risks” (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).

14. Scope for Project Expansion or Contraction

Geographical scope, the number of management actions incorporated in the project, range of assets addressed, financial, human resources, period of time allowed for the project.

15. Cost

Show the total inputs to the project (both NHT2 and Non-NHT2), and the funds sought from NHT2 for the following periods:

- First 6 months (Jan-June 2005)
- 2005-06
- 2006-07

16. Estimated Total Investment Influenced by the Project

17. Cost Effectiveness

Why is the project a cost-effective way of addressing the threat to asset value?

18. Long Term Strategy

Can the project’s aims and methods be further developed?

19. For how long will this kind of project be needed?

20. Can the project become financially self-sustaining?

E.g. what plans are there to diversify funding sources?

21. Can the project become socially self-sustaining?

E.g. what actions are in place to extend active partnerships involved with the project?

NATURAL DIVERSITY REGIONAL DELIVERY PROGRAM

1. PROJECT ND01: PERTH BIODIVERSITY PROJECT

Long Title: Protection and Management of Significant Natural Areas in the Swan Region

1.1 Summary

The Project assists Local Governments to use local biodiversity planning tools to identify, protect and manage significant natural areas across the Swan region. Natural areas can be areas of native vegetation, vegetated or open water bodies (lakes, swamps), waterways (rivers, creeks and estuaries), springs, rock outcrops, bare ground (generally sand or mud), caves and coastal dunes or cliffs. Emphasis is placed on the ecological assessment of natural areas, land use planning process, reserve management and the offering of incentives to private landholders.

This project addresses the key assets under the Biodiversity Theme of retention and preservation of areas of high natural diversity and endemic landform/soil/vegetation complexes along with ecosystem integrity. Freshwater lakes and wetlands (Water Theme) and terrestrial coastal habitats (Coastal and Marine Theme) assets will also be addressed by the project.

Biodiversity decline, ecosystem fragmentation, habitat loss, native vegetation loss (particularly threatened native vegetation loss), and invasive exotic plants are the key biophysical threats that will be addressed by this project. All of these threats are listed as key areas of investment in the Biodiversity Theme (Table 1) and, in addition, are listed as key investment areas in one or more of the other themes (Tables 2 - 5).

The Project enables Local Governments to identify the highest value natural diversity areas by the consistent use of local significance criteria (as per the Swan strategy) and by setting targets for the protection and retention of these natural areas. The setting of targets is done within a local and regional context therefore contributing to the regional resource condition targets for Native Vegetation Communities Integrity and Significant Species and Ecological Communities. Ecosystem integrity will also be addressed during the local biodiversity planning process with Local Governments identifying ecological linkages, as per the Biodiversity Planing Guidelines.

Resource condition assessments, done with the PBP Natural Areas Initial Assessment template, will enable Local Government to identify priority on-ground actions required to address threats in local, public reserves, such as exotic plant invasions, to the highest priority regionally or locally significant natural areas. All investments into on-ground management of high priority natural areas are made on public assets

Since this project is focused on building the capacity of Local Government to undertake biodiversity planning it will also address some of the key social threats including a lack of political will (Biodiversity Theme), inadequate coordination of government and community and the non-acceptance of NRM principles (Regional Capacity theme).
Local Governments on the periphery of the region with high land development threats to natural areas are targeted. Local biodiversity planning will be strongly promoted to these Local Governments and their communities. A series of workshop sessions to build wider understanding of the benefits of local biodiversity planning will be conducted.

Delivery of this Project is in partnership with thirty-one of the Region's Local Governments, State Government (Department of Environment, Department for Planning and Infrastructure and Department of CALM), and non-government groups such as Greening Australia (WA) and Birds Australia. Greater interaction with Swan sub-regional staff and community groups is proposed, especially through access to information and training.

1.2 Relationship to Swan Strategy key investment needs

1.2.1 Biodiversity Theme

Table 1: Key areas of nrm investment for averting threats to biodiversity values.

	Investment Target Forests & Woodlands	%	Investment Target Terrestrial Biodiversity	
1	Native vegetation clearing or loss	17.4	Native vegetation clearing or loss	13.2
2	Biodiversity decline	14.7	Biodiversity decline	12.6
3	Exotic Plants	9.2	Ecosystem fragmentation	12.3
4	Ecosystem fragmentation	8.3	Exotic Plants	8.3
5	Habitat loss	8.3	Habitat loss	7.6
6	Political will (lack of)	7.3	Ignorance, negligence, intolerance	7.0
7	Diseases -plants	5.5	Political will (lack of)	6.0
8	Ignorance, negligence, intolerance	4.6	Inadequate coordination of government & community activity	4.3
9	Infrastructure development	3.7	Exotic (feral) animals	4.0
10	Inadequate involvement of community or industry	3.7	Climate Change	3.6
11	Process disruption	2.8	Fire management regime	3.3
12	Fire management regime	2.8	Process disruption	2.6
13	Recreation & access	2.8	Diseases -plants	2.0
14	Inadequate coordination of government & community activity	2.8	Abstraction of water	2.0
15	Erosion & sedimentation	1.8	Infrastructure development	2.0
16	Chemical Contamination	0.9	Inadequate involvement of community or industry	2.0
17	Diseases -animals	0.9	Salinity	1.7
18	Exotic (feral) animals	0.9	Non-acceptance of NRM principles	1.3
19	Abstraction of water	0.9	Agricultural Management Practices	1.0
20	Non-acceptance of NRM principles	0.9	Recreation & Access	1.0
			Erosion & sedimentation	0.7
			Drainage modification	0.7
			Chemical Contamination	0.3
			Hydrological change	0.3
			Fossil fuels consumption	0.3
	Total	100.0	Total	100.0

1.2.2 Coast and Marine Theme

Table 2: Key areas of nrm investment for maintaining or enhancing coastal and marine values

	Investment Target	%
1	Biodiversity decline	13.1
2	Inadequate involvement of community or industry	9.7
3	Ignorance, negligence, intolerance	9.0
4	Recreation & Access	7.6
5	Inadequate coordination of government & community activity	6.9
6	Urban or Industrial Discharges	6.2
7	Exotic (feral) animals	5.5
8	Political will (lack of)	5.5
9	Erosion & sedimentation	4.8
10	Nutrient export & enrichment	4.8
11	Climate Change	4.1
12	Ecosystem fragmentation	4.1
13	Exotic Plants	4.1
14	Habitat loss	3.4
15	Infrastructure development	3.4
16	Chemical Contamination	2.8
17	Non-acceptance of NRM principles	2.8
18	Process disruption	2.1
	Total	100.0

1.2.3 Regional Capacity

Table 3: Key areas of nrm investment for maintaining or enhancing regional capacity for natural resource management (percentage of participants mentioning each issue in Workshop A)

	Investment Target	%
1	Ignorance, negligence, intolerance	17.9
2	Inadequate involvement of community or industry	17.1
3	Inadequate coordination of government & community activity	9.8
4	Nutrient export & enrichment	8.1
5	Non-acceptance of NRM principles	8.1
6	Biodiversity decline	6.5
7	Urban or Industrial Discharges	5.7
8	Political will (lack of)	4.9
9	Drainage modification	3.3
10	Native vegetation clearing or loss	3.3
11	Chemical Contamination	2.4
12	Habitat loss	2.4
13	Ecosystem fragmentation	1.6
14	Exotic Plants	1.6
15	Agricultural Management Practices	1.6
16	Erosion & sedimentation	0.8
17	Hydrological change	0.8
18	Process disruption	0.8
19	Salinity	0.8
20	Fire management regime	0.8

1.2.4 Water Theme

Table 4: Key areas of nrm investment for averting threats in urbanised areas

	Investment Target – Swan-Canning Estuary and Coastal Plain Streams	%		Investment Target – Freshwater Lakes	%		Investment Target – Darling Range Streams	%
1	Nutrient export & enrichment	14.8	1	Nutrient export & enrichment	11.6	1	Hydrological change	15.9
2	Urban or industrial discharges	12.7	2	Biodiversity decline	8.5	2	Drainage modification	13.6
3	Inadequate involvement of community or industry	6.9	3	Ecosystem fragmentation	7.9	3	Nutrient export & enrichment	11.4
4	Drainage modification	6.3	4	Native vegetation clearing or loss	6.7	4	Biodiversity decline	9.1
5	Erosion & sedimentation	5.3	5	Urban or Industrial Discharges	6.1	5	Erosion & sedimentation	9.1
6	Habitat loss	5.3	6	Infrastructure development	6.1	6	Ecosystem fragmentation	6.8
7	Ignorance, negligence, intolerance	5.3	7	Inadequate involvement of community or industry	6.1	7	Exotic Plants	6.8
8	Political will (lack of)	4.8	8	Habitat loss	5.5	8	Habitat loss	4.5
9	Agricultural Management Practices	4.2	9	Hydrological change	5.5	9	Abstraction of water	4.5
10	Biodiversity decline	3.7	10	Ignorance, negligence, intolerance	5.5	10	Urban or Industrial Discharges	4.5
11	Ecosystem fragmentation	3.7	11	Drainage modification	4.9	11	Native vegetation clearing or loss	4.5
12	Exotic Plants	3.7	12	Erosion & sedimentation	4.3	12	Political will (lack of)	4.5
13	Abstraction of water	3.7	13	Exotic Plants	4.3	13	Salinity	2.3
14	Hydrological change	2.6	14	Abstraction of water	4.3	14	Non-acceptance of NRM principles	2.3
15	Process disruption	2.6	15	Political will (lack of)	3.7		Total	100.0
16	Salinity	2.6	16	Chemical Contamination	2.4			
17	Recreation & access	2.6	17	Inadequate coordination of government & community activity	1.8			
18	Inadequate coordination of government & community activity	2.6	18	Climate Change	1.2			
19	Chemical Contamination	2.1	19	Agricultural Management Practices	1.2			
20	Non-acceptance of NRM principles	1.6	20	Exotic (feral) animals	0.6			
21	Acidification	0.5	21	Process disruption	0.6			
22	Climate change	0.5	22	Recreation & Access	0.6			
23	Diseases -plants	0.5	23	Non-acceptance of NRM principles	0.6			
24	Exotic (feral) animals	0.5		Total	100.0			
25	Infrastructure development	0.5						
	Total	100.0						

1.2.5 Land Theme

Table 5: Key areas of nrm investment for averting threats in urbanised areas

	Investment Target	%
1	Biodiversity decline	14.6
2	Native vegetation clearing or loss	14.6
3	Ecosystem fragmentation	9.4
4	Urban or Industrial Discharges	7.3
5	Infrastructure development	7.3
6	Political will (lack of)	7.3
7	Habitat loss	5.2
8	Climate Change	4.2
9	Nutrient export & enrichment	4.2
10	Drainage modification	4.2
11	Chemical Contamination	3.1
12	Ignorance, negligence, intolerance	3.1
13	Non-acceptance of NRM principles	3.1
14	Erosion & sedimentation	2.1
15	Inadequate coordination of government & community activity	2.1
16	Inadequate involvement of community or industry	2.1
17	Acidification	1.0
18	Diseases -plants	1.0
19	Exotic Plants	1.0
20	Process disruption	1.0
21	Abstraction of water	1.0
22	Fossil fuels consumption	1.0
	Total	100.0

1.3 Why this is a Priority Project

In 2001 there was approximately 266,000 ha of native vegetation mapped in the Perth Metropolitan Region, of this 190,000 ha existed in Bush Forever Sites, CALM estate and proposed regional parks. The decision making and management activities of local government have the potential to directly impact on the remaining 75,000 ha that are designated Local Natural Areas by the Perth Biodiversity Project. The long-term retention of Local Natural Areas is threatened by the fact that 58,000 ha exist on private land, of this 8,000 ha is zoned under the Metropolitan Region Scheme for intensive development (Urban, Urban Deferred or Industrial zoning).

Wetlands are a characteristic feature of the Swan Coastal Plain portion of the Perth Metropolitan Region, with approximately 80,000 ha of wetland remaining in a condition that supports a high to moderate level of biodiversity. The protection of these wetlands should be a high priority as over 80% of the wetlands on the Swan Coastal Plain have been lost or irreversibly degraded (EPA 1991). There are about 14,000 ha of mapped native vegetation associated with these wetlands. Native vegetation of wetlands is some of the most floristically diverse of all the vegetation in the Perth Metropolitan Region. In addition to the native vegetation associated with Perth's wetlands there is approximately 10,000ha of native vegetation located within 50m of waterways that provides important ecological linkage functions and other ecosystem services.

Local biodiversity planning is the only remaining process recognised by State Government that can be used to achieve significant retention and protection of these natural areas as Perth continues to grow. The Project is therefore essential to achieving the Region's natural diversity retention and protection targets.

The Project focuses on Local Governments given that they have a comprehensive role in biodiversity conservation through the land use planning process and the management of locally vested natural areas. It has also been shown in Perth that Local Governments will re-direct greater funding to biodiversity conservation if they are given direct and clear support and incentives that are tailored to the way they do business.

To reinforce the above, the development of local biodiversity plans and strategies and their incorporation into Town Planning Schemes has been identified in the Biodiversity Theme of the Investment Plan as being essential for the retention of native vegetation communities, significant species and ecological communities across the Swan.

Whilst supporting protection of natural areas, the project also supports the professional management of natural areas by Local Government. Local Governments in the Region have responsibility for managing over 8000 hectares of bushland, wetlands and other natural areas.

A template for the collection of ecological information has been created and will continue to be promoted widely across the region. This will enable land managers to identify management priorities, such as weed control, for individual natural areas and prioritise these works according to ecological significance and threat.

Tables 6 to 11 list how the components of the project relate to the prioritised management actions.

Table 6. Biodiversity Theme

Note: Those Management Actions that fall within the proposed work of the Perth Biodiversity Project over the next two and half-years are flagged with the PBP project component that directly relates to them, in bold.

REF	RANK	TARGET	MANAGEMENT ACTIONS
		MATTER FOR TARGET - NATIVE VEGETATION COMMUNITIES INTEGRITY	
BR1a **BR1b**		**The comprehensiveness, adequateness and representiveness (CAR) of the protected area system (including formal reserves and off-reserves) is improved by 50% by 2015 based on 2005 baseline data.** **Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020 based on 2005 baseline data.**	
			Resource Assessment
BM1.1	**12**	100% of priority areas in each IBRA sub region identified for inclusion into CAR system by 2005	• Review CAR system by major landform element in each IBRA sub region **(Local Biodiversity Planning Support - PBP Mapping)** • Develop natural diversity condition assessment framework and methodology **(Natural Area Initial Assessment Template; Reference Sites)** • Determine extent and condition of native vegetation complexes in each major landform element **(Local Biodiversity Planning Support - PBP Mapping; Natural Area Initial Assessment Template)** • Identify priority native vegetation complexes in each major landform element **(Local Biodiversity Planning Support - PBP Mapping; Natural Area Initial Assessment Template; Reference Sites)** • Determine priority natural diversity areas for inclusion to CAR reserve system **(Local Biodiversity Planning Support - PBP Mapping)** • Determine priority natural diversity areas for protection to be retained outside the CAR reserve system **(Local Biodiversity Planning Support - PBP Mapping)**
			Planning
BM1.2	**11**	25% of priority areas in each IBRA sub region have natural diversity conservation plans developed by 2006	• Review and prioritise existing conservation management actions for natural diversity areas, significant species populations, and threatened ecological communities **(Local Biodiversity Planning Support; Natural Areas Template)** • Identify new reserves for locally and regionally significant natural diversity areas based on biodiversity values and principles of ecological viability **(Local Biodiversity Planning Support; Natural Area Initial Assessment Template; Reference Sites)** • Review area management plans and threat abatement plans and practices for the reserve system (including formal reserves and off-reserves) **(Local Biodiversity Planning Support; Natural Area Initial Assessment Template)** • Develop guidelines and plans for sustainable natural diversity management • Commence Bush Forever Phase II
BM1.3	**9**	100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's natural diversity by 2006.	• Establish and gain agreement on an urban growth boundary. • Review land planning process and identify cleared land suitable for development • Review design codes for new urban areas **(BL sensitive subdivision Guidelines)** • Develop recommendations for local and regional structure planning processes **(Local Biodiversity Planning Support; Protecting biodiversity in TPS)** • Develop mechanisms to preferentially locate new developments on previously cleared land

REF	RANK	TARGET	MANAGEMENT ACTIONS
			• Develop area management plans **(Local Biodiversity Planning Support)** • Prepare local natural diversity strategies and action plans in accordance with *Local Government Natural diversity Planning Guidelines for Natural area Protection and Management*. **(Local Biodiversity Planning Support)**
			On-Ground Action
BM1.4	**6**	10 local natural diversity strategies for priority areas outside the CAR reserve system implemented by 2006.	• Develop and implement local natural diversity strategies for priority areas (**Natural Area Initial Assessment Template; On-ground works in LG reserves)** • Complete implementation of Bush Forever Phase I
			Capacity Building
BM1.5	**3**	30% increase in community participation in education, restoration, protection and management activities high priority native vegetation in the Region by 2009	• Develop and implement incentive mechanisms for private landholders to protect natural diversity (including formal mechanisms, such as conservation covenants, and informal agreements, such as Land for Wildlife) **(Local Biodiversity Planning Support to develop Incentive Strategies; Incentives)** • Develop regional information system to enhance natural diversity planning, management, monitoring and evaluation. **(Natural Areas Initial Assessment Databases)** • Continue and expand community natural diversity training programs (e.g. *Skills for Nature Conservation, Urban Nature, Land for Wildlife, Greater Gardens, Grow Us A Home*) **(Reference Sites - training; Natural Area Initial Assessment Template – training)** • Promote inclusion of natural diversity restoration and management training through tertiary institutions and TAFE's. • Develop natural diversity management operational policy and training programs for Local Government Authorities and State agencies with bushland management responsibilities. **(Local Biodiversity Planning Support – training; Capacity change/policy & political support; Building a Natural Areas Management Industry)**
		MATTER FOR TARGET – SIGNIFICANT SPECIES AND ECOLOGICAL COMMUNITIES	
BR2	**RCT**	**50% of critical habitat for identified significant species and ecological communities protected by 2014**	
			Resource Assessment
BM2.1	**10**	100% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005	• Develop methodology to identify significant species populations for monitoring, protection and habitat management. **(Natural Area Initial Assessment Template; Reference Sites; Bird Surveys)** • Initiate program for prioritisation of significant species and their conservation and management
			Planning
BM2.2	**5**	100% of all relevant NRM legislation and policy in state and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006	• Prepare local natural diversity strategies and action plans in accordance with *Local Government Natural diversity Planning Guidelines for Natural area Protection and Management.* **(Local Biodiversity Planning Support)** • Review and prioritise existing conservation management actions for significant species and threatened ecological communities, and threat abatement plans. • Develop recovery plans/interim recovery plans and threat abatement plans
			On-Ground Action
BM2.3	**13**	25% of all significant indigenous species have viable linkages established between populations over their original geographical extent by 2009	• Establish a regional ecological linkage program **(Local Biodiversity Planning Support - PBP Mapping)** • Establish mechanisms to protect areas required for ecological linkages. **(Local Biodiversity Planning Support; Protecting biodiversity in TPS)**

REF	RANK	TARGET	MANAGEMENT ACTIONS
			• Revegetate cleared areas designated as ecological linkages. • Implement local natural diversity strategies and action plans prepared in accordance with *Local Government Natural diversity Planning Guidelines for Natural area Protection and Management* **(Local Biodiversity Planning Support)**
BM2.4	**14**	100% of priority areas to be reconstructed as buffers to threatened ecological communities / vegetation complexes determined by 2006	• Develop and implement revegetation plans for reconstruction of buffers to threatened ecological communities / vegetation complexes
			Capacity Building
BM2.5	**4**	30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008	• Coordinate, facilitate and support community involvement (**Bird Surveys)** • Establish collaborative partnerships to ensure the conservation management and recovery planning of significant species and significant ecological communities • Develop partnerships to determine research project to develop a landscape plan for ecological linkages.
		MATTER FOR TARGET – ECOLOGICALLY SIGNIFICANT INVASIVE SPECIES	
BR3		**Reduction in impact of regionally significant invasive species by 2020 (with a quantified target set by December 2005)**	
			Resource Assessment
BM3.1	**1**	Identify, prioritise and set targets for the management of significant threatening species to natural diversity by 2005	• Identify priority weed species and determine percentage elimination, reduction and containment targets for priority weed populations **(Natural Area Initial Assessment Template; Reference Sites and plots)** • Determine percentage elimination, reduction and containment targets for Phytophthora cinnamomi (dieback) • Identify priority pest/feral species • Determine of percentage elimination, reduction, containment targets for priority ferals and pests
			Planning
BM3.2	**2**	100% of all priority feral pests and diseases have threat abatement plans established by 2006	• Develop threat abatement plans for feral animals and pests linked to National Threat Abatement Strategies • Develop management response improvements to ensure no new introduction of potential feral/pest animals/plants/disease
			On-Ground Action
BM3.3	**8**	15% reduction in the use of exotic species in urban landscaping by 2008	• Develop and implement guidelines for rural landscapers • Support implementation of *Local Plants Landscaping Policy and Landscaping with local plants guidelines for Local Government* • Implement priority programs for feral animal control by State and Local government and other stakeholders (eg western shield, and identified priority local and site feral animal control). • Regional implementation of State Weed Plan and Environmental Weed Strategy for Western Australia.
			Capacity Building
BM3.4	**7**	30% increase in the effectiveness of control programs for feral animals, pests and diseases by 2009	• Facilitate, coordinate and support community and stakeholder involvement in mitigation and remediation actions • Promote wider regional community, land manager and Local Government education and awareness and training programs on feral animal, pest and disease management • Provision of training in feral, pest animal and disease identification, mapping and management

Note: These tables contain the Management Actions, in all other themes, that fall within the proposed work of the Perth Biodiversity Project over the next two and half-years. Each action is flagged with the PBP project component that directly relates to them, in bold.

Table 7. Coastal and Marine Theme

REF	TYPE	TARGET	MANAGEMENT ACTION
			Resource Assessment
CMM1.1	**4**	100% of priority natural coastal areas identified and assessed by 2005	• Establish monitoring systems to collect/analyse baseline and trend data. **(For Coastal Areas - Natural Area Initial Assessment Template; Reference Sites and plots; Bird Surveys)**
			On-Ground Works
CMM1.4	**5**	20% increase in on-ground community environmental restoration programs addressing coastal dune wind erosion in priority areas by 2007	• Develop and implement local natural diversity strategies and revegetation works for priority areas **(Natural Area Initial Assessment Template; On-ground works in LG reserves)**
			Capacity Building
CMM1.5	**2**	30% increase in community participation in biodiversity education, mitigation and remediation actions by 2009	• Training and capacity building for Local Government Authorities and community on coastal biodiversity/ecology **(Natural Area Initial Assessment Template - training; Perth Region Plant Biodiversity Project Reference Sites and Plots - training)** • Continue to provide incentives for landholders and land managers such as the Swan Alcoa Landcare Program. **(Incentives)**

Table 8. Regional Capacity Theme

REF	RANK	TARGET	MANAGEMENT ACTIONS
			CAPACITY BUILDING
RCM1.4	**3**	Develop a regional capacity framework supported by an integrated regional management information system by 2006.	• Coordinate, support and motivate community and stakeholders through the regional Coordinators and facilitators network. (**Capacity change/policy & political support; Building a Natural Areas Management Industry)** • Coordinate an integrated regional education and training program addressing land, water and biodiversity and cultural heritage themes **(PBP training integrated into the regional education and training program)**

Table 9. Land Theme

REF	RANK	TARGET	MANAGEMENT ACTION
			Resource Assessment
LM1.1	**7**	Priority areas for salinity risk management established in the avon upper swan region by 2005.	• Identify priority areas for protection and remedial actions based on risk assessment, including areas of high biodiversity value, high value water resources, and land of high value for primary production. **(Local Biodiversity Planning Support - PBP Mapping; Natural Area Initial Assessment Template)**
LM2.1	**8**	Establish benchmarks and monitoring at representative sites for water erosion, waterlogging and acid sulfate soils by 2005.	• Identify priority areas for remedial actions based on risk assessment, including areas of high biodiversity value, high value water resources and land of high value for primary production. **(Local Biodiversity Planning Support - PBP Mapping; Natural Area Initial Assessment Template)**

Table 10. Water Theme

REF	RANK	TARGET	MANAGEMENT ACTION
			RESOURCE ASSESSMENT
WM1.1	2	100% of priority rivers and waterways in Region identified for protection by 2005	• Continue Foreshore Condition assessment project **(Natural Area Initial Assessment Template)**
			RESOURCE ASSESSMENT
WM2.1	2	100% of priority wetlands in Region identified for protection by 2005	• Consolidate baseline data and analyse priority wetland condition. **(Natural Area Initial Template; Perth Region Plant Biodiversity Reference Sites and Plots (more than 40 plots contain wetland plant communities))**
			PLANNING
WM2.2	**5**	100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's priority wetlands by 2006	• Undertake a strategic review of Planning Policies and include requirements for hydrological assessments of development proposals near priority wetlands **(Local Biodiversity Planning Support)**
			ON-GROUND ACTIONS
WM2.4	**3**	Develop and implement management restoration plans for priority wetlands by 2008	• Implement strategic programs in areas identified in WM2.1 to protect, manage and restore priority wetlands **(Natural Area Initial Assessment Template; On-ground works in LG reserves)**

Table 11. Cultural Heritage Theme

REF	RANK	TARGET	MANAGEMENT ACTION
			PLANNING
CH1.2	**3**	Review and identification of opportunities in policy and legislation to include Indigenous cultural heritage by 2009.	• Develop and promote inclusion of clauses relating to Indigenous cultural heritage in NRM related policies and legislation at local, state and national level. **(Local Biodiversity Planning Support)**

1.4 Past Achievements

The Perth Biodiversity Project commenced in late 2001. Major achievements to date:

- All thirty (31) Local Governments in Perth Metropolitan region are participating in the Project.
- Forty-two (42) on-ground and capacity building projects funded under devolved grants program: NHT investment in devolved grants program of $0.48 m attracted funding of $0.97 million from Local Governments, in addition to community involvement in projects. A total of 285 ha of remnant protection works were carried out whilst effective weed control was undertaken on 223 ha of bushland. Vegetation condition assessment was carried out on 4570 ha of bushland (283 sites).
- Key projects funded under devolved grants program:
  - ✓ Private land conservation incentives (Local Governments: Cockburn, Kwinana, Rockingham;

  - ✓ Biodiversity awareness training for Councillors and senior staff (Local Governments: Swan, Kalamunda, Mundaring, Bayswater, Belmont, Bassendean)
  - ✓ Local biodiversity planning trials (Local Governments: Swan and Serpentine-Jarrahdale)
  - ✓ Bushlinks: Linking biodiversity, community and Local Government (Local Governments: Wanneroo and Joondalup);
  - ✓ Ecological assessment of reserves (Local Governments: Wanneroo and Kwinana);
  - ✓ Weed mapping projects (Local Governments: Gosnells, Kalamunda)
  - ✓ Local Government Bushland management Leadership Pilot Program (Greening Australia and Local Governments: Swan, Serpentine-Jarrahdale, Canning, Melville, Nedlands, Gosnells)

- New native vegetation mapping produced to assist Local Government with local biodiversity planning. Maps distributed in hardcopy form to all Local Governments and to fifteen (15) Local Governments, 3 State Government agencies, and four (4) peak NGO's in digital form. Spatial datasets developed include:
  - ✓ Native Vegetation Extent by Administrative Planning Category
  - ✓ Native Vegetation Extent by Ownership Category
  - ✓ Native Vegetation Extent by Vegetation Complex
  - ✓ Native Vegetation Extent by MRS Zoning
  - ✓ Potentially Locally Significant Natural Areas (PLSNA's)
- Local Government Biodiversity Planning Guidelines produced and given in-principle endorsement by WA Local Government Association, Departments for Planning and Infrastructure, Environment and CALM and Federal Department of Environment and Heritage, Swan Catchment Council and South West Catchments Council.
- In partnership with Department of Environment and Department of CALM , establishment of the Perth Region Plant Biodiversity Project to make reference site and plot (floristic) information available to Local Government and the community.
- Memorandum of Understanding between the WA Local Government Association and individual Local Governments for the protection of native vegetation developed and signed by 28 Local Governments.
- Baseline established of the capacity of Perth's Local Governments to conserve biodiversity through a survey of 30 Local Governments.
- Lobbied State Government on behalf of private landholders for conservation zoned land to be exempt from Land tax.
- Local Government Natural Areas Managers Network set up by Local Government officers and coordinated by PBP meets monthly to discuss issues relating to the management of natural areas.
- Bird Surveys undertaken by Birds Australia in 70 Local Government reserves.

1.5 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	All project resources and funds directed to Local Government, often on projects in partnership with community. All support of on-ground activities relates to investment in bushland on local public reserves. Minor allocation to assist with start up of private conservation incentives. Previous devolved grants schemes run by the project have shown Local Governments in the Swan more than match NHT funds and that these schemes attract indirect extra investment. For example, five new positions, focused on natural areas, have been created in Local Government in the Swan region over the last 2 years. The project has also been able to engage significant community involvement in biodiversity activities (eg. Bird Survey Program).
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	The local biodiversity planning process developed takes a strategic approach to identifying areas of high biodiversity value and condition by the setting of ecological targets. Local Governments with the largest remaining biodiversity resources (outer region) are targeted due to largest scope to protect areas prior to, or as part of land development process.
(3) Investment should not exceed the public benefits that result.	Local Governments have a track record in matching any NHT investment with their own funds for both local biodiversity planning and on-ground works therefore contributing to the public benefits that will flow out of the planning process.
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	The local biodiversity planning process takes a strategic approach to identifying areas of high biodiversity value and condition by the setting of ecological targets.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	The assets this project targets are high priority public assets.
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Although the project would like all 30 Local Governments to undertake biodiversity planning it will strategically target outer metropolitan areas where land clearing for urban development is the key threat to biodiversity values.
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	All project components are piloted or tested before rolling out to all Local Governments. For example, the local biodiversity planning process is being piloted in two Local Governments.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	The Local Government Biodiversity Planning Guidelines use the setting of Local Government-wide on-ground natural area targets based on broad opportunities and constraints before on-ground assessment has taken place.

1.6 Work Program

P1 = First Six Months (Jan 1st – June 30th 2005)
P2 = Financial Year 2005-06
P3 = Financial Year 2006-07

Project Component	Activity	P 1	P 2	P 3
Local Government Biodiversity Planning Support	Continue assistance to 2 Local Governments - City of Wanneroo and Shire of Kalamunda (Pilot Program)			
	Commence assistance to 2 other Local Governments also preparing Local Biodiversity Strategies (out of Swan, Joondalup, Stirling, Cambridge)			
	Work with 3 other high priority Local Governments with aim of getting 2 commitments to local biodiversity planning in 2005/06 Council budgets			
	Provide assistance to 2 – 4 Local Governments as they go through Milestones 1 and 2 of the Biodiversity Planning Process			
	Develop and deliver a training workshop, targeted at Local Government Officers and elected members, on the Local Biodiversity Planing Guidelines.			
Local Government lands template assessment and use of native vegetation mapping	Assist managers of natural areas to apply the Natural Area Initial Assessment Template and to identify the priority on-ground actions needed to address threats to the highest priority significant regional or local natural areas (includes wetlands) within their area			
	Provide regional native vegetation mapping and information CD to Reserve Friends Groups and other community groups; provide training if required			
On-ground works in Local Government reserves	Assist Local Governments to prioritise management actions after reserve assessment and assist in development of on-ground projects eligible for application to targeted grant program.			
	Manage a targeted grants program that will provide funds to Local Government to undertake on-ground actions to address the threats to the highest priority regional or local natural areas within their area.			
Local natural area databases	Trial use of databases across 2 Local Governments			
	Refine database based on trial results and redistribute to the 2 Local Governments participating in the trial			
	Distribute and support the use of the database across all 31 Local Governments			
Perth Region Plant Biodiversity Project (a collaborative DoE/CALM/PBP project)	Develop a new partnership agreement with DoE and CALM to initiate Phase 2 of the Perth Region Plant Biodiversity Project (PRPBP)			
	Distribute the Swan Coastal Plain Plant Biodiversity Reference Site Files and Local Government Area Plant Biodiversity Summary Files developed in Phase 1 of the PRPBP to Local Government and other key stakeholders			
	Complete compilation of Local Government Area Plant Biodiversity Summary Files for all 31 Local Governments			
	Consult with land managers and Friends Groups regarding the setting up of Photo Reference Points at each Reference site on the Swan Coastal Plain.			
	Develop a training program on the Natural Ecosystems of the Swan Coastal Plain based on previous work by Dept of Environment for delivery to Local Government in spring 2005 and 2006.			

Project Component	Activity	P 1	P 2	P 3
	Select potential Reference Sites for the Jarrah Forest portion of the Metropolitan Perth Region			
	Compile area and plot based plant biodiversity information for the Jarrah Forest Reference Sites into Reference Site Files.			
	Distribute Local Government Area Summary Files to all 31 Local Governments			
	Compile significant species and communities information into Appendix of Natural Areas Initial Assessment templates for each Local Government.			
Private conservation incentives to landowners	Present detailed report to Swan Catchment Council on a proposal to coordinate an incentives program for private land conservation			
	Coordinate an incentives program for private lands conservation across participating Local Governments.			
Birds survey program	Bird Surveys, undertaken by Birds Australia volunteer observers, on 30 Local Government Reserves across Perth for a twelve-month period (Round 3).			
	Coordinate the production and dissemination of Round 3 survey of site reports to Local Governments			
Building a Natural Area Management industry	Provide administrative support to the Natural Area managers Network			
Capacity change and natural diversity policy and political support	Continue to provide presentations to elected members, professional forums on local biodiversity planning (in addition to more formal seminar series)			
	Present draft local biodiversity targets from 1 Local Government for WA Planning Commission comment			
	Compile report on changes required to Public Open Space Policy to meet regional targets.			
Protecting biodiversity in Town Planning Schemes and Bushland sensitive subdivision and landscape design	WALGA and Swan Catchment Council to negotiate senior planner position with Department for Planning and Infrastructure.			
	Employ senior planner to assist Local Governments make changes to their Town Planning Scheme, based on their Local Biodiversity Strategies			
	Produce design guidelines for Local Governments and developers to ensure future urban bushland areas are designed for greater viability.			

1.7 How the project has been designed and developed

The project design has continued to evolve ever since it was first proposed in 1999.
In early 2004, a 3-5 year future activites plan was mapped out by the Project team. This was then discussed at a Local Government stakeholder forum in early 2004 as part of a review of the strategic direction of the project. The Project's Management Group, with broad stakeholder representation, also discussed the future priorities of the Project in mid-2004. Both the Local Government stakeholder forum and the PBP Management Group have supported the future activities plan and recommended that the Project remain Local Government focused.
The plan has also been circulated to Swan Catchment Council staff for comment.

1.8 Partners

- Department for Planning and Infrastructure
- WA Local Government Association and 31 Local Governments

- Department of Environment
- Department of CALM
- Greening Australia (WA)
- Birds Australia (WA)
- Operationally, the Project has direct links to:
- Bush Forever Unit, Department for Planning and Infrastructure (Local Biodiversity Planning)
- Terrestrial Ecosystems Unit, Department of Environment (Perth Region Plant Biodiversity Project, additional ecological expertise and access to additional ecological information)
- Greening Australia (WA) – (Technical Officer position)
- Birds Australia (WA) – (Birds survey program)

1.9 Management Structure

- Human and financial resources – accountability through WALGA Director for Policy and Executive Team, and PBP Manager.
- Project direction and strategic delivery – PBP Management Group and Reference Group

1.10 Outputs and Timelines

1.10.1 Outputs for the six-month period to June 04/05

1. Training workshop for all thirty (30) Local Governments on Local Biodiversity Planning Guidelines.
2. Support 3 Local Governments to identify priority management actions that address threats to areas of high natural diversity.
3. Draft Local Biodiversity Targets developed for two Local Government areas (pilot program).
4. Report written for the Swan Catchment Council on a proposal for PBP to coordinate an incentives program for private land conservation.
5. Report written on changes required to Public Open Space Policy to meet regional targets.
6. Training program developed on the Natural Ecosystems of the Swan Coastal Plain, based on previous work by DoE, for delivery to Local Government.
7. Distribute to XX Local Governments Swan Coastal Plain Plant Biodiversity Reference Site Files and Local Government Area Plant Biodiversity Summary Files.
8. Distribute to XX Local Governments the Natural Areas Initial Assessment Database and provide support to these Local Governments on the use of the database.

Milestones

1.10.2 Milestones for the 6 month period to June 04/05

1. Local Governments completed Milestone 1 of the Local Government Biodiversity Planning Process, using the Guidelines, and have commenced work on Milestone 2.
2. Training and support provided to Local Governments on Natural Area Assessment, Mapping and Information.

3. Local Governments undertaking Milestone 5 of the Local Biodiversity Planning Process.
4. Natural Area Database trailed and delivered to Local Government
5. Plant biodiversity information provided to Community and Local Government.

1.11 Expected Outcomes for Natural Resource Condition

For the 6 month period to June 04/05:

1. Natural Biodiversity Targets set for all Natural Areas in the two pilot Local Governments (Wanneroo and Kalamunda).
2. Areas of high Natural Diversity identified on XX Local Government Reserves.
3. Priority management actions identified to address threats to areas of high natural diversity on XX Local Government reserves.

1.12 Risk Factors

Specific Risk	Description of Risk	Likelihood and impact	Strategies to manage identified risks
Short-term funding cycles	Allocation of six months funding severely restricts the ability of the project to plan, influence Local Governments and deliver on regional priorities.	Moderate likelihood. Difficult to maintain skilled personnel and expertise. Activities in first six months cannot be confidently carried out if no guarantee is given that expertise and targeted grants funding will be available in 2005/06.	Request to be made to Swan Catchment Council to allocate base funding to Association to maintain core capacity.
Timing	Local Government budgeting process may prohibit the commitment of resources to local Biodiversity Planning especially before June 2005	Likely to occur	Some Local Governments have already budgeted to undertake biodiversity planning activities in the 2004/05 financial year. There may be scope to align with budgeted activities that might overlap issues relevant to biodiversity planning.
Availability of Local Government staff.	Local Government staff may consider themselves to already be fully committed to certain activities within pre-defined work plans.	Likely to occur.	Support Local Government Officers in identifying how their current activities and future commitments can contribute to local biodiversity planning or be modified to do so.

1.13 Scope for Project Expansion or Contraction

1.13.1 Ecological and Town Planning Support

An urgent need to provide ecological and town planning advice into the rezoning and structure planning processes was identified by the stakeholder review group. This is to address existing development proposals in the system on the urban development front. The current problem is that insufficient, and sometimes incorrect, ecological assessment is being carried out as part of existing development assessment processes (whether it be formal environmental assessment under the Environmental Protection Act or informal assessment under the Town Planning and Development Act).

The Perth Biodiversity Project has previously identified additional regional-scale ecological and town planning expertise flowing from the implementation of local biodiversity strategies. A regional ecologist would provide a service to Local Governments to verify the ecological information that would be collected on behalf of developers using the Natural Areas Initial Assessment templates. This would give Local Governments access to expert, independent ecological advice, essential for good decision-making. Town planning expertise, delivered through a senior planner would assist Local Governments to make the necessary amendments to their Town Planning Schemes to achieve their biodiversity protection and retention targets set in their strategies.

The discussion at the stakeholder review meeting revolved around the current assessment of rezoning and structure plan proposals on the urban front. The group agreed that more needs to be done to modify development proposals on this urban front given the amount of clearing that continues to occur. This is a significant challenge because:

1) Land on the urban front has generally already been zoned for development in the Metropolitan Region Scheme and bushland protection opportunities are already severely constrained by the MRS zoning;
2) State agencies and Local Governments first must agree on the framework in which this new ecological information will be used. Unless this framework is agreed, then additional ecological information can be easily discounted or ignored; and
3) There needs to be a clear distinction between the role of this position (as assisting Local Government and the community) and the responsibilities that State Agencies already have to protect regionally significant natural areas. In other words, without clear delineation, direction and management, the position could simply do State Government work. This is a real concern, given State Government has so few experts in agencies that can provide the required level of ecological expertise.

Not-withstanding the above, there is strong merit in increasing the ecological assessment capacity available to Local Governments and the community immediately. However, the role of this regional ecological position needs to be carefully developed so that it:

1) Upholds current information collection standards (i.e. uses the Natural Area Initial Assessment templates, as a minimum standard);
2) Is recognised by the current decision makers in Local and State Government;
3) Levers new, matching resources from State Government for ecological expertise.

1.13.2 Wetland Biodiversity

There has been some confusion in the past as to whether the Perth Biodiversity Project has included wetland biodiversity. PBP has in the past included wetland biodiversity and will continue to do so in the future. PBP is a major local government initiative to promote the

long-term protection and management of natural areas in the swan region. Natural areas can be areas of native vegetation, vegetated or open water bodies (lakes, swamps), waterways (rivers, creeks and estuaries), springs, rock outcrops, bare ground (generally sand or mud), caves and coastal dunes or cliffs.

PBP has addressed wetland biodiversity and will continue to do so in the following ways:

- Local Biodiversity Planning
    - Local Significance Criteria promoted in the Local Government Biodiversity Planning Guidelines include criteria relating to protection of wetland, streamline and estuarine fringing and coastal vegetation.
    - Provides a framework for the identification, assessment, prioritisation and retention/protection of biodiversity values (including wetland values)
    - Native vegetation mapping that identifies those vegetated natural areas that potentially have wetland values
- Natural Area Initial Assessment Templates
    - The templates compile information on ecological values, current vegetation condition, threats, required management actions and where present existing management infrastructure.
    - The template distinguishes between upland and wetland structural plant communities
    - More than 250 natural areas have been assessed using the templates
    - A database is currently being developed to collate, store and interrogate information collected using the natural area initial assessment templates (it will be possible to extract the area of wetland plant communities mapped and assessed using the templates, once this information is in the database).
    - Training and technical support for the use of the template and development of draft users guide
- Perth Region Plant Biodiversity Project
    - This project aims to work with the relevant state government agencies in compiling the plant biodiversity information available for the Perth Metropolitan Region in a form relevant for use by local government and hence also NRM groups, NGOs and the community.
    - More than 40 of the 120 reference plots that have been established to extend plant biodiversity information for the Swan Coastal Plain are within wetland plant communities.
    - The project is assisting DoE and CALM to develop the Swan Coastal Plain species list for native and weed taxa of the southern Swan Coastal Plain (includes both upland and wetland species)
- Targeted Grants
    - PBP has provided funding assistance to 7 Local Government projects that have involved undertaking management activities in wetland plant communities
    - PBP has provided funding assistance to 2 Local Government projects that have undertaken ecological assessment of more than 130 natural areas.
    - $50,000 of the $100,000 targeted grants for the years 2005-06 and 2006-07 are proposed for investment in Local Government project that have a focus on assessment, management or protection of wetland values.

1.13.3 Other expansion activities

- Expansion to Shire of Chittering has occurred
- Continuation of Shire of Serpentine-Jarrahdale (which is within the South West Catchment Council region) requires agreement between Swan Catchment Council, SWCC, Shire and WALGA.
- Inclusion of Northern Agricultural CC or AVON Local Governments experiencing high development pressure is possible in 3-5 years.

1.14 Cost

First Six Months (to June 30th 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project Manager	6	7168	43,008	80%	34,207
2 x Biodiversity Coordinators	6	11524	69,144	37%	25,772
Technical Officer (in partnership with Greening Australia)	6	6675	40,050	100%	40,050
Project Ecologist (in partnership with Dept of Environment and Dept of CALM);	6	3606	21,636	100%	21,636
Perth Region Plant Biodiversity Project – (technical support & consultant botanist)	1	13500	13,500	100%	13,500
Senior Project Ecologists - Dept of Environment & Dept of CALM	20	1000	20,000	0	0
Targeted Grants	1	100000	100,000	50%	50,000
Bird survey program	6	70 hrs * $30/hr	12,800	15%	2,000
Vehicle (lease and running costs)	6	800	4,800	100%	4,800
Additional operating costs (GIS licenses, meeting expenses, insurance, stationary, mail, photocopying)	1	4250	4250	100%	4,250
Local Biodiversity Planning Milestone Program	1	10000	10,000	50%	5,000
Training for professionals and community	4	1000	4,000	100%	4,000
Initial natural areas assessment database update	1	5000	5,000	100%	5,000
Printing of Natural Area Initial Assessment Template Users Guide	1	4785	4,785		4,785
Total			**352,973**		**215,000**

3.2 Financial Year 2005 - 06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project Manager	12	7,168	86,016	80%	68,415
2 x Biodiversity Coordinators	12	11,524	138,288	37%	51,544
Technical Officer (in partnership with Greening Australia)	12	6,675	80,100	100%	80,100
Project Ecologist (in partnership with Dept of Environment and Dept of CALM)	12	3,606	43,272	100	43,272
Perth Region Plant Biodiversity Project – (technical support & consultant botanist)	12	2,253	27,045	100	27,045
Targeted grants - on-ground works	1	50,000	100,000	50%	50,000
Targeted grants - local biodiversity planning	1	50,000	100,000	50%	50,000
Senior Project Ecologists - Dept of Environment & Dept of CALM	30	1,000	30,000	0	0
Bird survey program	12	1,567	18,800	43%	8,000
Vehicle (lease and running costs)	12	800	9,600	100%	9600
Training for professionals and community	1	10,000	10,000	100%	10,000
Additional operating costs (GIS licences, meeting expenses, insurance, stationary, mail, photocopying)	1	8,500	8,500	100%	8500
Initial natural areas assessment database management	1	10,000	10,000	100%	10000
Total			**661,621**		**416,476**

3.3 Financial Year 2006 - 07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project Manager	12	7,168	86,016	80%	68,415
2 x Biodiversity Coordinators	12	11,524	138,288	37%	51,544
Technical Officer (in partnership with Greening Australia)	12	6,675	80,100	100%	80,100
Project Ecologist (in partnership with Dept of Environment and Dept of CALM)	12	3,606	43,272	100	43,272
Perth Region Plant Biodiversity Project – (technical support & consultant botanist)	12	2,253	27,045	100	27,045
Targeted grants - on-ground works	1	50,000	100,000	50%	50,000
Targeted grants - local biodiversity planning	1	50,000	100,000	50%	50,000
Senior Project Ecologists - Dept of Environment & Dept of CALM	30	1,000	30,000	0	0
Bird survey program	12	1,567	18,800	43%	8,000
Vehicle (lease and running costs)	12	800	9,600	100%	9,600
Training for professionals and community	1	10,000	10,000	100%	10,000
Additional operating costs (GIS licences, meeting expenses, stationary, mail, photocopying)	1	8,500	8,500	100%	8,500
Initial natural areas assessment database management	1	10,000	10,000	100%	10,000
Total			**661,621**		**416,476**

1. 2006/07 budget subject to renegotiation of partnerships with the Department of Environment and Greening Australia

Budget Justification:

1. **Staff.** The project requires 4.6 FTE to support the range of activities. One FTE is funded by the Department of Planning and Infrastructure, although this commitment is only guaranteed to June 2005. Non-salary on-costs for 3.6 FTE are funded by WALGA, the Department of Environment and Local Governments.
2. **Targeted grants program**. The Perth Biodiversity Project has demonstrated that strategic use of a funding program has a significant leverage effect on Local Governments. Previous NHT investment in a Local Government devolved grants program of $0.48 m attracted funding of $0.97 million from Local Governments, in

addition to community involvement in projects. There are two types of targeted grants proposed for the 2005/06 and 2006/07 years:

(a). Assistance to Local Governments to undertake the Local Biodiversity Planning One is to encourage Local Governments to undertake local biodiversity planning to prepare local biodiversity strategies. The process encourages biodiversity targets and criteria to be set enabling local governments to identify biodiversity values and integrate biodiversity conservation into their planning and decision making processes.

(b). Assistance to Local Governments for assessment and management of Local Government managed Natural Areas

The targeted grants programs will be planned and administered under the direction of the Projects Management Group. Funding on a 1:1 basis will be a requirement. $100,000 of funding is proposed for the targeted grants program, with $50,000 coming from the SCC Natural Diversity program and $50,000 from the Water program. Projects funded with the $50,000 from the Water Program will need to demonstrate the aspects of the project that are relevant to wetland assessment, retention, protection and management.

1.15 Estimated Total Investment Influenced by the Project

The Association's Perth Biodiversity Project has shown that funds directly invested in Local Government biodiversity activities have attracted a strong return. For every dollar provided to Local Government projects by PBP, $2.00 was invested by Local Governments and the community. There has also been evidence that strategic funding to specific Local Governments has prompted neighbouring Local Governments to undertake similar activities (e.g. City of Wanneroo and City of Joondalup). Strategic Funding of new positions focused on bushland management within Local Government, has resulted in new permanent positions being created.

The Project will continue to receive the support of the Department for Planning and Infrastructure through commitments established under Bush Forever. Negotiations are yet to be finalised on the amount to be provided by the DPI in 2004/05.
During the 2000-01 period, metropolitan Local Governments received $660,000 in external grant funding for biodiversity conservation activities, although not stipulated, some could be assumed to be Natural Heritage Trust funding. During the same period Local Government invested $5.14 million into biodiversity projects, this represents a direct Local Government contribution of $8 for every $1 of grant funding received. Given similar levels of investment in the future the project represents good value for money.

1.16 Cost Effectiveness

With the finalisation of areas to be protected through the Bush Forever and Forest Management Plan processes, opportunities for retention or protection of additional areas of high natural diversity that can contribute to the Swan Catchment Council biodiversity targets will be largely restricted to those identified through local governments developing and implementing local biodiversity strategies. Local government should therefore be appropriately resourced and supported to prepare local biodiversity strategies.

For the period 1997-2001 the equivalent of 260 football fields (500ha) of remnant vegetation has been cleared each year on the Swan Coastal Plain portion of the Perth Metropolitan Region. If no direct action is taken by Local Governments, the continuation of the business as usual approach to development and land use planning activities will significantly erode biodiversity values to a point beyond repair and reinstatement. If these circumstances persist,

future generations will not be able to enjoy the same natural experiences within, and so close to Perth as the current generation.

The Project therefore provides a cost effective way of maintaining and consolidating Local Governments and their community's momentum and capacity to strategically plan for the retention, protection and management of biodiversity in the SCC region.

1.17 Long Term Strategy

This project builds on the work undertaken in previous NHT grants in which PBP was funded to develop the *Local Government Biodiversity Planning Guidelines* and assist Local Government prepare Local Biodiversity Strategies as per the principles set out in the Guidelines. This project will continue to assist Local Governments in the local biodiversity planning process in the first six months of the project. Additional Biodiversity Planning Tools to be implemented in the first six months include the Natural Area Database and initiatives such as providing assessment expertise and additional senior planning support for Local Government as they make changes to their Town Planning Schemes, based on LB strategies, are planned for subsequent years.

1.18 For how long will this kind of project be needed?

The Association has a long-term approach to assisting Local Governments and the community conserve biodiversity. As such our 25-years aims are to assist Local Governments and the community to a) protect and manage all local natural areas in the region within a secure conservation network and b) plan for and implement ecological linkages between local and regional biodiversity areas.

1.19 Can the project become financially self-sustaining?

Local Governments undertaking the biodiversity planning process will invest considerably in this project. The Biodiversity Strategy Action Plan that the Local Governments develop will provide the framework for Local Governments to allocate funds in their own budgets to undertake the identified actions.

1.20 Can the project become socially self-sustaining?

2. PROJECT ND02: STOP DIEBACK - THE BIOLOGICAL BULLDOZER

2.1 Summary

The project aims to further build on three previous NHT projects (973863, 003125, 023186). By working in partnership with the state government agencies, community groups, local government authorities (LGAs) and other relevant organisations, the project will protect the natural diversity (biodiversity) and increase the capacity of sustainable production throughout the Swan NRM region of WA from the impacts of *Phytophthora* Dieback.

The proposed project plans to achieve these aims by:

- Building the capacity of LGAs and the community through education, training & awareness raising.
- Map the presence of the pathogen within high conservation bushland reserves.
- Develop and implement management plans for these high conservation reserves.
- Empower LGAs, community conservation groups and industry to implement appropriate hygiene practices.
- Enable LGAs and the community conservation groups by directly protecting plants with a systemic, environmentally friendly fungicide (phosphite).
- Develop a communications strategy for the communication between organisations that are currently managing *Phytophthora* dieback and to their key stakeholders including LGAs, community conservation groups and industry. This will allow for an improved strategic approach and increased consistency in the messages being delivered.

The expected results of the proposed project are:

- Develop mapping schedule and prioritisation process for all high conservation bushland within the Swan region
- Map 12 reserves of high conservation value for the presence and distribution of the pathogen
- In partnership with LGA's develop management plans for these 12 reserves
- Develop and implement an auditing system for LGA's currently managing the disease, thereby creating understanding of where LGA's can be encouraged to improve
- Conduct phosphite treatment within 15 high conservation value bushland reserves, thus preventing the further spread of the disease and reducing its impact
- Production of a monitoring report that clearly demonstrates that phosphite treatment preventing the further spread of the disease and reduces its impact
- Train and thereby increase the capacity of LGA's, community groups and industry to manage the disease
- Through the production and implementation of a communication strategy, increase the understanding of all stakeholders, including the general community about the risks of *Phytophthora* Dieback to biodiversity and industry within WA

2.2 Why is this a Priority Project?

The project addresses a number of key areas that were identified within the Swan Region Strategy Investment plan (Table 1 - Biodiversity values) and a number of prioritised management actions (Table 2). The proposed project complements a number of other recent key initiatives that are designed to ensure the successful management of *Phytophthora* Dieback in WA. The Dieback Working Group have been involved in a number of these initiatives and are likely to be an invaluable contributor to their implementation. These initiatives include:

- the formation of the Centre for *Phytophthora* Science and Management (Murdoch University),
- the development of a Dieback Response Framework (initiative of State Minister for the Environment),
- the formation of the Dieback Response Group (initiative of State Minister for the Environment),,
- the review of the National Threat Abatement Plan (Federal Dept. of Environment and Heritage - *see below*); and
- the production of a guide to investment in dieback management by the Dieback Consultative Council and the World Wildlife Fund

National Threat Abatement Plan:
The draft National Threat Abatement Plan was published in 1999 and is currently under review. The goal of the plan is to stabilise the disease, and so lessen its effects in already infected areas, and to prevent the pathogen's spread into new areas. The plan aims to achieve this in four main ways:

- By increasing our understanding of where the pathogen currently is, which areas and species are vulnerable to it
- By reducing the pathogen's spread into new areas
- By treating localised areas containing high conservation values (such as rare and threatened species) with phosphite, a chemical that induces resistance to *P. cinnamomi* in native plants
- By coordinating regionally variable action on the part of the large number of people and organisations - in government, industry and the wider community - with an interest in the problem

In particular, the plan sets a number of objectives designed to accomplish this goal through a range of objectives, including management plans, education, encouraging further policy development, coordination and on-ground action (phosphite treatment).

The proposed project also aims to support the community to help manage their bushland by offering training and by conducting phosphite treatment days within their local bushland reserves.

The proposed project provides leverage to LGA's and state government departments by raising the awareness of the community that Dieback management is paramount. At the same time the project is designed to assist LGA's and state government departments in the further implementation of *Phytophthora* Dieback management policies and procedures. It's anticipated that through further assistance to these key stakeholders it will become a part of their every day operations and thus empower them to eventually to manage the disease without a high level of support from the DWG project.

Table 1: Key areas of NRM investment for averting threats to biodiversity values.

	Investment Target Forests & Woodlands	%	Investment Target Terrestrial Biodiversity	
1	Native vegetation clearing or loss	17.4	Native vegetation clearing or loss	13.2
2	Biodiversity decline	14.7	Biodiversity decline	12.6
3	Exotic Plants	9.2	Ecosystem fragmentation	12.3
4	Ecosystem fragmentation	8.3	Exotic Plants	8.3
5	Habitat loss	8.3	Habitat loss	7.6
6	Political will (lack of)	7.3	Ignorance, negligence, intolerance	7.0
7	Diseases - plants	5.5	Political will (lack of)	6.0
8	Ignorance, negligence, intolerance	4.6	Inadequate coordination of government & community activity	4.3
9	Infrastructure development	3.7	Exotic (feral) animals	4.0
10	Inadequate involvement of community or industry	3.7	Climate Change	3.6
11	Process disruption	2.8	Fire management regime	3.3
12	Fire management regime	2.8	Process disruption	2.6
13	Recreation & access	2.8	Diseases - plants	2.0
14	Inadequate coordination of government & community activity	2.8	Abstraction of water	2.0
15	Erosion & sedimentation	1.8	Infrastructure development	2.0
16	Chemical Contamination	0.9	Inadequate involvement of community or industry	2.0
17	Diseases -animals	0.9	Salinity	1.7
18	Exotic (feral) animals	0.9	Non-acceptance of NRM principles	1.3
19	Abstraction of water	0.9	Agricultural Management Practices	1.0
20	Non-acceptance of NRM principles	0.9	Recreation & Access	1.0
			Erosion & sedimentation	0.7
			Drainage modification	0.7
			Chemical Contamination	0.3
			Hydrological change	0.3
			Fossil fuels consumption	0.3
	Total	100.0	Total	100.0

Table 2. The management action targets within the Swan Region Strategy that specified action to manage *Phytophthora* Dieback.

Target	Management Action
BM1.5 30% increase in the capacity of the wider regional community to conserve and protect natural diversity by 2008	Continue to expand community natural diversity training programs
	Promote inclusion of natural diversity restoration and management training through tertiary institutions and TAFE's
	Develop natural diversity management operational policy and training programs for Local Government Authorities
BM3.1	Determination of percentage elimination, reduction, containment targets for priority feral/pests and diseases
BM3.2	Develop a Dieback mapping/surveying schedule
	Develop threat abatement plans for feral animals and pests linked to National Threat abatement strategies
	Develop management response improvements to ensure no new introduction of potential feral/pest animals/plants/disease
BM3.4	Promote wider regional community, land manager and LG education and awareness and training programs on feral animal, pest and disease management
	Provision of training in feral, pest animal and disease identification, mapping and management

2.3 Past Achievements

Since 1998 the project has achieved a number of substantial outcomes:

- 40 (2600 ha) high conservation value bushland reserves mapped
- 40 *Phytophthora* Dieback management plans produced
- 26 bushland reserves treated with Phosphite (55 ha directly protected; 155 ha indirectly protected)
- Annual monitoring of 10 bushland reserves treated with Phosphite
- Over 450 local government staff completed the nationally recognized training course of *Phytophthora* Dieback management in Local Government
- Over 1100 community members completed training in *Phytophthora* Dieback management
- Five publications describing best practice management of *Phytophthora* Dieback in Local Government, bushland reserves and the Extractive Industries
- Numerous displays at community days, environmental expo's and field days
- A number of private residents provided information on the management of *Phytophthora* Dieback

2.4 Incorporation of NHT Principles

(1)	Generates the greatest public benefits per dollar of public investment.	
(2)	Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	
(3)	Investment should not exceed the public benefits that result.	
(4)	Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	
(5)	Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	
(6)	Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	
(7)	The processes required for setting priorities will involve ongoing learning and need constant feedback.	
(8)	Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	

2.5 Work Program

The current proposal has been broken into two parts, the first is the 6 months from the 1st of January 2005 to the 30th of June 2005; the second is the next two years (1st July 2005 - 30th June 2007).

2.6 How the project has been designed and developed

It's been developed in consultation during a meeting of the members of the Dieback Working Group (including State government departments, tertiary education institutions, LGA's and community conservation groups) and plans to build on the outcomes of the past NHT projects.

2.7 Partners

The project aims to continue the strong relationships developed in the past projects with Alcoa World Alumina Australia, Australian Association of Bush Regenerators, Catchment groups, Chamber of Commerce and Industry, Conservation Commission of WA, Conservation Council, Conservation Volunteers Australia, Curtin University, Department of Conservation and Land Management, Department of the Environment, Department of Land Administration, Dieback Consultative Council, Dieback Response Group, Greening Australia, Landcare groups, LGAs within the Swan region, Main Roads Western Australia, Midland TAFE, Murdoch TAFE, Murdoch University, numerous "friends of' community conservation groups, Regional Councils, Swan Catchment Centre, the Centre of *Phytophthora* Science and Management, the Roleystone Dieback Action Group, Urban Bushland Council, WALGA and the WWF.

The project is designed to feed information of the known occurrence of *Phytophthora* Dieback into the LGAs undergoing the reserve assessments in the Perth Biodiversity Project (PBP). Similarly, the PBP project will direct LGAs going through the reserve assessments to gain advice/training/support about Dieback within their area from the Dieback Working Group.

Furthermore this project can also offer training and support to other organisations that are involved in education/training and awareness raising about environmental issues such as the Greening Australia project.

2.8 Management Structure

Project management will be conducted using the same principles and processes that have proved successful in the past NHT projects (973863, 003125, 023186). The Dieback Working Group (consisting of community, LGAs and state government representatives) will assume overall responsibility for management of the project, including strategic decision-making. A smaller representative Management Committee will oversee the activities of the Project Coordinator ensuring the project objectives are achieved through the works plan. The Management Committee will continue to meet on a four to six week basis. The Management Committee consists of the Chairman (community representative), the Department of CALM Dieback Coordinator and a LGA representative.

2.9 Outputs and Timelines

Part I - 1/01/05 - 30/06/05

- Develop mapping & prioritisation schedule for high-value bushland for assessment of the presence of *Phytophthora* Dieback within the Swan region
- Conduct mapping for the presence and distribution of *Phytophthora* Dieback within 2 high-value bushland reserves

- Prepare *Phytophthora* Dieback management plans for the 2 reserves mapped for the presence and distribution of the disease
- Design audit process for monitoring the adoption and implementation of *Phytophthora* Dieback management polices within LGAs. Trial the audit process for two LGAs within the Swan region.
- Treat 2 high conservation value bushland reserves that are infested with *Phytophthora* Dieback with the fungicide, phosphite
- Conduct at least 4 training workshops with LGAs employees, community conservation groups or employees of extractive industry companies on the management of *Phytophthora* Dieback
- Participate in 2 community awareness raising opportunities to help increase the awareness of *Phytophthora* Dieback in WA
- Develop a communications strategy for effective information transfer between all identified stakeholders involved in the management of *Phytophthora* Dieback in WA.
- Implement high priority and urgent initiatives from the communication strategy.

Part II - 1/07/05 - 30/06/07

- Implement the mapping schedule designed within Part I of the project proposal, including the mapping of 10 high-value bushland reserves for the presence and distribution of *Phytophthora* Dieback
- Mentor the LGA environmental officers during their preparation of *Phytophthora* Dieback management plans for the 10 reserves mapped for the presence and distribution of the disease
- Roll out the LGAs Dieback management policy/practice audit to the remaining 14 LGAs within the Swan region that are members of the Dieback Working Group.
- Treat 12 high conservation value bushland reserves that are infested with *Phytophthora* Dieback with the fungicide, phosphite
- Conduct at least 16 training workshops with LGAs employees, community conservation groups or employees of extractive industry companies on the management of *Phytophthora* Dieback. Mentor tertiary institutes so they can provide the level of dieback management training required by the LGA and other customers
- Participate in 8 community awareness raising opportunities to help increase the awareness of *Phytophthora* Dieback in WA
- Implement the initiatives of the communications strategy for effective information transfer between all identified stakeholders involved in the management of *Phytophthora* Dieback in WA. This will include distribution of newsletters, conducting Dieback Information Group meetings, meeting of the DWG members, expansion of the DWG membership and development of a number of communication tools (e.g. website).
- Re-monitor the dieback spread within bushland injected with phosphite during the previous NHT funded projects

Table 3. Project outputs for the proposed project to manage *Phytophthora* Dieback within the Swan Region NRM.

Project objectives		Date	
#	**Description**	**01/01/05 - 30/06/05**	**01/07/05 - 30/06/07**
1	Develop Dieback mapping schedule	Develop schedule & prioritisation system for bushland within Swan region	Implement mapping schedule
2	Dieback mapping of bushland	Map 2 reserves for the presence of the *Phytophthora* Dieback	Map 10 reserves for the presence of *Phytophthora* Dieback
3	Dieback management plans	2 Management plans prepared	Mentor the preparation of 10 Management plans
4	Audit LGAs Dieback policy adoption	Design audit process & pilot in two LGAs	Roll out audit process to the other DWG member LGAs in Swan region
5	Phosphite treatment in bushland	3 high conservation value bushland reserves treated with phosphite	12 high conservation value bushland reserves treated with phosphite
6	Monitoring of phosphite treatment sites	-	10 reserves monitored and monitoring report prepared
7	Dieback training in LGAs, community conservation groups and extractive industries	4 workshops held, attended by approximately 80 representatives of LGAs, community conservation groups and extractive industries companies	16 workshops held, attended by approximately 320 representatives of LGAs, community conservation groups and extractive industries companies. Tertiary institute has established and offering a dieback management training course
8	Community awareness raising	Dieback display held during 2 community awareness raising opportunities	Dieback display held during 8 community awareness raising opportunities
9	Communication strategy	Communication strategy developed	Communication strategy initiatives implemented

2.10 Expected Outcomes for Natural Resource Condition

Date (quarter)	Milestone
01/01/05-31/03/05	▪ Collect all available data on the bushland reserves in the Swan region ▪ Collate all previous Dieback mapping in the bushland reserves in the Swan region ▪ Create prioritisation system for bushland reserves requiring mapping ▪ Design the audit process for the adoption of Dieback management polices/procedures in local government ▪ 1 reserve treated with Phosphite ▪ 2 Dieback workshops held ▪ 1 Dieback community display conducted ▪ Draft communication strategy developed
01/04/05-30/06/05	▪ Map 2 reserves for the presence of Dieback ▪ Prepare to management plans for the 2 reserves mapped ▪ Trail audit process in two LGAs in the Swan region ▪ 2 reserves treated with Phosphite ▪ 2 Dieback workshops held ▪ 1 Dieback community display conducted ▪ Communication strategy released
01/07/05-30/09/05	▪ Implement mapping schedule to prioritise which 10 bushland reserves to map in the next 2 years ▪ Map 5 reserves for the presence of Dieback ▪ 2 Dieback workshops held ▪ 3 reserves treated with Phosphite ▪ Report written outlining the proposed schedule of Dieback mapping required within the Swan region ▪ Implement initiatives of communications strategy
01/10/05-31/12/05	▪ Prepare to management plans for the 5 reserves mapped ▪ 2 Dieback workshops held ▪ 2 reserves treated with Phosphite ▪ Conduct initiatives of communications strategy
01/01/06-31/03/06	▪ 2 Dieback workshops held ▪ Conduct initiatives of communications strategy
01/04/06-30/06/06	1. 2 Dieback workshops held 2. ~~10 reserves monitored for rate of spread~~ 3. 1 reserve treated with Phosphite 4. Conduct initiatives of communications strategy
01/07/06-30/09/06	▪ Map 5 reserves for the presence of Dieback ▪ 2 Dieback workshops held ▪ 3 reserves treated with Phosphite ▪ Monitoring report written ▪ Conduct initiatives of communications strategy
01/10/06-31/12/06	▪ Prepare to management plans for the 5 reserves mapped ▪ 2 Dieback workshops held ▪ 2 reserves treated with Phosphite ▪ Conduct initiatives of communications strategy
01/01/07-31/03/07	• Write up report on the findings of the LGA audit process • 2 Dieback workshops held ▪ Conduct initiatives of communications strategy

2.11 Risk Factors

- Agreements yet to be finalised with project officer employer

2.12 Scope for Project Expansion or Contraction

The current proposal is designed to set a foundation whereby the Dieback Working Group project will become more self sustainable by 2007. It's anticipated that the implementation of the communications strategy will obtain a higher level of commitment by the federal & state governments. It is also designed to out source many of the described activities by empowering state government departments, LGAs and industry to take a leading hand in the management of *Phytophthora* Dieback. This will also be achieved through negotiation with these stakeholders to further the implementation of Dieback policies/procedures. Furthermore, the training component will become more integrated into existing education institutions such as tertiary institutes and TAFE courses, thus reducing the need to fund as many *Phytophthora* Dieback training workshops.

Furthermore, it's anticipated that the project could become more state wide focussed with the prospect of expanding to have another officer within regional southwest WA. This would allow for the project to provide greater assistance and capacity to the other NRM regions within WA. Ultimately this would reduce the funding required from the Swan Catchment Centre. Similar to that described above this other project officer would be of a limited term, during which state government departments, LGAs and industry would be empowered to take a leading hand in the management of *Phytophthora* Dieback.

2.13 Cost

First Six Months (to June 30th 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project Coordinator			$27,025	78%	$21,064
Car	6	$1,002	$6,012	"	$4,689
Administration Costs			$2,000	"	$1,560
Community Strategy			$10,000	"	$7,800
Mapping	2	$2,220	$4,440	"	$3,463
Phosphite treatment			$1,000	"	$780
Purchase of computer project equipment			$5,000	"	$3,900
Training workshops & displays			$1,480	"	$1,154

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project Coordinator			$57,500		$57,500
Car	12	$1,002	$12,024		$12,024
Administration Costs			$2,000		$2,000
Community Strategy			$10,000		$10,000
Mapping	5	$2,220	$11,100		$11,100
Phosphite treatment			$2,000		$2,000
Monitoring Program	10	$810	$8,100		$8,100
Training workshops & displays			$2,960		$2,960

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project Coordinator			$57,500		$57,500
Car	12	$1,002	$12,024		$12,024
Administration Costs			$2,000		$2,000
Community Strategy			$10,000		$10,000
Mapping	5	$2,220	$11,100		$11,100
Phosphite treatment			$2,000		$2,000
Training workshops & displays			$2,960		$2,960

Budget Rationalisation:

Project Coordinator
Part I - Project Coordinator @ $47,000 p.a. + 15 % on costs
Part II - Project Coordinator @ $50,000 p.a. + 15 % on costs
Car
$1002 per month ($12,024 p.a.) for lease of vehicle
Administration costs
$2,000 p.a. to cover miscellaneous costs
Communication strategy costs
Communication strategy development - Marketing consultant $110/hr for 45 hrs to develop strategy = $49,500
Development of style guide, logo and electronic newsletter format by Graphic designer = 51 hrs @ 100 hrs
Communication strategy implementation, includes development of interactive website with all DWG publications $12,000, two Dieback Information Group meeting held @ $3,000 each. annual general meeting of the DWG @ $1,000 each.
Mapping
Dieback mapping consultant. 30 hrs per reserve (@ $60/hr) & 6 Dieback soil/tissue samples per reserve ($70 per sample). Therefore mapping costs $2,220 per reserve.
Part I - 2 reserves @ $2,220 per reserve = $4,440
Part II - 10 reserves @ $2,220 per reserve = $22,200
Phosphite treatment

Each reserve treated with phosphite requires phosphite (Agri-fos 600 - $100 per 20 L container), wetting agent ($150 per container), and maintenance of injection gear/spray trailer. Estimated cost = $330 per reserve.
Monitoring program
Dieback mapping consultant. 10 hrs per reserve (@ $60/hr) & 3 Dieback soil/tissue samples per reserve ($70 per sample). Therefore monitoring costs $810 per reserve.
Training workshops & displays
Training workshop costs including accommodation, travel expenses and catering estimated to cost $370 per workshop

Display costs, including the purchase of plants and other miscellaneous items estimated to cost $200 per display

During first 6 months of funding a computer & data projector will be purchased at a cost of $5,000. Currently, the Dieback Coordinator has to hire a computer & projector from a range of sources. The DWG will make the computer & data projector available for use by community conservation groups and any other interested environmental programs.

2.14 Estimated Total Investment Influenced by the Project

Program	NRM Funds Sought	Industry cash contributions	***In kind* contributors**			
			CALM	Landholder/ Community	Industry	Local Govt
Dieback Working Group	$259,225	$25,000	$15,000	$50,000	$10,000	$40,000
Total real funds	$284,225					
Total *In kind* funds			$115,000			

Therefore an investment of **$259,225 from NRM** will result in a project worth **at least $399,225.**

2.15 Cost Effectiveness

2.16 Long Term Strategy

2.17 For how long will this kind of project be needed?

2.18 Can the project become financially self-sustaining?

2.19 Can the project become socially self-sustaining?

3. PROJECT ND03: RECOVERY ACTIONS FOR 9 THREATENED ECOLOGICAL COMMUNITIES ON THE SWAN COASTAL PLAIN.

Summary

This project will implement the most urgent actions for the recovery of 9 of the most endangered (CR and EN) Threatened Ecological Communities (TECs) in the Swan Region. Interim Recovery Plans (IRPs) for these TECS which provide detailed costed recovery actions for each ecological community. In addition, other high priority actions identified by the Recovery Teams for these TECs will be pursued. The implementation of recovery actions for these nine TECs has commenced under a previously funded NHT project.

The outcomes of this project are to prevent further decline and maintain these TECs. The IRP for each TEC identifies success criteria and actions to achieve those criteria over a three to five year period. While these criteria will be used in monitoring the success and outcomes on this Priority Project, it is unlikely that there would be a change in status of the TECs in the twelve months covered by this Priority Project.

This Project seeks to achieve this by: - (use dot points)
Implementing priority recovery actions for each of the nine TECs as identified in Interim Recovery Plans and on advice from Recovery Teams for TECs. Actions include, but are not limited to:

- habitat assessment, mapping and monitoring, including identification of new occurrences.
- threatening process assessment, mapping and monitoring
- planning and implementation of habitat management, such as fencing and access control, control of weeds, dieback management and treatment, fire planning and management, rehabilitation.
- systems and programs of investigation, research and adaptive management of TEC occurences.
- captive breeding of significant fauna species, and propagation of significant flora species.
- production and dissemination of interpretive material.
- liaison and coordination with decision making authorities and other stakeholders to promote and enable the achievement of the project outcome.

Why this is a Priority Project

Say how the project relates to the prioritised management actions in Chapters 7 to 12 of the *Swan Region Strategy for Natural Resource Management: Investment Plan.* Briefly explain the "big picture" and whether this project either complements or is essential to other governmental, private sector or community activities that are underway to protect the particular asset. What "leverage" does the project exert?

The primary management actions that this project relate to are:

REF	RANK	TARGET	MANAGEMENT ACTION
BM2.2	5	100% of all relevant NRM legislation and policy in state and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006	Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority significant species and ecological communities Review and prioritise existing conservation management actions for significant species and threatened ecological communities, and threat abatement plans
BM2.5	4	30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008	Establish collaborative partnerships to ensure the conservation management and recovery planning of significant species and significant ecological communities

There are also significant links and relevance to other management actions of the strategy. For example the project deals with threatening processes (BM3.3) at the point where those processes are having acute impact (species extinction). The project will also result in additions and improved management of the CAR conservation reserve system (BM1.2, BM1.4). Many of the TECs covered in this project are significant wetlands and the project provides information and demonstration of wetland management which is applicable elsewhere (WM2.4).

This project involves the implementation of recovery actions for Nationally and State listed TECs that are found in Swan NRM region. The project links to other work by CALM and other organisations to protect and manage TECs.
This projects achieves NHT priorities by:

- Protecting and restoring the habitat of threatened species, threatened ecological communities and migratory birds; in that the project specifically seeks to provide conservation management to occurences of TECs.
- Protecting and restoring significant freshwater, marine and estuarine ecosystems; in that significant areas of freshwater wetland are protected and managed. Information gained on the management of high value freshwater wetlands can be applied elsewhere.
- Preventing or controlling the introduction and spread of feral animals, aquatic pests, weeds and other biological threats to biodiversity; in that information gained on the control and management of threatening processes in these significant reserves can be applied elsewhere.

3.1 Past Achievements

Implementation of recovery actions for these nine TECs has commenced under a previously funded NHT project. Similarly CALM has received funding through the South West Catchments Council for similar recovery actions for TECs located in that NRM region.

CALM has been the State agency responsible for the identification and listing of TECs in Western Australia and has been carrying out recovery actions for TECs for some years.

3.2 Incorporation of NHT Principles

Generates the greatest public benefits per dollar of public investment.	Recovery of Nationally and State listed Threatened Ecological Communities, most work is carried out on public land.
Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Investment focussed on critically endangered TECs, in those locations where they occur. These sites would be included as priority areas in the SCC regional strategy.
Investment should not exceed the public benefits that result.	All outcomes are to the public benefit, already considerable investment by State and Commonwealth.
Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Prevention of destruction of critically endangered TECs requires significant and intensive effort.
Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	NA - See above
Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Investment focussed on critically endangered TECs, in those locations where they actually occur.
The processes required for setting priorities will involve ongoing learning and need constant feedback.	An adaptive management approach is a feature of species and TEC recovery and is achieved through recovery plan, periodic review, and recovery team.
Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	Precautionary principle is a basis of recovery planning

3.3 Work Program

The project will involve the implementation of priority recovery actions for each of the nine TECs as identified in Interim Recovery Plans and on advice from Recovery Teams for TECs. Each year an annual works program is developed, and actions include, but are not limited to:

- habitat assessment, mapping and monitoring, including identification of new occurrences.

- threatening process assessment, mapping and monitoring
- planning and implementation of habitat management, such as fencing and access control, control of weeds, dieback management and treatment, fire planning and management, rehabilitation.
- systems and programs of investigation, research and adaptive management of TEC occurrences.
- captive breeding of significant fauna species, and propagation of significant flora species.
- production and dissemination of interpretive material.
- liaison and coordination with decision making authorities and other stakeholders to promote and enable the achievement of the project outcome.

Specific actions identified for 2004/05 include:

- Stygofauna cative breeding investigations
- Monitor condition & survey occurrences of TEC's & identify remedial actions
- Undertake weed mapping and monitoring
- Undertake seed provincing and TEC health assessment (for long term management)
- Undertake weed control
- Dieback maping and hygiene management plans and implementation
- Grow tube stock for rehabilitation
- Identify co-occuring significant species
- Produce interpretative material
- Map TEC boundaries
- Undertake further actions to recover co-occurring significant species
- Produce fire response plans for TEC occurrences
- Undertake hydrological investigations (specifically Organic Mound Springs TEC)

3.4 How the project has been designed and developed

The Project implements priority actions identified through the IRPs for each of the TECs and incorporates new information on occurences and methods of management through input from the project team and the Recovery Teams for TECs.

3.5 Partners

CALM is a major partner for this project, in addition input is available through the support of other agencies, local governments and community groups. Including Naragebup and City of Rockingham for recovery actions for Lake Richmond thrombolites, Friends of Brixton Street, Friends of Talbot Road and other friends groups where they exist for significant sites.

3.6 Management Structure

- Project implements priority actions identified through the project team, who report to the Recovery Teams for these TECs.
- Employment will be as CALM staff and CALM will provide the administrative and human resources management of the positions. Some works will be carried out by contract.

3.7 Outputs and Timelines

See section C1 of the project schedule for project 033121. The following outputs will be carried out over the twelve months of this project:

- Stygofauna cative breeding investigations
- Monitor condition & survey occurrences of TEC's & identify remedial actions
- Undertake weed mapping and monitoring
- Undertake seed provincing and TEC health assessment (for long term management)
- Undertake weed control
- Dieback maping and hygiene management plans and implementation
- Grow tube stock for rehabilitation
- Identify co-occuring significant species
- Produce interpretative material
- Map TEC boundaries
- Undertake further actions to recover co-occurring significant species
- Produce fire response plans for TEC occurrences
- Undertake hydrological investigations (specifically Organic Mound Springs TEC)

3.8 Milestones

From section C2 of project schedule for project 033121.

Quarter	Milestones
1	Works programming and timetabling for second year. Stygofauna survey, holding and breeding root mat species in aquaria. Monitor condition of occurrences of TEC's and where necessary identify remedial actions. Undertake weed mapping. Commence seed provincing/TEC health study. Undertake weed control. Dieback interpretation & implement of hygiene management plans. Grow tube stock for rehabilitation. Identify co-occurring threatened species.
2	Produce interpretive material for the promotion of recovery actions for TECs. Map boundaries of TEC occurrences. Monitor & survey occurrences of TEC's and where necessary identify remedial actions. Undertake further weed mapping. Seed collection for future rehabilitation. Undertake dieback management. Undertake further actions to recover co-occurring threatened species.
3	Monitor condition & survey occurrences of TEC's and where necessary identify remedial actions. Complete fencing. Plant out tube stock for rehabilitation. Seed collection for future rehabilitation.
4	Produce further interpretive material for the promotion of recovery actions for TECs. Monitor condition of occurrences of TEC's and where necessary identify remedial actions. Finalise fire management strategies Complete hydrological investigations Complete seed provincing/TEC health work Complete monitoring and evaluation of project, and audit

3.9 Expected Outcomes for Natural Resource Condition

The project contributes towards meeting the following Resource Condition Targets from the regional strategy:

- BR2: 50% of critical habitat for identified significant species and ecological communities protected by 2014
- BR1b: Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020, based on 2005 baseline data. Because the project focusses on some TECs that occur in what would be identified as significant wetlands, the project also has relevance to:
- WR2: Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005).

3.10 Risk Factors

Describe both "internal" risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and "external risks" (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).
While State Government funding is commited for the long term, there remains uncertanty of the long term availability or commitment of Australian Government funds through the NHT.

Climate variation imposes new stresses on the remaining bushland and wetlands. This necessitates new and adaptive responses to management of these areas and the recovery of the TECs.

3.11 Scope for Project Expansion or Contraction

This project deals with those TECs that are listed as Critically Endangered on the WA list. There are occurrences of 17 other TECs that, while endangered, are at a lower level of threat.

Where these TECs co-occur with other TECs and areas of significance it is possible to provide management actions that provide benefit beyond the listed TECs. In addition some individual occurrences of endangered TECs are under threats that, if not ameliorated, may result in the TEC becoming at higher threat. Therefore it is sometimes valuable to provide conservation management of a small number of occurrences of other TECs that are under specific threat.

Several of these TECs are also located in other NRM regions (SWCC and NACC). There has been some funding available through the SWCC for recovery actions of these TECs. Where possible the project team will coordinate actions across NRM boundaries.

The recovery actions carried out from year to year will vary, and as the larger "capital" type works, such as fencing, are completed the management will shift to ongoing recovery, rehabilitation and maintenance works (such as weed control and rehabilitation).

3.12 Cost

First Twelve Months (12 September 2004 to 11 September 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project Coordinator	1	69,604	69,600	50	34,800
Project Officer	1	56,780	56,780	100	56,780
Vehicle	17,000km	0.45	6,300	100	7,650
Office Support/accom.			10,500	100	10,500

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Specific Contract works: Dieback, flora survey, hydrological/stygofauna survey, rehabilitation, weed control etc.			70,000	100	70,000
Operating Costs: materials, fencing, herbicides etc					121,770
TOTAL					296,500

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project Coordinator	1	69,604	69,600	50	34,800
Project Officer	1	56,780	56,780	100	56,780
Vehicle	17,000km	0.45	6,300	100	7,650
Office Support/accom.			10,500	100	10,500
Specific Contract works: Dieback, flora survey, hydrological/stygofauna survey, rehabilitation, weed control etc.			70,000	100	20,000
Operating Costs: materials, fencing, herbicides etc					69,270
TOTAL					196 000

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
TOTAL					196,000

3.13 Estimated Total Investment Influenced by the Project

Total investment influenced by this project includes the in-kind costs from CALM and other partners in implementing specific actions of the project, as well as the investment by CALM and other agencies in the ongoing identification, protection and management of TECs in the Swan NRM region and for those occurrences of these TECs that occur outside of the Swan NRM Region.

3.14 Cost Effectiveness

- Funding is directly used for specific protection and recovery actions for TECs. The project also includes liaison and negotiation with land managers and adjoining areas that have impact on these TECs.

- The greater project of TEC protection and management also involves the statutory planning and environmental impact assessment processes to provide protection to TECs and other significant areas.

3.15 Long Term Strategy

- The recovery planning process includes continuous improvement, adaptive management and periodic formal review.
- As the project advances the actions carried out will be building on activities carried out in earlier stages of the project.

3.16 For how long will this kind of project be needed?

The implementation of the Recovery programs for TECs and threatened species have made considerable progress towards protecting TECs and significant species. However, changes to the threat to species and communities and thus formal status, cannot be achieved in a short time and a long-term commitment is required.

There will be a long term and ongoing commitment of State resources to the recovery of threatened species and Ecological Communities, and there would be expected to be similar long term commitment by the Australian government, local government and community groups.

3.17 Can the project become financially self-sustaining?

This project involves the recovery of a Nationally and State listed TECs, and conservation management on crown lands and so will require ongoing financial input from State and Australian governments.

There is the possibility of diversifying funding through the pursuit of sponsorships and other methods of fund-raising.

3.18 Can the project become socially self-sustaining?

There are already several community groups involved with this project. In addition the World Wide Fund for Nature, through its Threatened Species Network, has interest in recovery actions for threatened species and Ecological Communities.

A component of the project is involved in liaising with stakeholders in an effort to increase the support and input to the recovery process.

4. PROJECT ND04: PREDICTIVE MAPPING PLANNING TOOL FOR THREATENED SPECIES AND ECOLOGICAL COMMUNITIES

4.1 Summary

The Swan NRM region includes the Perth Metropolitan area, where there continues to be a considerable amount and rate of urban and other development. A considerable amount of this development will occur on areas still retaining natural bushland and wetlands, and often containing State and Commonwealth listed threatened species and ecological communities.

Currently, consideration of the possible impact of development and other decisions on threatened species and ecological communities is based on separate interrogation of several computer and paper based datasets, along with expert advice, field survey and assessment. Because of this fragmented approach, it can take some time for the Department of Conservation and Land Management to collate and provide biodiversity advice.

This project will use existing databases, provide an update process and develop a GIS system that will enable a more coherent prediction of what threatened species and ecological communities (and other biodiversity values) that may be located in any particular area. This will provide for better consideration of threatened species and ecological communities in decision making, and will provide information to better identify and prioritise significant areas of bushland and wetland.

The accuracy and usefulness of the end product will be dependent on the level of rigour used to develop, and the comprehensiveness and accuracy of data used. The first stage of this project will develop a GIS tool to interrogate existing datasets. This will initially be based on a simple proximity measure, for example, known populations of threatened species within 1, 5 or 10km. The results of such a tool would still require expert interpretation to ensure that users are aware of limitations and value of results provided, and specific biodiversity attributes. In addition it would not replace the need for field survey of proposals, or give definitive answers on presence or absence of any species, but would provide guidance to the level and targets of field survey.

Stage two of the project would then be to provide annotation of specialist, species-specific or habitat-specific information to assist interpretation. For example, if the species or ecological community is only located on a particular soil, or landform.

Stage three of the project would be the development of true predictive modelling of possible occurrence based on habitat features, such as soil type, associated vegetation and other habitat characters. It is not proposed to commence this phase of the project in this first funding as any such system would require an extremely good knowledge of each species and TEC habitat and life history. This information is lacking for the majority of threatened species and would require a significant field research requirement and the resource cost of development of any predictive system for all species or ecological communities would be prohibitive. However it may be a very valuable tool for some species. For example, some orchid species that have a short growing period, or do not flower every year, or only flower following wildfire, and so are very difficult to identify if any patch of bush is habitat or not. A species-

specific approach may be valuable for these species if we can identify specific habitat, or co-occurring species as indicators of likely presence.

Therefore, it is intended to include a trial to carry out predictive analysis for a small number of flora species to determine if prediction can be made based on floristic and other data and known sites of threatened flora occurrence. The results of this trial will provide guidance on whether further development is warranted.

The project will also include provision for update of digital and GIS databases from existing records that are not yet entered into the databases, and for some targeted field assessments (surveys or re-survey) to address major gaps in the data.

The system will advise planning decisions by State and Local government on land use, and include elements of feedback and science development to ensure that the system is improved in future years. The tool and methodology can be applied to other values (as well as threatening processes) and for other NRM regions.

The project also has the potential to provide for increased community education and awareness of threatened species and ecological communities, and land management practices that contribute to threatening processes. This will result in improved conservation of biodiversity.

The tool will be valuable outside of environmental assessment processes, as it is likely to be an important tool for decision making in relation to the conservation and management of threatened species and ecological communities.

4.2 Why this is a Priority Project

The primary management actions that this project relates to are:

REF	RANK	TARGET	MANAGEMENT ACTION
BM2.1	10	100% of critical habitat at regional and local scale for significant species and ecological communities identified by 2005	Develop methodology to identify significant species populations for monitoring, protection and habitat management Initiate program for prioritisation of significant species and their conservation and management.

There are also significant links and relevance to other management actions of the strategy. For example, the project will provide a tool to allow land use planning decisions to better consider threatened species and significant bushland areas (BM2.2 and BM1.3). It will also identify and prioritise significant species for management (BM2.1), and provide information to allow other stakeholders to involve themselves in the conservation and protection of significant species and ecological communities (BM2.5).

This project involves the implementation of recovery actions for Nationally and State listed threatened species and ecological communities that are found in Swan NRM region. The project links to other work by CALM and other organisations to protect and manage threatened species and ecological communities.
This projects achieves NHT priorities by:

Protecting and restoring the habitat of threatened species, threatened ecological communities and migratory birds; in that the project specifically seeks to provide conservation management to occurences of Flora species.

4.3 Past Achievements

This is a new project. However it builds upon existing datasets and processes that has guided the ongoing program of species recovery carried out by the Department of Conservation and Land Management over many years.

CALM has been using the datasets initially proposed to be automated in this project to provide advice to the statutory land use environmental impact assessment process for some years.

4.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Project deals with the protection of Nationally and State listed threatened flora, fauna species and ecological communities. Will allow efficient use of information in statutory and planning decisions.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Investment focussed on threatened flora, fauna species and ecological communities, in those locations where they actually or potentially occur. These sites would be included as priority areas in the SCC regional strategy.
(3) Investment should not exceed the public benefits that result.	All outcomes relate to the conservation of Nationally and State listed threatened flora, fauna species and ecological communities and so are to the public benefit. There is already considerable investment by State and Commonwealth.
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Prevention of destruction of threatened flora, fauna species and ecological communities requires significant and intensive effort. This project will provide information that will enhance and strengthen decision making.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	NA - See above
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Investment focussed on threatened flora, fauna species and ecological communities, in those locations where they actually or potentially occur. These are distributed across the region.
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	An adaptive management approach is a feature of species and TEC recovery. This project will assist the decision making for priority setting, and will identify priority areas for further survey.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	Precautionary principle is a basis of recovery planning and environmental impact assessment. This project will apply a precautionary principle to assist decision making.

4.5 Work Program

A project officer will be employed to implement and oversee the project. The officer will need significant GIS and biological knowledge and skills.

A detailed work plan will be developed at the start of the project in consultation with the relevant data custodians, and potential users of the database, and other stakeholders. The work plan will further clarify costed actions, who is responsible for implementing them and expected outcomes.

While this process of development of the work plan may result in changes to the sub-tasks of the project, it is envisaged that the basic sub-tasks for this project will include:
Development of GIS tool to "automatically" interrogate existing datasets. In stage one this will be based on a simple proximity measure, for example known records of threatened species within 1, 5 or 10km.

Provide annotation of specialist or species-specific or habitat-specific information to assist interpretation. For example if the species or ecological community is only located on a particular soil, or landform. This would be based on existing written records as well as interview with experts. It is unlikely that all species and TECs can be dealt with within the resources available in this first year, but a method of prioritising input based on threat, geographical location, accuracy or uniqueness of record etc could be determined.

Updating and maintenance of existing databases (input new records to flora, fauna and TEC databases). This will only include confirmed records, which may include records from "grey" literature (eg. consultant reports). This ongoing update and input of data will be essential to maintain currency (the system will have on-line access to allow constant updating of information). Again, it is probable that not all existing records can be inputted in the time and resources available, however a method of prioritising input based on threat, geographical location, accuracy or uniqueness of record could be determined. On-going data input will be provided by the Department of Conservation and Land Management.

Conduct additional surveys or re-survey of suitable habitat for priority taxa. (Survey of identified suitable habitat for the species may result in additional populations being located).

A trial to carry out predictive analysis for a small number of flora species to determine if prediction can be made based on floristic and other data and known sites of threatened flora occurrence.

The first year will deliver stage one and will commence stage two. At the end of the first year an adequate description of the requirements to complete stages two and three will be available along with a recommendation if the process of true predictive mapping should be further pursued, and if so, what additional data requirements this would entail.

4.6 How the project has been designed and developed

The project was identified at one of the Swan Catchment Council's investment planning workshops, where the basis of the project and desired outcomes was identified. The project was further developed by CALM staff and the SCC Natural Diversity Regional Coordinator in conjunction with specialist CALM staff.

4.7 Partners

CALM is a major partner for this project, in addition input is available through the support of other agencies, local governments WALGA (PBP) and community groups.

4.8 Management Structure

A project officer will be employed to implement and oversee the project. The officer will need significant GIS and biological knowledge and skills.

The project will be given direction through a project team with GIS and flora and fauna and TEC skills, and will be provided support and some guidance from the Swan Region Threatened Flora Recovery Team.

Employment will be as CALM staff and CALM will provide the administrative and human resources management of the positions. Day to day management would be under the CALM nature conservation team. Some works will be carried out by contract.

The project officer will work closely with stakeholders such as local government (including the PBP project), DPI, WA Museum and DoE and CALM regional and specialist staff.
Outputs and Timelines

The likely outputs of the project will be as follows:

Output	**Timeframe**
Development of a works program - A detailed work plan that includes summary of costed actions, who is responsible and expected outcomes.	Within two months from start of project.
Liaise with relevant stakeholders in the development and implementation of project, and in extension and education to stakeholders and community.	Throughout project.
Develop "stage one" GIS tool to "automatically" interrogate existing threatened species and ecological communities datasets. In stage one this will be based on a simple proximity measure, for example, known records of threatened species within 1, 5 or 10km.	Completed in third quarter.
Commence "stage two" of the project to provide annotation of specialist or species-specific or habitat-specific information to assist interpretation.	Commence in second quarter, and continue to end of project.

Output	Timeframe
Update and maintenance of existing databases – input new records to flora, fauna and TEC databases.	Commence in first quarter, and continue to end of project.
Conduct additional surveys or re-survey of suitable habitat for priority taxa.	To be carried out during appropriate time for each taxa or TEC, for example in spring or during flowering period.
Trial predictive analysis of a small number of flora species.	To be carried out during appropriate time for each taxa, for example in spring or during flowering period.
Description of the requirements to complete stages two and three along with a recommendation if the process of true predictive mapping should be further pursued	Commence and complete in fourth quarter.

4.9 Expected Outcomes for Natural Resource Condition

The project contributes towards meeting the following Resource Condition Targets from the regional strategy:

- BR2: 50% of critical habitat for identified significant species and ecological communities protected by 2014
- BR1b: Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020, based on 2005 baseline data.

4.10 Risk Factors

The process of development of the work plan may result in changes to the sub-tasks of the project, for example, it is possible that the size and accuracy of the grey literature and other new records are such that no real benefit is gained by including them, similarly other elements of the project may be found to be more costly or less valuable to deliver than expected.

The skills and experience required by the project coordinator are necessarily very high, there could be delays in attracting and employing a person of appropriate skills. This may influence the project schedule and work plan.

Potential for the stage three prediction process to be too complex to achieve, for example it is not possible to identify the driving factors that determine the distribution of many species.

In most cases any system will not replace the need to actually carry out adequate survey. Any system will identify areas where this survey is most likely required.

Need to avoid scenario where results of this system are used in an uninformed way to justify the clearing of bushland. Therefore the results of any system need to be interpreted by specialist interpreters skilled and knowledgeable people who have understanding of the flora and fauna of an area and who understand the limitations of any system.

The ongoing update and input of data is essential to maintain currency and accuracy of this system. There needs to be in place systems to facilitate this update.
Scope for Project Expansion or Contraction
The full project requires further development. To be a true "predictive" system would require significantly greater investment (2-3 times). The available funding would provide a simple proximity system based on known information that would still require expert knowledge to correctly use and interpret the information.

The first year will deliver stage one and commence stage two, will develop a more complete description of stages two and three, and recommend if the process of true predictive mapping should be further pursued, and if so what additional data requirements this would entail. This may then result in a future ask for funding for an expanded project.

4.11 Cost

First Six Months (to June 30th 2005) Not Applicable

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Coordinator	1	74,400	74,400	100	74,400
GIS support		17,000	17,000	100	17,000
Office Support		3,500	3,500	100	3,500
Officer – update of data sets and field check -	1	63,969	63,969	100	63,900
Materials – mapping and field			2,500	100	2,500
Total					161,300

Financial Year 2006-07
The results of the first year of the project will be used to determine the value of pursuing a more complex predictive tool in future years.

4.12 Estimated Total Investment Influenced by the Project

The CALM recurrent funding associated with threatened flora management in the Swan Region is in excess of $200,000.

This does not include the significant input to statutory processes to protect threatened species, that is carried out by State agencies (CALM, DoE and DPI) as well as local government. The assessment of biodiversity values occupies many $10,000's of investment in the development industry.

4.13 Cost Effectiveness

The project will clarify the requirements for field assessment of threatened species and ecological communities during planning processes. The project also includes liaison and negotiation with land managers and adjoining areas that have impact on these species.

Will provide a more rapid response to queries about the likely occurrence of threatened species and ecological communities during planning processes and so provide for rapid determination of impact.

The greater project of threatened flora protection and management also involves the statutory planning and environmental impact assessment processes to provide protection to threatened flora and other significant areas.

The tool will be valuable outside of the environmental assessment processes as it is likely to be an important tool for decision making in relation to the conservation and management of threatened species and ecological communities.

4.14 Long term Strategy

The recovery planning process includes continuous improvement, adaptive management and periodic formal review. As the project advances the actions carried out will be building on activities carried out in earlier stages of the project.

4.15 For how long will this kind of project be needed?

Given the rate and extent of development occurring in the Swan Region there will be an ongoing need for adequate assessment of environmental impact. Indeed, as clearing for development continues to reduce the amount of remnant vegetation in the Swan NRM region, the need for adequate assessment will only increase.

Therefore the need for such a system as this, together with adequate on-ground survey, will be ongoing. For the system to continue to be valuable and current it is essential that input of data is maintained.
The tool will be valuable outside of the environmental assessment processes as it is likely to be an important tool for decision making in relation to the conservation and management of threatened species and ecological communities.
There will be a long term and ongoing commitment of State resources to the conservation and recovery of threatened species and ecological communities, and there would be expected to be similar long term commitment by the Australian government, local government and community groups.

4.16 Can the project become financially self-sustaining?

This project facilitates the protection and recovery of Nationally and State listed threatened species and ecological communities, and so will require ongoing financial input from State and Australian governments.
The charging of a fee for the supply of information to commercial proponents provides a mechanism to support the ongoing data management of the system. However, it would not be anticipated that non-commercial applicants, such as community groups, local government or government agencies would be charged a fee. The State government will ensure the maintenance of the system once developed.

4.17 Can the project become socially self-sustaining?

Information will be useful to others. Many community groups and agencies are involved in the collection and provision of data that would become a part of this tool.

A component of the project could provide liaison and education with stakeholders in an effort to increase the support and input to the recovery process. This should result in land managers and public utilities in better considering, protecting and managing threatened flora populations in future.

5. PROJECT ND05: WESTERN SWAMP TORTOISE RECOVERY PLAN

5.1 Summary

This Project will implement one year of the ongoing Recovery Plan for the Western Swamp Tortoise.

The Western Swamp Tortoise (WST) is one of the world's most endangered tortoise or turtle, with less than 50 mature individuals in existence. The status of this species is: Threatened (WA Wildlife Conservation Act 1950), Critically Endangered (ranking by WA Threatened Species Scientific Committee), Endangered (Commonwealth Environment Protection and Biodiversity Conservation Act 1999), Critical (Action Plan for Australian Reptiles, 1993), Critically Endangered under IUCN (2000) Red List Criteria A2c and D, listed as Critically Endangered in the IUCN 2000 Red List of threatened animals.

The long term aim of this project is to decrease the chance of extinction of the Western Swamp Tortoise. The Recovery Plan for the Western Swamp Tortoise identifies recovery actions to be implemented over a three to five year period. The Recovery Plan also includes success criteria and actions to measure the progress of the recovery over that period. While these criteria will be used in monitoring the success and outcomes on this Project, there will be no change in status of the Western Swamp Tortoise in the twelve months covered by this Project.

The recovery actions address and seek to ameliorate priority threats to the species (feral predators, changes to hydrology, reduced population size, lack of knowledge) and are carried out on the known remaining, and possible future habitat of the species.

5.2 Why is this a Priority Project?

Say how the project relates to the prioritised management actions in Chapters 7 to 12 of the *Swan Region Strategy for Natural Resource Management: Investment Plan.* Briefly explain the "big picture" and whether this project either complements or is essential to other governmental, private sector or community activities that are underway to protect the particular asset. What "leverage" does the project exert?

The primary management actions that this project relate to are:

REF	RANK	TARGET	MANAGEMENT ACTION
BM2.2	5	100% of all relevant NRM legislation and policy in state and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006	Develop recovery plans/interim recovery plans and threat abatement plans

BM2.5	4	30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008	Establish collaborative partnerships to ensure the conservation management and recovery planning of significant species and significant ecological communities
BM3.3	8	15% reduction in the use of exotic species in urban landscaping by 2008	Implement priority programs for feral animal control by State and Local government and other stakeholders (eg western shield, and identified priority local and site feral animal control).
WM2.4	3	Develop and implement management restoration plans for priority wetlands by 2008	Implement strategic programs in areas identified in WM2.1 to protect, manage and restore priority wetlands

There is also significant links and relevance to other management actions of the strategy. For example the project deals with threatening processes at the point where those processes are having acute impact (species extinction). The project results in additions and improved management of the CAR conservation reserve system. The project is carried out on significant wetlands and provides information and demonstration of wetland management which is applicable elsewhere.

(note that there are differences in the actions listed between Section 4 and Section 5 of the Strategy, and between the Strategy and the draft Investment plan).

This project involves the implementation of recovery actions for Nationally and State listed Critically Endangered species that is only found in Swan NRM region. The project links to other work by CALM and other organisations to protect and manage habitat of threatened species.
This projects achieves NHT priorities by:

- Protecting and restoring the habitat of threatened species, threatened ecological communities and migratory birds; in that the project specifically seeks to decrease the chance of extinction of the Western Swamp Tortoise.
- Protecting and restoring significant freshwater, marine and estuarine ecosystems; in that three significant areas of freshwater wetland (two of which are listed on the register of the national estate, and in the 'Directory of Important Wetlands in Australia') are protected and managed. Information gained on the management of high value freshwater wetlands can be applied elsewhere.
- Preventing or controlling the introduction and spread of feral animals, aquatic pests, weeds and other biological threats to biodiversity; in that information gained on the control and management of threatening processes in these significant reserves can be applied elsewhere.
- Establishing and effectively managing a comprehensive, adequate and representative system of protected areas; in that the three areas covered by this Project are in Nature Reserves, part of the formal conservation reserve system

5.3 Past Achievements

The implementation of the WST Recovery Actions over the past 10-15 years has made considerable progress towards being able to move the species to 'Endangered' however, the long time to sexual maturity (10-15 years) and large generation time (at least 40 years) means that progress is slow and a long-term commitment is required. The WST Recovery Plan has been funded by the Endangered Species Program since 1998.

The Actions undertaken include:

- Perth Zoo's development of a successful captive breeding program
- Construction of fox-proof fence at Ellen Brook and Twin Swamps Nature Reserves
- 1080 baiting
- Establishment of bore pump and pipeline at Twin Swamps to supplement swamps in dry years
- Additional land purchases added to Ellen Brook Nature Reserve
- Progressive rehabilitation of new additions for tortoise habitat
- Land purchased at Mogumber Nature Reserve, foxes controlled and re-introductions commenced
- Re-stocking of Twin Swamps Nature Reserve (after fox removal)
- Extensive research and monitoring undertaken into ecology, breeding success, habitat threats and management success

5.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Recovery of Nationally and State listed threatened species, most work carried out on public land.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Investment focussed on critically endangered species, in those locations where it is found, and identification of future translocation sites of most chance of success.
(3) Investment should not exceed the public benefits that result.	All outcomes are to the public benefit, already considerable investment by State and Commonwealth.
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Prevention of extinction of critically endangered species requires significant and intensive effort.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	NA - See above
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Investment focussed on critically endangered species, in those locations where it is found, and identification of future translocation sites of most chance of success.
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	Achieved through recovery plan, periodic review, and recovery team.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	Precautionary principle is a basis of recovery planning

5.5 Work Program

- Conduct feasability study of suitable translocation sites in the Moore River Nature Reserve/National Park area.
- Undertake water quality/depth monitoring at Twin Swamps and Ellen Brook Nature Reserves
- Management and protection of WST habitat on Twin Swamps and Ellen Brook Nature Reserves (fence and access maintenance, vegetation and WST refuge manegment, fire management including prescribed burn at Twin Swamps)
- Undertake review of hydrology monitoring data for Mogumber
- Management of Western Swamp Tortoise captive breeding program at the Perth Zoo.
- Undertake pest animal control at Ellen Brook, Twin Swamps and Mogumber Nature Reserves.
- Formation and ongoing support of "Friends of Western Swamp Tortoise" group
- Undertake targeted searches and monitoring of Western Swamp Tortoises at Ellen Brook, Twin Swamps and Mogumber Nature Reserves to recapture tortoises for long term population estimates
- Completion of the 2004 Western Swamp Tortoise population estimates for Ellen Brook, Twin Swamps and Mogumber Nature Reserves.
- Completion of the 2004 Western Swamp Tortoise Recovery Team Annual report.

5.6 How the project has been designed and developed

Project implements priority actions identified through the Recovery Plan for the WST and through input from Recovery Team.

The 3rd edition of the Recovery Plan was released in 2004 following a review of the program. The Recovery Team identifies and implements the priority actions from the Recovery Plan, and provides ongoing coordination and management of the project.

5.7 Partners

- The Department of Conservation and Land Management will coordinate the recovery program on behalf of the Swan Catchment Council and the majority of the works will be carried out by CALM, Perth Zoo and University of Western Australia.
- The Western Swamp Tortoise Recovery Team consists of representatives from the Department (Swan Coastal District, Science Division and the WA Threatened Species and Communities Unit (WATSCU)), the Zoology Department of The University of Western Australia, Perth Zoo, Curtin University of Technology (Department of Biomedical Science) ,World Wide Fund for Nature Australia, the Swan Catchment Council and the Adelaide Zoo.
- World Wide Fund for Nature, in partnership with Department of CALM, Ellen-Brockman Integrated Catchment Group and Greencorps are also currently undertaking a project to assist in the conservation of the Western Swamp Tortoise.

5.8 Management Structure

Project implements priority actions identified through the Recovery Plan for the WST and through input from Recovery Team.The 3rd edition of the Recovery Plan was released in 2004 following a review of the program. The Recovery Team then identifies and implements the priority actions from the Recovery Plan, and provide ongoing coordination and management of the project.

5.9 Outputs and Timelines

See section C1 of the project schedule. The following outputs will be carried out over the twelve months of this project:

- Conduct feasability study of suitable translocation sites in the Moore River Nature Reserve/National Park area.
- Undertake water quality/depth monitoring at Twin Swamps and Ellen Brook Nature Reserves
- Management and protection of WST habitat on Twin Swamps and Ellen Brook Nature Reserves (fence and access maintenance, vegetation and WST refuge manegment, fire management including prescribed burn at Twin Swamps)
- Undertake review of hydrology monitoring data for Mogumber
- Management of Western Swamp Tortoise captive breeding program at the Perth Zoo.
- Undertake pest animal control at Ellen Brook, Twin Swamps and Mogumber Nature Reserves.
- Formation and ongoing support of “Friends of Western Swamp Tortoise” group
- Undertake targeted searches and monitoring of Western Swamp Tortoises at Ellen Brook, Twin Swamps and Mogumber Nature Reserves to recapture tortoises for long term population estimates
- Completion of the 2004 Western Swamp Tortoise population estimates for Ellen Brook, Twin Swamps and Mogumber Nature Reserves.
- Completion of the 2004 Western Swamp Tortoise Recovery Team Annual report.

5.10 Milestones

From section C2 of project schedule.

First quarter recovery actions implemented	30/09/2004	Conduct feasability study of suitable translocation sites in the Moore River Nature Reserve/National Park area. Undertake water quality/depth monitoring at Twin Swamps, Ellen Brook and Mogumber Nature Reserves Undertake prescribed burn on Twin Swamps Nature Reserve Undertake review of hydrology monitoring data for Mogumber Undertake trageted searches and monitoring for Western Swamp Tortoises at Ellen Brook, Twin Swamps and Mogumber Nature Reserves. Carry out pest animal control at Ellen Brook, Twin Swamps and Mogumber Nature Reserves. Management of captive breeding program at Perth Zoo Provide Ongoing support to "Friends of Western Swamp Tortoise"
Second quarter recovery actions implemented	31/12/2004	Undertake water quality/depth monitoring at Twin Swamps, Ellen Brook and Mogumber Nature Reserves Undertake trageted searches and monitoring for Western Swamp Tortoises at Ellen Brook, Twin Swamps and Mogumber Nature Reserves. Carry out pest animal control at Ellen Brook, Twin Swamps and Mogumber Nature Reserves. Management of captive breeding program at Perth Zoo Provide Ongoing support to "Friends of Western Swamp Tortoise"

Third quarter recovery actions implemented	31/03/2005	Completion of the 2004 Western Swamp Tortoise population estimates for Ellen Brook, Twin Swamps and Mogumber Nature Reserves. Undertake water quality/depth monitoring at Twin Swamps, Ellen Brook and Mogumber Nature Reserves Undertake trageted searches and monitoring for Western Swamp Tortoises at Ellen Brook, Twin Swamps and Mogumber Nature Reserves. Carry out pest animal control at Ellen Brook, Twin Swamps and Mogumber Nature Reserves. Management of captive breeding program at Perth Zoo Provide Ongoing support to "Friends of Western Swamp Tortoise"
		Completion of the 2004 Western Swamp Tortoise Recovery Team Annual report.
Forth quarter recovery actions implemented	31/05/2005	Management of captive breeding program at Perth Zoo. Completion of 2004 tortoise hatching in captive colony at Perth Zoo.
		Carry out pest animal control at Ellen Brook, Twin Swamps and Mogumber Nature Reserves. Provide Ongoing support to "Friends of Western Swamp Tortoise"
		Undertake water quality/depth monitoring at Twin Swamps, Ellen Brook and Mogumber Nature Reserves Undertake trageted searches and monitoring for Western Swamp Tortoises at Ellen Brook, Twin Swamps and Mogumber Nature Reserves.

5.11 Expected Outcomes for Natural Resource Condition

The project contributes towards meeting the following Resource Condition Targets from the regional strategy.

- BR2: 50% of critical habitat for identified significant species and ecological communities protected by 2014
- WR2: Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005).

The outcomes of this Project is to decrease the chance of extinction of the Western Swamp Tortoise. The Recovery Plan for the Western Swamp Tortoise identifies success criteria and actions to achieve those criteria over a three to five year period. While these criteria will be used in monitoring the success and outcomes on this Project, there will be no change in status of the Western Swamp Tortoise in the twelve months covered by this Project.

5.12 Risk Factors

Describe both "internal" risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and "external risks" (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).

Risks:

- while State Government funding is commited for the long term, there remains uncertianty of the long term commitment of Australian Government funds through the NHT.
- Climate variation imposes new stresses on the remaining wetlands suitable for this species. This necessitates new and adaptive responses to management of the wetlands and the recovery of the species.

5.13 Scope for Project Expansion or Contraction

There is scope for expansion of this project specifically relating to the works required for the recovery of the WST, but also to expand the project to become a "threatened fauna" project that provides recovery and management actions for a greater number of threatened fauna.

Western Swamp Tortoise Recovery Program:
If Moore River Nature Reserve site is demonstrated to be suitable for translocation by a hydrological assessment, undertake site works to restrict existing drainage effects, control feral predators, and install fencing, then commence translocations of captive bred animals with a view to establishing a fourth population can commence. The recovery program aims to establish five populations.

Complete negotiations for acquisition of habitat adjoining Ellen Brook Nature Reserve from Midland Brick, add to the nature reserve, enclose with a fox proof fence and commence predator control. Ellen Brook population can extend onto this habitat and incorporate a number of animals still known to exist on Midland Brick land.

If negotiations with Perth Airport are successful, undertake protection measures with Perth airport on designated translocation site, including feral predator control, fox proof fencing, and potentially artificial maintenance of required water regime, then translocate captive bred animals on a trial basis to determine whether one of the five populations required can be established at Perth Airport.

Undertake a hydrological study of Twin Swamps nature Reserve to assess the impacts of increasing arid environment and groundwater abstraction. Determine, and implement the management measures necessary to maintain the tortoise's wetland habitat.

Recovery of Threatened Terrestrial Fauna of Swan Region:
There are a number of threatened terrestrial fauna species recorded within the Region that are listed under the State Wildlife Conservation Act (1950) as rare, or likely to become extinct.

These include six mammal species (three of which are now extinct in the Region), eight bird species (two of which are now extinct in the Region), two reptile species and three invertebrate species.

The priorities for recovery action for listed threatened fauna species in the Region is as follows:

Hurleya sp.	Crystal cave crangonyctoid	CR
Pseudemydura umbrina	Western Swamp Tortoise	CR
Calyptorhynchus latirostris	Carnaby's Black-Cockatoo	EN
Synemon gratiosa	Graceful sun moth	EN
Leioproctus douglasiellus	Native bee	EN
Neopasiphae simplicior	Native bee	EN
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	P3 (to be reranked)
Setonix brachyurus	Quokka	VU
Dasyurus geoffroii	Chuditch	VU

A larger project could be developed that provided recovery actions for these species. Note that the first two are dealt with in existing priority projects.

Additionally, there are 29 terrestrial species (seven mammals, ten birds, three reptiles and nine invertebrates) that are included on Department of Conservation and Land Management's (CALM) priority list.

This list includes those species that are apparently rare however there is inadequate information available to properly assess the status of those species. Additionally, the list includes those species that are known to be rare but are not currently threatened, and as such require ongoing monitoring.

A larger project could be developed that provided research, assessment and recovery actions for these species.

5.14 Cost

First Twelve Months (1 July 2004 to 30 June 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Chief Investigator/ and staff			142,000		52,400
Management of WST reserves			43,900		10,000
Population and environmental monitoring			10,700		
Captive breeding			56,500		40,800
translocation					16,200
			253,100		119,400

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
TOTAL			253 100		119 400

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
TOTAL			253 100		119 400

The additional costs for future recovery of the species are: (relative investment to be determined, but likely to require increase of Australian Government funding to $240 000)

2004/2005 -	Hydrological study and level survey of Moore River NR site -	$12000
	Earthworks Moore River site	$3000
	Mogumber - ongoing groundwater and salinity monitoring	$3000
	Twin Swamps bore running and maintenance	$3000
	Costs associated with Perth airport investigations	$20000
	Total	**$41000**

2005/2006-	Tortoise proof fencing Moore river site	$10 000
	Land acquisition	$75000
	New fox baiting Moore River site	$6000 pa
	Artificial aestivating tunnels - Moore River site	$3000
	Replace 1/3 of Ellen Brook VP fence	$40000
	Rehab Midland Brick land added to Ellen Brook Nature Reserve	$15000
	Ellen brook selective weed control (contract)	$10000
	Twin swamps hydrological study(preferably sooner)	$50000
	Mogumber - ongoing groundwater and salinity monitoring	$3000
	Twin Swamps ongoing groundwater monitoring	$5000
	Moore river ongoing groundwater monitoring	$2000
	Undertake swamp water quality monitoring and analysis all sites (not including invertebrate analysis	$10000
	Install second bore at Twin swamps	$30000
	Twin Swamps bore running and maintenance	$3000
	Depth guide data loggers (16) and palm top	$10000
	Costs associated with Perth airport investigations	$20000
	Total	**$292 000**
	+ additional zoo and research costs $40 000	

2006/2007	New fox baiting Moore River site	$6000 pa
	Replace 1/3 of Ellen Brook VP fence	$40000
	Rehab Midland Brick land added to Ellen Brook Nature Reserve	$15000
	Ellen brook selective weed control (contract)	$10000
	Mogumber - ongoing groundwater and salinity monitoring	$3000
	Twin Swamps ongoing groundwater monitoring	$5000
	Moore river ongoing groundwater monitoring	$2000
	Undertake swamp water quality monitoring and analysis all sites (not including invertebrate analysis	$10000

	Twin Swamps bore running and maintenance		$3000
	Costs associated with Perth airport investigations		$20000
		Total	**$114000**
	+ additional zoo and research costs $40 000		
2007/2008	Replace 1/3 of Ellen Brook VP fence		$40000
	New fox baiting Moore River site		$6000 pa
	Rehab Midland Brick land added to Ellen Brook Nature Reserve		$15000
	Ellen brook selective weed control (contract)		$10000
	Mogumber - ongoing groundwater and salinity monitoring		$3000
	Twin Swamps ongoing groundwater monitoring		$5000
	Moore river ongoing groundwater monitoring		$2000
	Undertake swamp water quality monitoring and analysis all sites (not including invertebrate analysis		$10000
	Twin Swamps bore running and maintenance		$3000
	Costs associated with Perth airport investigations		$20000
		Total	**$114000**
	+ additional zoo and research costs $40 000		

In addition to these costs Perth Zoo's costs are increasing and we probably need to provide in the order of an additional $10000 to $20000 a year. Likewise we need to consider that given the expanding program and greater number of translocation populations, whether the Chief Investigator and research component should increase, whether this be more of Gerald's time and or fund a component of Andrew's research fellowship time (Andrew is putting in a fair amount of his own time to the Recovery program currently), but this could easily be increased by $20000 per annum with another $10000 support costs. The $20000 towards the Airport site assumes Perth airport will be willing to resource fences, bores and capital costs (we have not got to this point yet).

5.15 Estimated Total Investment Influenced by the Project

$ This year
NHT SCC - $119 400
State $133 700 includes Perth Zoo and CALM costs.
+ Wetlands conservation grant $12 500
+ Community conservation grant to Friends $5 000
Tiwest possible $18 500
WWF grant for Friends and CALM $13 500
MRD possibly $20 000 for rehab

5.16 Cost Effectiveness

Funding is directly used for captive breeding and employment of chief investigator. Bulk of funding increase in next three years is to undertake hydrological assessments to ensure habitat can be sustained with increased aridity and lower groundwater, and to establish fox proof fencing to remove predation. These are the two greatest threats to this species.

5.17 Long Term Strategy

5.18 Can the project's aims and methods be further developed?

The recovery planning process includes continuous improvement, adaptive management and periodic formal review.

5.19 For how long will this kind of project be needed?

The implementation of the WST Recovery Plan over the past 10 years has made considerable progress towards being able to move the species to 'Endangered' however, the long time to sexual maturity (10-15 years) and large generation time (at least 40 years) means that progress is slow and a long-term commitment is required.

The outcomes of this Project is to decrease the chance of extinction of the Western Swamp Tortoise. The Recovery Plan for the Western Swamp Tortoise identifies success criteria and actions to achieve those criteria over a three to five year period. While these criteria will be used in monitoring the success and outcomes on this Project, there will be no change in status of the Western Swamp Tortoise in the twelve months covered by this Project.

5.20 Can the project become financially self-sustaining?

This project involves the recovery of a Nationally and State listed threatened species, and conservation management on crown lands and so will require ongoing financial input from State and Australian governments.

However the WST can be considered an "icon" species for the region and because of its high public profile the Western Swamp Tortoise Recovery Plan lends itself to sponsorships and other methods of fund-raising. In recent years the amount of money raised by sponsorships and public appeals has been a feature of the research into and management of the Western Swamp Tortoise. Since 1988, in addition to the provision of funds and staff time from the Department and Perth Zoo, and grants from the Natural Heritage Trust, money, equipment, substantial discounts on purchases or direct assistance have come from local, national and international sources, including:

Aherns Pty Ltd; British Chelonia Group; Bundesverband für fachgerechten Natur-und Artenschutz (Germany); Chelonia Institute; Deutsche Gesellschaft für Herpetologie und Terrarienkunde (DGHT); East-West Veterinary Supplies; Endangered Species Program, Environment Australia; Kailis Brothers; Midland Brick Co Ltd; Minerva Airconditioning; School of Biomedical Sciences, Curtin University of Technology; Unidata Australia Pty Ltd; WA Nature Conservation and National Parks Trust Account; Western Australian Water Corporation; World Wide Fund for Nature Australia; Zoology Department, The University of Western Australia.

5.21 Can the project become socially self-sustaining?

World Wide Fund for Nature, in partnership with Department of CALM, Ellen-Brockman Integrated Catchment Group and Greencorps are also currently undertaking a project to assist in the conservation of the Western Swamp Tortoise. The 10 member team is involved in on ground rehabilitation at Ellen Brook and Twin Swamps Nature Reserves. The team also is also developing a communication tool to aid in the recovery of the species and raise awareness of associated issues such as water management and biodiversity threats. Another

goal of the group is to assist in the development of a "Friends of" group to also aid in the recovery of the species.

Also, because of its high public profile the Western Swamp Tortoise Recovery Plan lends itself to sponsorships and other methods of fund-raising. In recent years the amount of money raised by sponsorships and public appeals has been a feature of the research into and management of the Western Swamp Tortoise. Since 1988, in addition to the provision of funds and staff time from the Department and Perth Zoo, and grants from the Natural Heritage Trust, money, equipment, substantial discounts on purchases or direct assistance have come from local, national and international sources, including:

Aherns Pty Ltd; British Chelonia Group; Bundesverband für fachgerechten Natur-und Artenschutz (Germany); Chelonia Institute; Deutsche Gesellschaft für Herpetologie und Terrarienkunde (DGHT); East-West Veterinary Supplies; Endangered Species Program, Environment Australia; Kailis Brothers; Midland Brick Co Ltd; Minerva Airconditioning; School of Biomedical Sciences, Curtin University of Technology; Unidata Australia Pty Ltd; WA Nature Conservation and National Parks Trust Account; Western Australian Water Corporation; World Wide Fund for Nature Australia; Zoology Department, The University of Western Australia.

6. PROJECT ND006: RECOVERY OF THREATENED FLORA OF SWAN REGION

6.1 Summary

Previous NHT funded projects have resulted in the preparation of interim recovery plans for all Critically Endangered flora of the Swan Region. In addition, with the assistance of NHT funding, a regional flora plan dealing with all threatened flora occurring in the Swan Region was produced. (Evans, R., Willers, N, and Mitchell D. (2003) Threatened flora of Swan Region. Unpublished report to the Department of Conservation and Land Management, and Environment Australia.)

Implementation of those plans is progressing, but not at the level of funding identified in the plans. This project will implement priority recovery actions for flora species in the Swan NRM Region, focussing on actions for the seven critically endangered plant species in the Swan Region. (In decreasing order of threat: Baby blue orchid, Cinnamon Sun Orchid, Curved-leafed Grevillea, Grand Spider Orchid, Split-leaved Grevillea, Swamp Starflower, Narrow Curved-leafed Grevillea). Priority recovery actions will also be carried out for other threatened flora species in the region where they co-occur with populations of Critically Endangered species, or where the action will prevent a change to the status of a species.

This project has significant links and relevance to management actions of the Swan Strategy. Primarily, it implements recovery actions for threatened species. In addition the project deals with threatening processes at the point where those processes are having acute impacts (eg. species extinction). The project is carried out on significant areas of bushland and wetlands and provides information and demonstration of management actions that are applicable elsewhere.

6.2 Why is this a Priority Project?

The primary management actions that this project relate to are:

REF	RANK	TARGET	MANAGEMENT ACTION
BM2.2	5	100% of all relevant NRM legislation and policy in state and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006	Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority significant species and ecological communities Review and prioritise existing conservation management actions for significant species and threatened ecological communities, and threat abatement plans
BM2.5	4	30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008	Establish collaborative partnerships to ensure the conservation management and recovery planning of significant species and significant ecological communities

There are also significant links and relevance to other management actions of the strategy. For example, the project will identify and prioritise significant species for management (BM2.1), the project deals with threatening processes (BM3.3) at the point where those processes are having acute impact (species extinction). The project will also result in additions and improved management of the CAR conservation reserve system (BM1.2, BM1.4).

This project involves the implementation of recovery actions for Nationally and State listed flora species that are found in Swan NRM region. The project links to other work by CALM and other organisations to protect and manage threatened species and ecological communities. This projects achieves NHT priorities by:

- Protecting and restoring the habitat of threatened species, threatened ecological communities and migratory birds; in that the project specifically seeks to provide conservation management to occurences of Flora species.
- Preventing or controlling the introduction and spread of feral animals, aquatic pests, weeds and other biological threats to biodiversity; in that information gained on the control and management of threatening processes in these significant reserves can be applied elsewhere.

6.3 Past Achievements

This is a new project. However it builds upon previous NHT funded projects to prepare Interim Recovery Plans for threatened species. It is also based on the ongoing program of species recovery carried out by the Department of Conservation and Land Management over many years.

6.4 Incorporation of NHT Principles

Describe how this project incorporates the NHT2 Investment Principles given in the table below.

(1) Generates the greatest public benefits per dollar of public investment.	Recovery of Nationally and State listed flora species.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Investment focussed on endangered flora species, in those locations where they occur. These sites would be included as priority areas in the SCC regional strategy.
(3) Investment should not exceed the public benefits that result.	All outcomes relate to the recovery of Nationally and State listed flora species and so are to the public benefit, already considerable investment by State and Commonwealth.
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Prevention of destruction of endangered Flora species requires significant and intensive effort.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	NA - See above
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Investment focussed on endangered Flora species, in those locations where they actually occur.

(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	An adaptive management approach is a feature of species and TEC recovery and is achieved through recovery plan, periodic review, and recovery team.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	Precautionary principle is a basis of recovery planning

6.5 Work Program

Activities	Method	Outputs
Develop detailed annual works plan.	A detailed work plan will be developed at the start of each year in consultation with threatened flora recovery teams, CALM, the NRM group, and relevant stakeholders. The work plan will include a summary of costed actions, identify who is responsible for implementing them and expected outcomes.	Recovery actions listed in priority/seasonal order. All stakeholders consulted and approval obtained for recovery actions.
Undertake actions listed in the work plan.	Complete priority actions as listed in each year's work plan under the coordination of relevant recovery teams.	Recovery and improved conservation of threatened plant species.

Populations for each taxon will be monitored, threats assessed and recovery actions prioritised. An annual works program will be developed to ensure the efficient completion of these actions by the target date.
Recovery actions include survey, monitoring, liaison, fencing, induced recruitment, fire research, weed control, habitat rehabilitation, dieback control, community awareness, and investigation of biological and ecological requirements.
Based on the existing Interim Recovery Plans (IRPs) and project staff advice, the first year's works program is likely to be based on the following priority actions for each of the Critically endangered species (CR).

Species name	**Number of populations**	**Recovery Plan status**	**Rank**	**Actions to be carried out in this Priority Project.**
Caladenia huegelii	30	draft	CR	Monitoring, community awareness, further surveys, weed control, liaison, fire research, Declared Rare Flora (DRF) markers.
Calytrix breviseta subsp. Breviseta	2	completed	CR	Transfer land title, liaison, community awareness, control rabbits, collect seed, weed control, monitor
Thelymitra manginiorum	2	completed	CR	Fire research, monitor, liaison, community awareness,
Grevillea althoferorum	1	completed	CR	Fire research, monitor, liaison, further surveys, signage, community awareness, pamphlet production
Epiblem grandiflorum var. cyanea	1	completed	CR	Fire research and management strategy, community awareness, liaison, genetic study (possible PhD project)
Grevillea curviloba subsp. curviloba	5	completed	CR	Weed control, rehabilitation, monitor, fencing, liaison, DRF markers, community awareness,
Grevillea curviloba subsp. incurva	15	completed	CR	Weed control, rehabilitation, monitor, liaison, fencing, DRF markers, community awareness,

6.6 How the project has been designed and developed

The Project implements priority actions identified through the IRPs for each of the flora species and incorporates new information on occurrences and priorities for management through input from the project team and the Recovery Teams.

6.7 Partners

CALM is a major partner for this project, in addition input is available through the support of other agencies, local governments, universities, landowners and community groups. The Botanic Parks and Gardens Authority, and land managers, such as Westrail and Main Roads will be included in the project.

6.8 Management Structure

A project officer will be employed to implement and oversee recovery activities under the direction of the project team, and the Swan Region Threatened Flora Recovery Team.

Employment will be as CALM staff, and CALM will provide the administrative and human resources management of the positions. Day to day management would be under the CALM Swan Region nature conservation team. Some works will be carried out by contract. Overall guidance for the project will be by the Swan Region Threatened Flora Recovery Team.

Recovery teams include a wide range of membership from community groups, landowners, volunteers, Shires and other government departments. Frequently, members of flora recovery teams are also members of NRM Groups. Recovery Teams are responsible for overseeing the development of works programs, implementation of recovery plans, prioritization of recovery actions and seeking additional resources to implement recovery actions.

The project officer will work closely with stakeholders such as landholders, land managers, 'Friends' and other community groups that are involved in managing areas that contain threatened flora. Department of Conservation and Land Management (CALM) regional staff support the project and are assisting the project officer in implementing recovery actions. Other groups that are likely to be involved in the project include the Wildflower Society, the WA Native Orchid Study and Conservation Group and many volunteers that are not on recovery teams.

6.9 Outputs and Timelines

The work program for the project will be finalised following confirmation and receipt of funding. The timing of many of the actions is highly seasonal and there will need to be consideration of this seasonal timeframe of activity with the funding and reporting timetable.

Several recovery actions are ongoing maintenance activities and will continue beyond the timeframe of this funded project. However, it is expected that all key actions will begin in the first year and many will be completed by the end of the second year of the project.

Actions	Start and finish	Key milestones
Develop an annual works program for all taxa	Within two months from start of project and at start of each new years program	A detailed work plan that includes summary of costed actions, who is responsible and expected outcomes
Conduct surveys of suitable habitat for all taxa	Over the project during plants' flowering season	Survey of identified suitable habitat for the species resulting in additional populations being located.
Annual monitoring of all taxa	annually during plants' flowering season	Improved population and threat information resulting in better management and conservation of target species
Liaise with relevant stakeholders in the development and implementation of recovery actions	As required over the project	Support for, and ownership of, recovery actions by all stakeholders
Increase community awareness through field visits, newspaper articles, radio interviews, posters and presentations	Opportunistically during the project	An increased awareness of threatened species and land management practices that contribute to threatening processes, resulting in improved conservation of native flora
Implement recovery actions as per annual works program	Begin implementation within two months of start of project and continue through project	Improved conservation of targeted threatened plant species

6.10 Milestones

See above. The works programs and timelines will be based on the seasonal requirement of each species, for example flowering or growing periods of the species, or of weed species requiring control.

6.11 Expected Outcomes for Natural Resource Condition

The project contributes towards meeting the following Resource Condition Targets from the regional strategy:

- BR2: 50% of critical habitat for identified significant species and ecological communities protected by 2014
- BR1b: Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020, based on 2005 baseline data.

The project also contributes to BR3: Reduction in impact of regionally significant invasive species by 2020.

6.12 Risk Factors

The timing of many of the actions are highly seasonal and there will need to be consideration of this seasonal timeframe of activity with the funding and reporting timetable. In particular based on the timing of confirmation and receipt of funding, and then establishment of project and employment of project staff.

Given the human population density of the Perth area, and the small size of many of the bushland areas that contain threatened flora, there is a continuing risk from human interference or destruction. This includes issues such as wildfire, as well as deliberate interference or vandalism of conservation works.

Climate variation imposes new stresses on the remaining bushland and wetlands. This necessitates new and adaptive responses to management of these areas and the recovery of the flora species and all threatened species and Ecological Communities.

6.13 Scope for Project Expansion or Contraction

A work plan will be developed at the start of each year. The work plan will include a summary of costed actions, who is responsible for implementing them and expected outcomes. This work plan will allow for modification of the detail of the project from year to year, for example to include or exclude species and populations dealt with.

There are an additional 31 DRF flora species that occur in the Swan Region at lower levels of threat that could be included into any expanded project or dealt with in future years. In addition the listing and ranking of flora species is reviewed each year and may result in changes to the species included in this project.

Priority recovery actions will also be carried out for other threatened flora species in the region where they co-occur with populations of Critically Endangered species, or where the action will prevent a change to the status of a species.

6.14 Cost

First Six Months (to June 30th 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
TOTAL					NIL

Financial Year 2005-06 (carried over from year 1)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Coordinator/officer (includes salary overheads)	1	63,969	63,969	50	31,985
Vehicle	19,200km	.45	8,640	100	8,640
Office Support/Accom.		3,500	3,500	100	3,500
Operating costs: contracts, field materials, herbicides			55,875	100	55,875
Total					100,000

Financial Year 2006-07 (carried over from year 2)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Coordinator/officer (includes salary overheads)	1	63,969	63,969	50	31,985
Vehicle	19,200km	.45	8,640	100	8,640
Office Support/Accom.		3,500	3,500	100	3,500
Operating costs: contracts, field materials, herbicides			55,875	100	55,875
Total					100,000

6.15 Estimated Total Investment Influenced by the Project

The CALM recurrent funding associated with threatened flora management in the Swan Region is in excess of $200,000.

This does not include the significant input to statutory processes to protect threatened species. In addition it is likely that the various partners and potential partners to the project will provide substantial "investment" of time and effort.

6.16 Cost Effectiveness

Funding directly used for specific protection and recovery actions for threatened flora species. The project also includes liaison and negotiation with land managers and adjoining areas that have impact on these species.

The liaison and education impact from this project, having a repeated and ongoing dialogue with land managers (for example Westrail, Main Roads and private land owners) will provide for efficiencies in that those land managers will increasingly take on responsibility and stewardship of significant bushland under their influence.

The greater project of threatened flora protection and management also involves the statutory planning and environmental impact assessment processes to provide protection to threatened flora and other significant areas.

6.17 Long Term Strategy

The recovery planning process includes continuous improvement, adaptive management and periodic formal review.

As the project advances the actions carried out will be building on activities carried out in earlier stages of the project.

6.18 For how long will this kind of project be needed?

The implementation of the Recovery programs for threatened flora and threatened species have made considerable progress towards protecting threatened flora and significant species. However, changes to the threat to species and communities and thus formal status, cannot be achieved in a short time and a long-term commitment is required.

Increased urbanisation (involving significant clearing of remnant bushland) is occurring the Swan Region, and this is placing ongoing and increasing pressure and threat to the already threatened species of the region.

Many recovery actions require several years to complete while others become part of an ongoing maintenance program. Further funding is likely to be sought to continue this project beyond the first year.

There will be a long term and ongoing commitment of State resources to the recovery of threatened species and Ecological Communities, and there would be expected to be similar long term commitment by the Australian government, local government and community groups.

6.19 Can the project become financially self-sustaining?

This project involves the recovery of a Nationally and State listed threatened flora, and conservation management on crown lands and so will require ongoing financial input from State and Australian governments.

There is the possibility of diversifying funding through the pursuit of sponsorships and other methods of fund-raising.

6.20 Can the project become socially self-sustaining?

There are already several community groups involved with the protection and recovery of threatened flora species in the region, such as “Friends of” groups, peak conservation groups and individual landowners and community volunteers. In addition the World Wide Fund for Nature, through its Threatened Species Network, has interest in recovery actions for threatened species. Previous activities for the recovery of threatened flora species have involved the input of the Wildflower Society and the WA Native Orchid Study and Conservation Group.

A component of the project is involved in liaison and education with stakeholders in an effort to increase the support and input to the recovery process. This should result in land managers and public utilities in better considering, protecting and managing threatened flora populations in future.

7. PROJECT ND07: RECOVERY OF THREATENED TERRESTRIAL FAUNA OF SWAN REGION

7.1 Summary

Introduction
The mosaic of landscapes in the Swan Region, broadly divided between the woodlands and damplands of the coastal plain and forests of the hills, are diverse ecosystems with significant differences. Yet all ecosystems of the Swan Region are subject to a number of threatening processes that are the same. Wildfire, dieback disease, water catchment and abstraction, fragmentation and competing landscape use are processes that affect threatened terrestrial fauna in hills and coastal plain ecosystems. The objective of this project is to increase our awareness and understanding of these threatening processes for some of the regions most vulnerable terrestrial fauna species and to provide guidelines for their future management. The species have been ranked in earlier catchment council reviews as most in need of assessment and management guidelines, and include three vertebrates: the quokka and two species of the Forest Black Cockatoos; and three invertebrates: the Graceful Sun Moth and two local native bees. This project will collate all of the historical information relating to these species and implement recovery actions that have been identified as a high priority. It will assess habitat variables that predict the occurrence of these species and, using this information, produce guidelines to direct future management.

A rationale for including Forest Cockatoos in this project
In an earlier submission of this project the conservation status of local fauna species was used to rank them into those that required most urgent action. The quokka occurs in the Darling Range while the invertebrate species occur on the coastal plain. One other species listed, the Forest Red-tailed Black Cockatoo had a Priority 3 (to be ranked) listing and on this basis was considered to be a lower priority for management action. However, since the earlier round of submissions, the newly formed Forest Black Cockatoos Recovery Team has met, and a Draft Forest Black Cockatoo Recovery Plan has been developed (Chapman in prep.). The Forest Cockatoos are two species; Baudin's Cockatoo Calyptorhynchus baudinii and the Forest Red-tailed Black-Cockatoo Calyptorhynchus banksii naso both occur in the jarrah forests of the Swan Catchment Councils (SCC) South East, Eastern Hills and Ellen Brockman Sub-Regions. (Higgins 1999; Johnstone and Storr 1998; Saunders et al. 1985). These 'Forest Black-Cockatoos' have similar breeding and feeding requirements (Johnstone 1997; Johnstone and Storr 1998) and face similar threats (Garnett and Crowley 2000). Therefore, any recovery actions undertaken to benefit one species are likely to benefit the other and this is why a combined recovery plan for Baudin's Cockatoo and the Forest Red-tailed Black-Cockatoo has been prepared and is now in a draft format. Baudin's Cockatoo is currently listed as Vulnerable, but has been nominated as nationally endangered (EN/A3), while the Forest Red-tailed Black Cockatoo has been nominated as nationally Vulnerable (VU/A3). Therefore, the conservation status of the Forest Black Cockatoos now warrants urgent recovery actions.

For these reasons the Forest Black Cockatoos will be included in the project submission. Indeed, it is the distribution of all of the threatened species over the SCC region that provides

the template for conduct of the project, and further supports the inclusion of the cockatoos in the project as a whole.

Approach: an evaluation of landscapes – not single species.
The vertebrate species in this project (the Quokka and the Forest Black Cockatoos) occur in the jarrah forest ecosystems of the South East, Eastern Hills and Ellen Brockman Sub-Regions. The invertebrate species (the Sun Moth and Native Bees) occur in the coastal plain ecosystems of the North Coastal, Urban North, South East and possibly the South Coastal Sub-Regions of the SCC. The division between the Darling Plateau Landform Unit for the vertebrates and Swan Coastal Plain Landform Unit for the invertebrates means that each group should be managed as multiple threatened species occurring over two major landforms. This is the approach that has been adopted for the current application and the following sections are divided between the Threatened Vertebrates of the Darling Plateau Landform Unit and the Threatened Invertebrates of the Swan Coastal Plain Landform Unit.

Threatened Vertebrate Species of the Darling Plateau

Distribution of the Quokka
There is a perception that quokkas (Setonix brachyurus), the small rat-kangaroos that is abundant on Rottnest Island, are extinct from areas close to Perth. An increased awareness of the presence of the quokka on the mainland has resulted in numerous records of occurrence since 1992, has confirmed the existence of several populations at the northern extent of the quokka's known geographic range, even as close as the hills near Kelmscott (P. de Tores Pers. Comm.; Hayward et al. 2003). However, with multiple landscape uses, including mining, water catchment and agriculture, and threatening processes such as feral pests, disease and wildfire impacting heavily on our jarrah forests, the survival for local quokkas populations is seriously threatened (see the review of Phytophthora (dieback) disease by Garkaklis et al. (2004) in Management of Australia's Forest Fauna Pp 899-913).

Distribution of Baudin's Black Cockatoo
Baudin's Cockatoo is endemic to a 2,000km^2 area (Garnett and Crowley 2000) of the humid and sub-humid zones of south-west Western Australia (Johnstone and Storr 1998). The distribution of Baudin's Cockatoo is generally contained within the 750mm isohyet of average annual rainfall (Figure 2; Saunders 1979). The former distribution of Baudin's Cockatoo is unknown because early records did not distinguish between the two species of White-tailed Black-Cockatoo (Higgins 1999). The current distribution of Baudin's Cockatoo is from Albany extending north to Gidgegannup, east to Mount Helena, Wandering, Quindanning, Kojonup, Frankland and King River and to the eastern strip of the Swan Coastal Plain including West Midland, Byford, North Dandalup, Yarloop, Wokalup and Bunbury (Johnstone 1997; Johnstone and Storr 1998). Baudin's Cockatoo also occurs in the Stirling Ranges (Sedgwick 1964), Porongorup Ranges (Abbott 1981) and near Boyup Brook (Davies 1966; Johnstone and Storr 1998; Saunders 1974a, 1979; Saunders et al. 1985).

Distribution of Forest Red-tailed Black Cockatoo
The Forest Red-tailed Black-Cockatoo is endemic to the south-west humid and sub-humid zone of Western Australia (Mawson and Johnstone 1997a). The sub-species inhabits the dense Jarrah Eucalyptus marginata, Karri E. diversicolour and Marri Corymbia calophylla forests receiving more than 600mm of annual average rainfall (Figure 3, Saunders and Ingram 1995; Saunders et al. 1985). Habitats in which the Forest Red-tailed Black-Cockatoo was studied by the Western Australian Museum (at Bungendore Park and Jarrahdale) had an

understorey of Bull Banksia Banksia grandis, Snottygobble Persoonia longifolia, Sheoak Allocasuarina fraseriana and Dryandra spp., with scattered Blackbutt E. patens and Wandoo E. wandoo (Johnstone and Kirkby 1999).

The Forest Red-tailed Black-Cockatoo once occurred between Albany, Augusta and Perth and north along the Swan Coastal Plain to Dandaragan (Figure 3, Johnstone 1997; Johnstone and Storr 1998; Saunders 1977), but was rare on the Swan Coastal Plain by the early 1900s (Alexander 1921). The current distribution of the Forest Red-tailed Black-Cockatoo is north to Gingin and east to Mount Helena, Christmas Tree Well, North Banister, Mt Saddleback, Rocky Gully and the upper King River (Figure 3; Johnstone 1997). The movements of the Forest Red-tailed Black-Cockatoo are irregular (Sedgwick 1949) and they can be found on the Swan Coastal Plain at any time of year in search of the Cape Lilac Melia azederach (Stranger 1997; pers. comm. R. Johnstone1), an introduced plant.

Conservation of Quokka and Quokka habitat in the South East and Eastern Hills subregions.
This project will map the known locations of quokka in the Swan Catchment Council region of the Northern Jarrah Forest and measure the impacts of current management practises and wildfire on the conservation of this threatened species. Inappropriate use of fire in these landscapes can lead to a degradation of the quokka habitat. The project will measure response of fragile quokka habitat to the 2005 and 2006 fuel reduction burning programs and wildfires. These peppermint (Agonis) swamp habitats are dotted throughout the forest ecosystem. The peppermint swamps are extremely sensitive to fire and the jarrah forest foraging areas for quokkas adjacent to the swamps are vulnerable to fire, Phytophthora disease and logging. The current project will produce adaptive management guidelines for micro-scale fire (mosaic burns) in the peppermint swamps in the jarrah forests on Perth's eastern fringe. The outcome will be landscape scale quokka management that is inclusive of multiple land-use: water catchment, forestry, mining and agricultural activities that currently occur in the Jarrah forests near Perth. It also provides an excellent opportunity to integrate landscape management with several species simultaneously, particularly the black cockatoos. Quokkas reside in the forest lowlands and utilise upslope forests for foraging, with cockatoos utilising the upslope forest areas for breeding and foraging sites. Management decisions for these areas directly affects both species.

The Forest Black Cockatoos of the South East and Eastern Hills subregions.
The draft Forest Black Cockatoo Recovery Plan has identified a number of key Future Recovery Actions must be addressed to ensure the conservation of these birds. The current project application will address three highest priority recovery actions. These are:

1. Consultative programs to eliminate illegal shooting in Perth Hills.
Illegal shooting of Baudin's Cockatoo by orchardists continues in the Perth Hills. In addition, many orchardists are not aware that there are two species of White-tailed Black-Cockatoo in Western Australia and that only one, Baudin's Cockatoo, causes damage to fruit crops. Thus, Carnaby's Cockatoo is also vulnerable to illegal shooting. Forest Red-tailed Black-Cockatoos are also shot illegally, based on the belief that they snap the tops off blue gums in south-west timber plantations. Illegal shooting is a significant threatening process for Forest Black-Cockatoos because the number of birds shot probably exceeds the number recruited into the population.

An education program is needed to make primary producers aware that the shooting of Black-Cockatoos is illegal in Western Australia and that offenders are liable for prosecution under

both the Wildlife Conservation Act 1950 and the Environmental Biodiversity and Biodiversity Conservation Act 1999. Education materials will be prepared to inform fruit growers that: there are two species of White-tailed Black-Cockatoo in south-west Western Australia; shooting of Baudin's Cockatoo and the Forest Red-tailed Black-Cockatoos is illegal; only Baudin's Cockatoo attacks pome fruit; and that means other than shooting can be used to protect fruit.

2. Implement strategies for the use of noise emitting devices in orchards (Land-use Planning). Of the two Forest Black-Cockatoos, only Baudin's Cockatoo is known to damage fruit crops. Baudin's Cockatoo causes locally severe damage to apples and pears in orchards. Orchardists have expressed the concern that although Baudin's Cockatoo can cause losses of fruit, the most effective means of damage control have not been established. Thus, effective non-lethal means of minimising the damage caused by Baudin's Cockatoo to fruit crops must be identified. Studies of the effectiveness of scare devices to minimise damage to orchard fruit by parrots have shown that Baudin's Cockatoo may be scared from orchards by noises such as those omitted by alarm systems and gas cannons. However, complaints are often received by neighbouring residents in residential areas. Two means to overcome this are the development of alternative means of preventing fruit damage and effective land use planning. Land use planners will be engaged in planning of buffer zones between fruit growing areas and residential developments. In addition, real estate developers and agents will be approached to develop a duty of disclosure to make potential residents aware of crop protection activities in fruit growing regions before making a land purchase.

3. Determine and implement ways to minimise the effects of logging on habitat loss.
The Conservation Commission produced a forest management plan to manage State forest and Timber Reserves from 1994-2003 (Department of Conservation and Land Management 1994). One of the goals of the plan was to take measures to protect and recover threatened species (Department of Conservation and Land Management 1994). A number of forest management techniques could be developed specifically to promote the recovery of and protect Forest Black-Cockatoos as part of the forest management planning process (Abbott and Whitford 2002). As part of this recovery plan, guidelines for silviculture, fire management and Phytophthera spp. management will be developed to promote the recovery of Forest Black-Cockatoos, together with a means of evaluating their effectiveness. Some silviculture guidelines were presented by Abbott (2001) and there has been considerable debate about the effects of logging regimes on hollow availability guidelines should be critically evaluated as part of the development of forest management recommendations.

The management of forestry operations for Forest Cockatoos also involves the management of quokka landscapes that occur in the same patches of forest.

Threatened invertebrate species of the Swan Coastal Plain

We have very little information on the distribution and abundance of the three most threatened invertebrate taxa which occur on the Swan Coastal Plain. These are the Graceful Sun Moth (Synemon gratiosa) and two native bee species (Leioproctus douglasiellus and Neopasiphae simplicior). The known locations of all three species stretches from Wanneroo in the north, to Mandurah and Forestdale in the south. This is an area experiencing unprecedented environmental stress, particularly from habitat fragmentation, disease, wildfire and water abstraction. The impact of these multiple threatening processes on the survival of these Endangered species is unknown. The objective of the Threatened Invertebrates of the Swan Coastal Plain project is to identify the past and likely current distribution of these

species, to rank the potential impact of threatening processes and to provide the basis for the establishment of a Regional Threatened Invertebrate Recovery Team.

The Graceful Sun Moth

Sun Moths (Castniidae) are diurnal flying moths that look similar to butterflies. Their larvae feed on the bulbs and other underground parts of sedges and grasses such as Lepidosperma spp. and Lomandra spp. (M. Williams Pers. Comm.). Many Castniid species have experienced dramatic declines in distribution and abundance. This is most likely a result of the loss of food resources for larvae related to habitat clearing, fragmentation and degradation (O'Dwyer et al. 1998).

The Graceful Sun Moth is a daytime flying moth with brightly coloured hind-wings. This species is restricted to the Swan Coastal Plain, known historically from at least 13 locations between Wanneroo and Mandurah. However, in the last decade the Graceful Sun Moths have only been recorded from four locations in the North Coastal and Urban North Sub-Regions and this species is now listed as Endangered. Coastal Plain habitat for the Graceful Sun Moth has been affected by clearing for urban development, fragmentation, wildfire and widespread plant disease, and there is now an urgent need to study historical changes in the abundance and distribution of this species. To address this need the current project will: collate all of the available information on the biology and ecology of the species; map the historical and current distribution of Graceful Sun Moths; measure the characteristics of vegetation in its preferred habitat and; map the extent of the remaining suitable habitat. The outcomes from this project will be a series of actions required for the conservation of the species, including a guide to the formation of a threatened invertebrate recovery team that can address some of the actions identified.

Swan Coastal Plain Bees.

We have very little information on two Endangered Swan Coastal bee species, Leioproctus douglasiellus and Neopasiphae simplicior. Collections of L. douglasiellus (females only) have been made from two locations, Forrestdale Lake and Pearce. Neopasiphae simplicior has been collected at Forestdale Lake and Cannington, and at two other sites outside of the Swan Region (Port Gregory and Mount Ragged). Most collections for both bee species were in the early and late 1980's, with the last collection for L. douglasiellus by T. Houston in 1988, and the last collection for C. simplicior in 1998.

These bee species appear to be closely associated with a few plant taxa. These include three species in the family Goodeniaceae, one species in the family Asteraceae and one species in the family Lobeliaceae (T. Houston Pers. Comm.). The Swan Coastal Plain habitat for these bee species is seriously threatened by modifications to vegetation through water abstraction, weed invasion, fire and habitat fragmentation and there is now serious concern for the conservation of these species. This current project will address the lack of basic information required to prioritise recovery actions for these species as part of a Swan Region Threatened Invertebrates Recovery Team. It will collate and update the information on the distribution of these species and their biology, update the taxonomy of plant species associated with the bees and map the suitable habitat that occurs on the Swan Coastal Plain.

7.2 Why is this a Priority Project?

The primary management actions that this project relate to are:

REF	RANK	TARGET	MANAGEMENT ACTION
BM2.2	5	100% of all relevant NRM legislation and policy in state and local planning systems reviewed and amendments recommended to provide increased consideration and protection for significant species and ecological communities by 2006	Develop and implement recovery plans/interim recovery plans and threat abatement plans for priority significant species and ecological communities Review and prioritise existing conservation management actions for significant species and threatened ecological communities, and threat abatement plans
BM2.5	4	30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008	Establish collaborative partnerships to ensure the conservation management and recovery planning of significant species and significant ecological communities

There are also significant links and relevance to other management actions of the strategy. For example, the project deals with threatening processes (BM3.3) at the point where those processes are having acute impact (species extinction). The project will also result in improved management of the CAR conservation reserve system (BM1.2, BM1.4), and relates to the protection and improved management of native vegetation communities (BR1).

This project involves the implementation of recovery actions for Nationally and State listed fauna species that are found in Swan NRM region. The project links to other work by CALM and other organisations to protect and manage threatened species and ecological communities. This projects achieves NHT priorities by:

- Protecting and restoring the habitat of threatened species, threatened ecological communities and migratory birds; in that the project specifically seeks to provide conservation management to occurrences of fauna species.
- Preventing or controlling the introduction and spread of feral animals, aquatic pests, weeds and other biological threats to biodiversity; in that information gained on the control and management of threatening processes for these significant species can be applied elsewhere.

This project provides a management template for the landscape that extends well beyond the single species or management authority. The outcomes from this project will influence Natural Resource Managers' decisions with regard to increased water catchment to Perth's water supply dams (forest thinning and burning), the protection of critical habitat from wildfire and the regeneration of small patches of new habitat for forest vertebrates. It will provide vital information to allow natural resource managers to make informed decisions in development proposals. For instance, recent assessments of major infrastructure projects and the abstraction of groundwater on the Swan Coastal Plain have been hampered by a lack of documented information on threatened invertebrate species – this project will address this issue.

7.3 Past Achievements

This is a New Project, but it will draw on recent historical information from other programs such as the development of techniques for the rehabilitation of dieback affected forests. It will liaise with the Water Corporation in their plans for the Wungong Catchment project, and will also integrate with other forest fauna management programs currently underway. These include Alcoa and CALMs foxglove project, CALM's Western Shield project, The Forest Black Cockatoo Recovery Team and CALM/Alcoa Noisy Scrub-bird translocation and release project.

7.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Recovery of Nationally and State listed fauna species.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Investment focussed on endangered fauna species, in those locations where they occur. These sites would be included as priority areas in the SCC regional strategy.
(3) Investment should not exceed the public benefits that result.	All outcomes relate to the recovery of Nationally and State listed fauna species and so are to the public benefit, already considerable investment by State and Commonwealth.
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Prevention of destruction of endangered fauna species requires significant and intensive effort.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	NA - See above
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Investment focussed on endangered fauna species, in those locations where they actually occur.
(7) 7. The processes required for setting priorities will involve ongoing learning and need constant feedback.	An adaptive management approach is a feature of species and TEC recovery and is achieved through recovery plan, periodic review, and recovery team.
(8) 8. Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	Precautionary principle is a basis of recovery planning

7.5 Work Program

The following sections outline general works programs and timelines to achieve the required outcomes. Please note that the timelines are based on a financial year July to June. The actual start date of the employed Conservation Officer will simply result in the timeline being offset to that date. Completion of all of the tasks within the works program assumes a second year of

funding for longer-term projects, in particular, those projects that require a high level of community consultation. The timelines presented in the table indicate which projects will be completed in the first year (quarters 1 to 4) and those that require additional time to complete (quarters 5 to 8).

Darling Plateau Quokkas

- Project planning and literature reviews will be undertaken in the first month of the project. The mapping of historical and current known locations will occur at this time.
- Identification of all potential peppermint swamp quokka habitat in the Perth Hills using GIS aerial photo interpretation.
- Obtain field assessments of these sites to confirm the presence or absence of quokkas. This will use the rapid assessment techniques of Burrows and Liddelow (CALM) that identifies quokka runnels and scats.
- Obtain fire age of quokka habitats by counting post-fire growth rings of Agonis (peppermint).
- Development of a mosaic burn plan to regenerate small patches of these swamps in consultation with local fires district managers.
- Identification of quokka translocation priorities in areas where suitable habitat exists but local populations of quokkas are extinct.
- Produce maps of current extant populations for targeted management by conservation authorities.

Darling Plateau Forest Black Cockatoos

- Project planning and literature review will be undertaken in the first month of the project. The mapping of current distributions will occur at this time.
- Consultative program to address illegal shooting- preparation of draft educational materials
- Consultative program to address shooting – meetings with main stakeholders (including recovery team)
- Consultative program to address shooting – review of educational program and material by stakeholders
- Distribution and assessment of educational material
- Survey of orchardists on Forest Cockatoo control
- Review of success of control methods
- Preparation of discussion document on Forest Cockatoo control procedures and their use in Perth Hills.
- Review of submissions on discussion document and preparation of draft guidelines for land-use planners (for review by key stakeholders).
- Production of land-use planning recommendations regarding the control of Forest Black Cockatoos on orchards.
- Review and assess current silvicultural practises and fuel reduction burning and determine the potential impact on cockatoo habitat.
- Produce draft guidelines for forest management aimed at the protection of cockatoo and quokka habitats for discussion.
- Produce recommendations and guidelines for silvicultural management of Jarrah Forests for the conservation of Forest Cockatoos.

Swan Coastal Plain Threatened Invertebrates

The projects relating to the Sun Moth and Native Bees have similar work programs and outcomes, and similar timelines. Differences in works programs will only be minor and relate to the life-history of the Sun Moth which is active in February and March. As a result, the timelines have been grouped.

- Project planning.
- Mapping historical distributions of invertebrates
- Fieldwork to assess current condition of invertebrate habitat
- Update distribution maps to reflect current habitat condition.
- Map suitable habitat types for each species.
- Assess the likely threatening processes for this remaining habitat.
- Produce management guidelines (including potential for translocation) for each species.
- Throughout the project consultations with interested community groups (Insect Study Society, WA Nats.), will be conducted with the aim of facilitating community surveys in 2006 – particularly for the Sun Moth.

Timelines:

Project time-line – Quokka	
Output	**Timeframe**
Project Planning: Map historical distributions, plan field work	1st Quarter
Habitat Mapping: Map occurrence of habitat in Darling Range	Begin at the end of 1st quarter, complete in 3rd quarter
Rapid Field Assessment: In-field assessment of quokka and habitat status	Begin in 3rd quarter, complete in 4th quarter. Mapping and further ground truth will be complete in 5th quarter.
Micro-Scale Burn Planning: Design edge and habitat burn patterns	Started in fifth quarter and completed in seventh quarter.
Reporting: Production of final maps and report	Reporting complete in 4th quarter. Additional works for year to will be reported in 8th quarter.
Project time-line – Forest Black Cockatoos	
Output	**Timeframe**
Project Planning: Project planning, literature review and mapping	1st Quarter
Consultation. Program: Illegal shooting educational materials	Star in 1st quarter, continue 3rd quarter, complete 4th. Quarter. Continue if funded for Year 2: NOTE: Year 2 funding will allow an assessment of success of program by analysis of CALM cockatoo mortality records.
Control Program: Determine extent of control measures	Survey start in 1st quarter, complete in 4th quarter
Control Program: Produce land-use planning guidelines	Begin and complete **Year 2.**
Forest Management: Assess and provide guidelines for silviculture.	Start 3rd quarter, complete 4th quarter (in conjunction with quokka rapid field assessment).

Project time-line – Quokka	
Output	**Timeframe**
Reporting:	Reporting complete in 4th quarter. Land-use planning guidelines and reports require Year 2.
Project time-line – Threatened Invertebrates	
Output	**Timeframe**
Project Planning: Plan field work and community consultation	1st Quarter
Distribution Mapping: Map historical and current distributions.	1st Quarter
Habitat Condition Assessment: Field assessment of habitat at known locations.	3rd quarter – repeat year 2 if funding available.
Map Suitable Habitat 1: Aerial photo. interpretation	4th quarter. Note: Analysis of main habitat variables (logistic approach) will be undertaken if funded in Year 2.
Map Suitable Habitat 2: Ground truth	3rd Quarter. Ground truth based on predictive habitat variables will be undertaken if funded year 2.
Recovery Guidelines: Community consultation and produce draft guidelines	Commence in 2nd quarter and complete in 4th quarter. Additional consultation and review by community will be undertaken if funded in Year 2.
Reporting:	4th Quarter. Note: Guidelines and actions for prospective invertebrate recovery team will be produced if funded in Year 2.

7.6 How the project has been designed and developed

This project has been designed and developed from 2 perspectives. Firstly, there is a need to consolidate single species fauna management programs into landscape approaches that allow the implementation of recovery objectives for several species to be undertaken over larger areas of the same landscape. This approach lends itself to whole landscape management rather than small scale habitat management. Clearly the division between the vertebrate and invertebrate groups is a natural division in this project.

Secondly, there is a division between the landscapes of the Swan Coastal Plain and the Darling Plateau. The invertebrate and vertebrate groups are divided between these Land Units and it was considered that they could be managed accordingly.

The projects also lend themselves to collaborative works with current recovery teams, CALM Management Reviews for forestry and quokka management, and community participation.

7.7 Partners

Department of Conservation and Land Management, WA Fruit Growers Association, the Western Australian Insect Study Group, the Centre for Phytophthora Science and Management (CPSM)– Ecosystem Function Research, Water Corporation, Western Australian Museum, the Dieback Working Group and the Perth Biodiversity Project.

7.8 Management Structure

Project officers will be employed to implement and oversee activities under the direction of the project team, and the Forest Black Cockatoo Recovery Team.

Employment will be as CALM staff and CALM will provide the administrative and human resources management of the positions. Day to day management would be under the CALM Swan Region nature conservation team. Some works may be carried out by contract.

7.9 Outputs and Timelines

Outputs for this project will be:

- Implementation of management of quokka habitat
- Implementation of recovery objectives for Forest Cockatoos and measurement of their success in the short-term
- Production of guidelines for the recovery of three threatened invertebrates on the Swan Coastal Plain including the recommendations for a Swan Region Threatened Invertebrate Recovery Team.

Indicative timelines for the project are presented in Section 2.1

7.10 Milestones

Threatened vertebrates of the Darling Range:

- Production of historical and current distribution maps
- Completion of draft educational material for review
- Production of maps identifying suitable quokka habitat
- Completion of quokka habitat (and surrounding cockatoo habitat) rapid field assessments
- Completion of meetings with key stakeholders regarding illegal shooting and cockatoo control techniques
- Distribution of educational material regarding illegal shooting of cockatoos
- Completion of report detailing the methods and extent of use of cockatoo control measures
- Completion of draft discussion document for land-use planning with regard to cockatoo control
- Completion of quokka habitat and surrounding cockatoo habitat assessments.
- Finalise land-use planning and cockatoo control discussion document for distribution to stakeholders.
- Completion of guidelines for small-scale regeneration of quokka habitat and management of cockatoo habitat.
- Mapping and final Reporting for Project.

Threatened Invertebrates of the Swan Coastal Plain:

- Production of historical and current distribution maps.
- Complete community information and consultation meetings outlining the project.
- Completion of known habitat assessments.
- Produce plan for community involvement in surveys.
- Completion of mapping and ground-truthing of potential habitat.
- Completion of community survey program.
- Completion of interim management guidelines.
- Production of management guidelines.

7.11 Expected Outcomes for Natural Resource Condition

Be as specific as you can.

The project contributes towards meeting the following Resource Condition Targets from the regional strategy:

- BR2: 50% of critical habitat for identified significant species and ecological communities protected by 2014
- BR1b: Maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020, based on 2005 baseline data.
- BR3: Reduction in impact of regionally significant invasive species by 2020.

Quokka Habitat Management and Regeneration
The regeneration of a complex mosaic of habitats in the Jarrah Forest is considered as essential to the management of the population (P. de Tores, Pers. Comm.). Outcomes from this project will be a burn program that aims to develop a complex mosaic within uniform degrading quokka habitats. The availability of suitable habitat is essential for the survival of local populations.

Managing of forestry practises for quokkas and cockatoos
Silvicultural practises that lead to a degradation of suitable habitat trees and forest health are considered detrimental to the survival of both quokkas and cockatoos. Within the mosaic of habitats for each species, this outcome will implement one of the key recovery actions for the Forest Black Cockatoos: a modification of silvicultural practises to protect cockatoo habitat trees.

Consultative programs to eliminate illegal shooting in Perth Hills.
The success of the education program will be evaluated by monitoring changes in the number of reports of illegal shooting and the number of prosecutions of persons shooting Forest Black-Cockatoos over time. Decreasing the mortality of Forest Cockatoos by shooting will have a positive outcome for the conservation of the species.

Management and recovery actions for threatened invertebrates
Currently there is no process for the management and recovery of threatened invertebrates in the Swan Region. The outcome of this project will be identification of recovery objectives and information that will more accurately define the conservation status of three Endangered invertebrate species. Additional outcomes will be the involvement of interested community groups in the conservation of invertebrate taxa.

7.12 Risk Factors

There are two Key Staff to be funded through this project (Conservation Coordinators for vertebrates and invertebrates). If either of these Key Staff leave the project then time will be lost replacing them. Environmental factors may be a risk. These include fire or extremely inclement weather. A boycott by stakeholder (namely fruit growers) would hinder progress in the Forest Cockatoos project. This is unlikely as the WA Orchardists Association has provided support to the recovery team.

7.13 Scope for Project Expansion or Contraction

The Geographical scope of this project is the two major landform units of the SCC; the Darling Plateau and the Swan Coastal Plain. It directly incorporates four Recovery Actions for the Draft Forest Cockatoos Recovery Plan, extends one Forest Cockatoo Recovery Action by incorporating Quokka habitat management to silvicultural and logging operations, extends current habitat assessments of Quokkas for fire management to surrounding forest used by cockatoos.

There is excellent opportunity for expansion of the Threatened Forest Vertebrate project by seeking collaboration with other land uses (Alcoa and Water Corporation) and expansion of the projects geographical range to their tenure to the south of the current project. That is to pursue a joint project with the South West Catchments Council.

The outcomes of the Swan Coastal Plain threatened invertebrate project may provide guidance on additional or new actions that would be valuable for the conservation of these species.

A project relating to the Carnaby's Black Cockatoo, *Calyptorhynchus latirostris* (which is listed under the *Western Australian Wildlife Conservation Act 1950* and the *Environment Protection and Biodiversity Conservation Act 1999*) has also been submitted under the additional 25% funding. In broad terms this project would involve identifying critical habitat and how Carnaby's Black-Cockatoo uses it, then disseminating this information and management guidelines to relevant stakeholders.

7.14 COST

First Six Months (to June 30th 2005) – Not applicable

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Conservation Coordinator (vertebrates)	0.5	63,969	31,985	100	31,985
Forest Cockatoos – collate occurrence within orchards, material and maintenance (travel)			2,700	100	2,700
Forest Cockatoos – Land use planning, community education materials and maintenance (travel)			2,400	100	2,400
Forest Cockatoos – mapping habitat trees in relation to forest mosaic (including quokkas)			2,500	100	2,500
Forest Quokkas – *Agonis* habitat assessments (incl. Travel)			5,300	100	5,300
Forest threatened vertebrate mapping and interim report production			800	100	800
Conservation Coordinator (invertebrates)	0.5	63,969	31,985	100	31,985
Collation, mapping occurrence and predicted habitat – Sun Moth			7,100	100	7,100
Collation, mapping occurrence and predicted habitat – native bees			7,100	100	7,100
Swan coastal threatened invertebrate interim report production			800	100	800
TOTAL					**92,670**

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Conservation Coordinator (vertebrates)	0.5	63,969	31,985	100	31,985
Forest Cockatoos – collate occurrence within orchards, material and maintenance (travel)			2,700	100	2,700
Forest Cockatoos – Land use planning, community education materials and maintenance (travel)			2,400	100	2,400
Forest Cockatoos – mapping habitat trees in relation to forest mosaic (including quokkas)			2,500	100	2,500
Forest Quokkas – *Agonis* habitat assessments (incl. Travel)			5,300	100	5,300
Forest threatened vertebrate mapping and report production			2,800	100	2,800
Conservation Coordinator (invertebrates)	0.5	63,969	31,985	100	31,985
Summer surveys for Sun Moth – map March 2006 survey results (incl. Travel)			8,200	100	8,200
2006 surveys, mapping occurrence			7,900	100	7,900
Swan coastal threatened invertebrate report production			2,800	100	2,800
TOTAL					**98,570**

7.15 Estimated Total Investment Influenced by the Project

7.16 Cost Effectiveness

This project adopts a landscape approach to assessing and managing threatening processes (*Phytophthora*, habitat clearing etc) to the management of several threatened fauna species simultaneously. The cost saving is through lack of duplication of office support for several 'species' based projects, the savings in travel to the same sites for at least two vertebrate and invertebrate species and savings in the application of mapping and GIS support for one project, not many.

7.17 Long Term Strategy

The strategic approach for this project is to develop a Regional Approach to threatened fauna management rather than a species approach. A major outcome for this project will be a

rationale for developing recovery teams for threatened fauna on a Land Unit, Sub-Region or Regional basis.

7.18 For how long will this kind of project be needed?

This specific project is intended to run for two years – reporting at the end of two years will provide advice and recommendations to the SCC, CALM (Regional Services, Nature Conservation and WATSCU) on the development of Regional Threatened Fauna Recovery teams or structures.

The implementation of Recovery programs for threatened species have made considerable progress towards protecting these significant species. However, changes to the threat to species and thus formal status, cannot be achieved in a short time and a long-term commitment is required.

There will be a long term and ongoing commitment of State resources to the recovery of threatened species, and there would be expected to be similar long term commitment by the Australian government, local government and community groups.

Many recovery actions require several years to complete while others become part of an ongoing maintenance program. Further funding is likely to be sought to continue this project beyond the first year.

7.19 Can the project become financially self-sustaining?

Active partnerships with the local orchard growers representatives will be developed through the WA Fruit Growers Association (Forest Black Cockatoos Recovery Team), the Western Australian Insect Study Group, the Centre for Phytophthora Science and Management (CPSM)– Ecosystem Function Research, The Dieback Working Group and the Perth Biodiversity Project. Actions to facilitate the extension of active partnerships will be through industry funded programs for vertebrate management and orchard management, programs for threatened fauna management as part of the CALM Sustainable Forest Management Branch activities, Australian Research Council and Water Corporation funding for management of threatening processes on the coastal plain and corporate funding through the CPSM.

7.20 Can the project become socially self-sustaining?

Partnerships between the project team and local stakeholders are currently underway with positions of Chair of the Forest Black Cockatoos Recovery Team, PBP Kalamunda Steering Committee membership, CPSM membership and Liaison with members of interested community groups.

8. PROJECT ND08: BIODIVERSITY ACTION LEARNING PROGRAM

8.1 Summary

Provide a brief summary of the project. What assets and threats does it address, by what means, and in what locations. What are the expected results?

On-ground management of the Region's bushland and other natural areas requires a high level of skills and knowledge. These skills are held by a limited number of individuals, with very few actually employed to carry out on-ground bushland management on public lands. The region therefore has a very low capacity to manage even some of our most significant natural areas. With recent efforts to formally protect natural areas (Bush Forever, Forest Management Plan and Local Biodiversity Planning), resources are needed to support the small, but growing network of professional bushland managers to maintain and improve the condition of high priority vegetation in the large areas under their management.

The project aims to develop an action-learning process which incorporates the management of priority ecological management sites, covering a number of vegetation types in the Swan Region. The managers of these priority areas will then carry out the highest priority on-ground management actions on site as part of the active learning program. Such “learning by doing” has been shown to be a particularly effective learning technique. Application of skills on a site-specific basis, will allow managers to appreciate the diversity of techniques appropriate to different sites and move away from a potentially counter-productive generic approach.

The sites will then be used as learning and demonstration sites for NRM professionals and community throughout the region.

The project will endeavor to involve and complement the work of the region’s bushland management community including Urban Nature, Perth Region Plant Biodiversity Project, Perth Biodiversity Project, Botanic Gardens and Parks Authority, Greening Australia WA, Dieback Working Group, Bush Forever agencies, participating public land managers, private landholders and 'friends groups'.

The proposed model is designed to achieve the following objectives:

1. Increase the capacity of the selected community members and Swan Region NRM professional network to manage a range of ecological communities which contribute to the achievement of resource condition change.
2. Ensure consistency in resource condition assessment and management practice across selected management sites.
3. Contribute to sound ecosystem management of sites that can be used as benchmarks for future prioritisation and action.
4. Design and develop a monitoring and evaluation program which links capacity building to the achievement of management action targets and resource condition targets.
5. Exchange knowledge and technical support within a regional learning network for NRM professionals and community.

8.2 Why this is a Priority Project

The primary management action that this project addresses is:

REF	TYPE	TARGET	MANAGEMENT ACTIONS
BM1.6	MAT	30% increase in community participation in education, restoration, protection and management activities high priority native vegetation in the Region by 2009	• Develop natural diversity management operational policy and training programs for Local Government Authorities and State agencies with bushland management responsibilities

The other targets and management actions that this project addresses are:

BM1.4	MAT	100% of priority protected areas have an active conservation management response by 2006	• Preparation and implementation of management plans and/or threat abatement plans where required
BM1.5	MAT	10 local natural diversity strategies for priority areas outside the CAR reserve system implemented by 2006	• Develop and implement local natural diversity strategies for priority areas
BM2.5	MAT	30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008	• Establish collaborative partnerships to ensure the conservation management and recovery planning of significant species and significant ecological communities • Develop partnerships to determine research project to develop a landscape plan for ecological linkages
BM3.4	MAT	30% increase in the effectiveness of control programs for feral animals, pests and diseases by 2009	• Promote wider regional community, land manager and Local Government education and awareness and training programs on feral animal, pest and disease management

The Biodiversity Action Learning Program builds capacity for future bushland management and has the potential to address most major threats to bushland. This regional level project focuses on areas of Regional significance. The cross-sector nature of the project is hoped to be an integrating focus for the region.

Active Learning is essential if priority bushland areas are to be managed appropriately. The program will be designed to complement works already undertaken by Urban Nature, Perth Region Plant Biodiversity Project, Perth Biodiversity Project, Greening Australia and Bush Forever.

It is important that the program works together with these groups to draw on past experience and cross-sector expertise, and to avoid duplication of effort.

8.3 Past Achievements

This is a new project building on key learnings from past PBP devolved grant.

8.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Past training has showed an increase in investment by land managers that more than matches initial investment.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Investment focuses on threats recognised in regional strategy and identified gaps in achieving targets through management actions. Focus on high priority areas and the key managers of these areas. The active learning process is designed to increase the probability of increased investment in appropriate management actions.
(3) Investment should not exceed the public benefits that result.	Investment based on maximum public benefit across sectors.
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Focus on high priority areas and the key managers of these areas.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Only high priority areas are targeted under this program. However, development of the industry professional NRM managers will indirectly have a broader impact on management of a range of assets.
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	The diverse membership of the steering group will facilitate ongoing learning and feedback from a number of different perspectives.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	Adaptive management of action learning program will facilitate pursuing new opportunities and overcoming new constraints that may arise.

8.5 Work Program

ACTIONS	TIMELINE	OUTPUTS	MILESTONES
Employment of skilled practitioner / administrator to deliver action-learning program.	May - June 05	Employment of practitioner / administrator	
Gain agreement on the scope and locations of project and action-learning sites.	June – August 05 Review June / July 06	Identify project partners, roles and responsibilities in relation to delivery of the program (partnership agreements may need to be developed). Scope and invite a range of representatives from SCC, sub-regional groups, State agencies, local governments, community groups and NRM professionals to guide the selection of priority biodiversity areas as action-learning sites across the region. Identify action-learning sites within priority ecological areas highlighted in the Regional Strategy, Local Government Biodiversity Planning Guidelines and through collaboration with regional communities. Assess selected sites for suitability and gain agreement from project/land managers for their inclusion into the capacity building program. Establish sites and demonstrate how they link to priority regional outcomes.	**M1. Establish Steering Group.** **M2. Identify sites and gain land manager commitment to project.**
Establish an action-learning network to build regional capacity and achieve ecological outcomes.	September /December 05	Identify and invite NRM professionals and community members to join the action-learning networks. Assess competencies of each of the participants within the action-learning networks e.g. capacity survey. Deliver first action-learning workshop to identify knowledge gaps within the action-learning networks and build group ownership of program outcomes. Develop key competencies/ learning outcomes for each learning network (participants) linked to the management outcomes for each action-learning site. Undertake ecological assessment of natural areas to identify and confirm ecological values utilising natural area initial assessment template and reference site and plot information from the Perth Region Plant Biodiversity Project. Design Action-Learning Program tailored to address the gaps in competencies of the networks required to achieve the Management Action Targets of the Regional Strategy based on the ecological needs of each sites. Eg. Training in mapping, prioritisation and management of weeds to improve the condition of X vegetation type.	**M3. Establish action/learning group.** **M4 Assess ecolgocial values & management needs** **M5. Design Program.**

ACTIONS	TIMELINE	OUTPUTS	MILESTONES
Develop technical work plan for each site and undertake targeted management of threatening processes.	December 05 Again July 06	In collaboration and where necessary design and implement work programs for each action-learning site to suit the on-ground requirements of the site. Provide technical support for the management of threatening processes at priority biodiversity sites. Set up monitoring and evaluation program for each site.	**M6 Develop and implement Management Action Plans.**
Tailor Action-Learning Events and on-ground activities to current levels of knowledge and requirements of participants	1st January / June 06 2nd August 06-June 07.	Deliver a series of 10 action-learning events per year conducting a review of the competencies of each participant and the overall competencies of the learning network after each event. Provide ongoing technical support to network participants and assist the network members to apply new competencies through practising new skills and applying newly acquired knowledge in the workplace. Monitor the application of new skills and knowledge from action-learning events. Land managers and community members will be able to undertake priority on-ground actions in a range of natural areas within the region.	**M7. Assessed increase in participant's skills in bushland management.**
Collect and share information from action-learning sites with NRM community.	1st January / July 06 2nd August 06-June 07.	Gain agreement on resource assessment standards and methodologies from SCC, State agencies and the learning network members. Facilitate the input of collected data from action-sites into a regional database. Provide technical support on the collection of resource condition data e.g. vegetation condition mapping **Provide technical support to the broader NRM community, sharing ecological knowledge gained from the action-learning sites.**	**M8. Resource condition data collected and collated**
Evaluation of program and recommendations made to SCC	**June / July** **06 and 07.**	**Final action-learning event and capacity survey to evaluate what has been learnt and overall change in knowledge and competency of the learning network members.** **Compile report on the overall capacity change across the learning network.** Compile report on key learnings and ecological management of action-learning sites.	**M9. Complete Evaluation Report**

8.6 How the project has been designed and developed

The project is based on learnings from the Local Government Bushland Management Pilot Leadership Program. Further development will be guided by PBP, Urban Nature, CALM, Swan Catchment Council, Department of Environment, Greening Australia and land managers involved.

8.7 Partners

The hosting partner is Greening Australia. Perth Biodiversity Project, CALM, DoE, DPI, Local Government, NGOs such as Conservation Council, Swan Catchment Council Biodiversity Officers, Utilities such as Water Corporation and Airports, and community bushland managers are potential partners. Detailed discussion and negotiations will need to take place before any partnerships can be formalised.

8.8 Management Structure

The line manager for the project officer will be located at host organisation. Greening Australia have offered to administer project and develop partnerships. The project will be managed by the steering committee with membership from key organisations listed above.

8.9 Outputs and Timelines

See table above.

8.10 Milestones

See table above.

8.11 Expected Outcomes for Natural Resource Condition

- Established bushland condition baseline information
- Established targets for bushland management
- Develop standards for bushland managers across a range of organisations
- Developed Management Action Plans and improved management for targeted high priority sites
- Improved / appropriate bushland management
- Maintained / Improved bushland condition
- Increased investment in targeted high priority bushland areas.
- Increased investment in bushland areas.
- Builds capacity for improved / appropriate future bushland management

8.12 Risk Factors

Describe both “internal” risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and “external risks” (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).

- requires potential participants connected to priority bushland areas to give time and resource commitments to action/learning group
- capacity of other organisations involvement.
- partner agreements are yet to be finalised as they are reliant on participant needs assessment

- resource condition change relies on a commitment to a long-term project and concurrent continuation of funding after year 2

8.13 Scope for Project Expansion or Contraction

Geographical scope, the number of management actions incorporated in the project, range of assets addressed, financial, human resources, period of time allowed for the project.
Opportunities for expansion could include

- Cross Regional Action Learning groups in other regions
- Additional action learning groups in Swan region with a staggered intake of groups potentially

There is potential for Expansion and Additional Action Learning Groups.
Outcomes for resource condition change and the ability to monitor and understand the impacts of bushland management are dependant on medium to long term biological processes. Therefore, the project should not be contracted to less than three years.

8.14 Cost

First Six Months (to June 30th 2005): NA

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Employee/on-costs	1.0 FTE		$62,066	100%	$62,066
Vehicle Servicing, fuel, lease agreement	10000 km	@.35c,	$7,000	100%	$7,000
Overheads Rent, computer, utilities, insurance			24,475	100%	24,475
Sub-Total			$93,541		$93,541
Direct costs:					
OH&S equipment clothes- First aid kit, boots, sunscreen, uniform					$1,500
Training materials					$3,000
Speakers- specialist	10 days	$800 per day			$8,000
Trainers- specialist	5 days.	$1000 per day			$5,000
Consultancy fees	6 experts * 5 days	$1000 per day			$30,000
Catering					$4,500
Herbarium vouching					$5,000
Monitoring materials Stakes, compass, measuring tape, rope, secateurs					$500
Collection licenses - CALM licenses					$100

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Dieback kit- Cleaning brush, metho, container					$100
Stationary - Clipboards, paper, pens, photocopying					$1,000
Reference- Field guides, plant id keys					$500
Miscellaneous					$200
Onsite Management materials - Herbicide, equipment, tools					$15,000
SubTotal					**$74,400**
Total					**$167,941**

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Employment	FTE				
Coordinator/oncosts	1.0 FTE		$68,447	100%	$68,447
Vehicle Servicing, fuel, lease agreement			$7,000	100%	$7,000
Overheads Rent, computer, utilities, insurance			$22,025	100%	$22,025
Sub-Total			$97,472		$93,541
Direct costs					
OH&S equipment clothes- First aid kit, boots, sunscreen, uniform			$1,500	100%	$1,500
Training materials			$10,500	100%	$10,500
Speakers- specialist	10 days	$800/day	$8,000	100%	$8,000
Trainers- specialist	5 days	$1000/day	$5,000	100%	$5,000
Consultancy fees	5 days	$1000/day	$5,000	100%	$5,000
Catering			$4,500	100%	$4,500
Herbarium vouching			$7,000	100%	$7,000
Monitoring materials Stakes, compass, measuring tape, rope, secateurs			$500	100%	$500
Collection licenses - CALM licenses			$100	100%	$100
Dieback kit- Cleaning brush, metho, container			$100	100%	$100
Stationary - Clipboards, paper, pens,			$1,000	100%	$1,000

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
photocopying					
Reference- Field guides, plant id keys			$500	100%	$500.00
Miscellaneous			$200.00	100%	$200.00
Onsite Management materials - Herbicide, equipment, tools			$15,000	100%	$15,000
SubTotal					$57,900
Total					$155,372

8.15 Estimated Total Investment Influenced by the Project

Investment includes participants' existing bushland management budgets, with potential for those to be increased as participant understanding of the threats and management techniques increases.
In-kind time will be given by steering committee and host line supervisor.

8.16 Cost Effectiveness

- High priority assets are targeted.
- The action learning process is designed to increase investment in appropriate management actions in the target areas and in other bushland areas.
- Knowledge sharing arrangements will promote appropriate management techniques for diverse local ecosystems to address threats at a regional scale.
- Capacity building between natural area managers and land managed.

8.17 Long Term Strategy

The project is based on adaptive learning principles. The steering committee and participants will further define the project and refine based on the principle of continuous improvement and project monitoring and evaluation.

8.18 For how long will this kind of project be needed?

3 yrs minimum.

8.19 Can the project become financially self-sustaining?

The management sites would be financially self sustaining.

8.20 Can the project become socially self-sustaining?

The intent of this program is to form networks that will be self sustaining and where participants can learn from experience- their own and their fellow participants. An objective is to decrease unsustainable reliance on outside experts. It is considered that the project will be self perpetuating as the group formed will seek greater knowledge and experience amongst themselves as time progresses and the group gains capacity. This has happened since the Perth Biodiversity Project Pilot, with participants continuing to seek advice and support form each other within a cohesive network.

9. PROJECT ND09: SKILLS FOR NATURE CONSERVATION

9.1 Summary

The SFNC sub-project addresses the capacity of the community and NRM professionals in the:

- Management, protection and restoration of natural areas including bushland, coastal areas, wetlands and waterways
- Social skills set necessary for community conservation groups to continue their involvement in conserving Perth's environment

SFNC addresses regional biodiversity, land, water, coast and marine and regional capacity assets including:

- Conservation of natural areas and their biodiversity
- Building regional capacity in biodiversity conservation

And the threats to these assets including:

- Degradation of natural areas through clearing of native vegetation, habitat fragmentation, weeds, altered hydrology etc..
- Contamination with nutrients and other pollutants
- Lack of capacity in NRM in general community and NRM professionals

This is achieved through the delivery of a calendar of training events that focuses on transferring skills and knowledge needed by the community and NRM professionals to address these issues. The program is evaluated each year by community panels and their feedback is used to develop the topics and improve the calendar for the next year and ensures that the workshops delivered through the program are timely and relevant to the target audience.

9.2 Why this is a Priority Project

Water management actions		
WM1.5	20% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in Region by 2009	Coordinate, facilitate, support and motivate community groups Support development, resourcing and implementation of restoration plans to protect major rivers Continue existing strategic community-training programs such as SCCP Education program, Ribbons of Blue, Waterwise, Skills for Nature Conservation, Urban Nature and Land for Wildlife through

		the integrated regional education and training program
WM2.5	20% increase in community participation in wetlands education, restoration, protection and management activities by 2009	Facilitate, support and motivate community groups Support development, resourcing and implementation of restoration plans to conserve and protect wetlands Continue and expand existing community-training programs such as Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program
WM3.4	20% increase in community participation in nutrient intervention education, restoration, protection and management activities by 2009	Facilitate, coordinate, support and motivate community groups Continue and expand existing community-training programs such as Swan-Canning Cleanup Program education initiatives, Great Gardens workshops, Ribbons of Blue, Wetland Watch and Skills for Nature Conservation, through the integrated regional education and training program
WM4.4	20% increase in community participation in education, restoration, protection and management activities for managing turbidity / particulate matter by 2009	Coordinate, facilitate and support community groups Continue and expand existing community-training programs such as River Restoration training, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program
WM5.4	20% increase in community participation in salinity education, mitigation and remediation activities by 2009	Coordinate, facilitate and support community groups Continue and expand existing community-training programs such as River Restoration

		training, Ribbons of Blue, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program
Biodiversity management actions		
BM1.5	30% increase in community participation in education, restoration, protection and management activities high priority native vegetation in the Region by 2009	Continue and expand community natural diversity training programs (e.g. *Skills for Nature Conservation, Urban Nature, Land for Wildlife, Greater Gardens, Grow Us A Home*)
BM2.5	30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008	Coordinate, facilitate and support community involvement
Coastal and marine management actions		
CMM1.5	30% increase in community participation in biodiversity education, mitigation and remediation actions by 2009	Continue and expand existing community-training programs such as Swan-Canning Cleanup Program education initiatives, Great Gardens workshops, Ribbons of Blue, Wetland Watch and Skills for Nature Conservation, through the integrated regional education and training program
CMM2.6	30% increase in community and stakeholder participation in education, mitigation and remediation activities related to marine habitat protection by 2008	Coordinate, facilitate and support community and stakeholder involvement in protection of marine habitat
Regional capacity		
RCM1.4	Develop a regional capacity framework supported by an integrated regional management information system by 2006.	Coordinate an integrated regional education and training program addressing land, water and biodiversity and cultural heritage themes

9.3 Past Achievements

Outcomes have been:-

- Increased skills and knowledge of participants on a wide range of biodiversity issues which will allow them to undertake and participate in the management and restoration of biodiversity assets
- Training events are also an opportunity for like-minded people to meet and network and provide an important mechanism for ongoing motivation and involvement of community volunteers in NRM activities
- Strong partnership between Swan Catchment Centre, Ecoplan and Greening Australia WA has been developed since the program was first implemented in 1998. The partnership has a proven capacity to deliver the program and has the scope to continue to evolve the program to meet the needs of the target audience

9.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	All project funds are directed into relevant training and education events aimed at community members.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	This project focuses on building regional capacity
(3) Investment should not exceed the public benefits that result.	The investment in the project is relatively minor.
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	

9.5 Work Program

The Work program includes the delivery of 8 workshops over until June 2005, with another 10 for the first half of 2005/6.

9.6 How the project has been designed and developed

The Skills for Nature Conservation training calendar has been operating since 1998 and has been implemented through a partnership between Ecoplan, Greening Australia WA and Swan Catchment Centre with support from Friends of groups and catchment groups across the Swan Region.

The decision to work together came from the need:

- To be strategic
- To pool resources for better environmental outcomes
- To present a united, targeted program for community organisations and
- To avoid competing for the same client group

Approximately 20 community workshops are delivered in each calendar year, aimed at volunteers and NRM professionals who are working to conserve Perth's natural areas including bushland, coastal areas, wetlands and waterways. Focus groups are run at the end of each year with participants and presenters to provide feedback on the calendar and to generate topics for the next years calendar, ensuring that the development of the training calendar is community-driven and meets the needs of out target audience.

9.7 Partners

- Greening Australia
- Swan Catchment Centre (Department of Environment) – 0.34 FTE Training Coordinator (NHT dollars)
- Ecoplan (CALM)
- Swan-Canning Cleanup Program - $4000 operational per year
- Bushcare
- Community volunteers who present at our workshops
- Catchment groups who present at our workshops

9.8 Management Structure

The project is managed through a partnership between Ecoplan, Greening Aust and the Swan Catchment Centre.

9.9 Outputs and Timelines

A calendar of training events is produced each year with some 18-20 workshops.

9.10 Milestones

Workshops

9.11 Expected Outcomes for Natural Resource Condition

Increased capacity of community members and NRM professionals to manage, protect and restore natural areas in the Swan Region

9.12 Risk Factors

Specific risk	Description of risk	Likelihood and impact	Strategies to manage identified risks
Short-term funding cycles	Allocation of short-term funding restricts the ability of the project to plan and influence regional targets	Moderate likelihood. It will be difficult to maintain momentum and reliable access to trained presenters.	Request that funding is allocated so that core capacity to deliver remains secure for longer term.
Insufficient qualified staff	If there are insufficient qualified staff to deliver the training it could lead to poor outcomes by affecting on-ground outcomes and hence natural resource condition targets	Unlikely to moderate likelihood.	Maintain collaboration with recognised staff.
Threat to partnership model	The partnerships with each sub-project could alter.	Low- moderate	Maintain collaboration with partners. Develop strategies that ensure delivery occurs in spite of changes to partnerships.
Availability to participants	Above risks can alter the number of workshops that are delivered	Low-moderate	Ensure the workshops are delivered through the Swan Region in a targeted method where it is most needed.
Ongoing on-ground action	In the absence of the availability of the training there is a risk of fewer active participants and lower skills in those already actively involved in on-ground action.	Low-moderate	Plan or ensure access to alternative modes of delivery.

9.13 Scope for Project Expansion or Contraction

The scope for the project is currently adequate as it is constantly evaluated and improved to meet the needs of the community.

9.14 Cost

First Six Months (to June 30th 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
1FTE				100	25,000
Operating				75	5,000
					30,000

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
1FTE				100	50,000
.5 FTE				50	30,000
Operating				75	21,000
					101,000

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
1FTE				100	50,000
.5 FTE				50	30,000
Operating				75	21,000
					101,000

9.15 Estimated Total Investment Influenced by the Project

9.16 Cost Effectiveness

9.17 Long Term Strategy

9.18 For how long will this kind of project be needed?

9.19 Can the project become financially self-sustaining?

9.20 Can the project become socially self-sustaining?

10. PROJECT ND10: NATURAL DIVERSITY IMPLEMENTATION FRAMEWORK

10.1 Summary

Provide a brief summary of the project. What assets and threats does it address, by what means, and in what locations. What are the expected results?
This project provides the framework for coordination and delivery of the Natural Diversity Regional Delivery Program. The broad outcomes of the project are:

Support implementation of the projects within the Natural Diversity Program
Develop partnerships with key stakeholders to develop and implement Natural Diversity projects
Coordinate activities within the Natural Diversity Program to maximise efficiency and outcomes
Implement monitoring and evaluation programs

The framework consists of a:

- Natural Diversity Program Manager : The role of this position is to ensure that the MAT's within the Natural Diversity Delivery Program are being met within given timeframes, to coordinate the delivery of the program across the Swan Region, to provide support and training to sub-regional staff within their program, to form partnerships at a strategic level to implement projects and to coordinate the monitoring and evaluation of the program.
- Part-time Communications Officer: The Communications Officer will assist with organising of events related to the program, coordinate a communications plan for the program and produce displays and information required within the program
- Part-time Local Government Officer : This position will ensure Local Government involvement in biodiversity projects, assist them to reach biodiversity goals for their area and assist them to partner with other stakeholders such as State Government and community
- Indigenous Officer: The Indigenous Officer will ensure that indigenous issues are considered within the delivery program, that indigenous people are involved in the decision making processes and engaged where possible in the delivery of projects.
- Sub-regional Officers: There is a Sub-regional Coordinator in each of the five regions of the Swan. A portion of their time will be committed to setting the priorities for Biodiversity within their sub-region in partnership with the Program Manager, developing partnerships within the Sub-region and supporting and coordinating the activities of the Sub-regional Biodiversity Officers. There are five Sub-regional Biodiversity Officers, two in the north, one in the north-east, one in the east and one in the south. The role of these officers is to support the delivery of Biodiversity Projects in their region, develop partnerships with Local Government, community and other stakeholders to develop and implement biodiversity projects and to carry out monitoring and evaluation of projects within their region

10.2 Why this is a Priority Project

The Swan Region has a population of over 1.4 million people, and it is the pressures which they place on environmental assets which is the major threat to NRM. Behaviour change at at a State Government, Local Government, industry and community level is essential if we are to protect our natural resources.
Partnership development is also essential to effective NRM in this region, and coordination of the large number of stakeholders involved in working with the environment in some way.
The investment in the Natural Diversity Framework reflects this requirement for initiating behaviour change, coordinating effort and developing partnerships.
The project meets the MAT's in the Swan Region Strategy in the following way:
Assets addressed

Terrestrial and aquatic biodiversity

Threats addressed

Habitat loss, ecosystem fragmentation, native vegetation clearing, fire management regimes, altered hydrology, exotic plants, feral animals, plant and animal diseases, clearing and filling of wetlands

Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Native vegetation Communities integrity	BR1a The comprehensiveness, adequateness and representativeness (CAR) of the protected area system (including formal reserves and off-reserves) is improved by 50% by 2015 based on 2005 baseline data BR1b maintain and improve the condition of high priority native vegetation (including formal reserves and off-reserves) by 2020, based on 2005 baseline data	BM 1.1 BM 1.2 BM 1.3 BM 1.4 BM 1.5 BM 1.6	
Significant species and ecological communities	BR2 50% of critical habitat for identified significant species and ecological communities protected by 2014	BM 2.1 BM 2.2 BM 2.3 BM 2.4 BM 2.5	
Ecologically significant invasive species	BR3 reduction in impact of regionally significant invasive species by 2020 (with a quantified target set by Dec 2005)	BM 3.1 BM 3.3 BM 3.4	BM 3.2

10.3 Past Achievements

N/A – a new project

10.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Most assets in the Region are public assets, and this project aims to achieve large-scale behaviour change to protect biodiversity assets
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Prioritisation of strategic actions will be assisted through this project
(3) Investment should not exceed the public benefits that result.	Investment in this project is mostly on public assets
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	The prioritisation process will be assisted by this project
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Investment in industry development will be an aim for private landholders
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Investment in the Sub-regions has been unequal and priotised according to NRM issues
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	Monitoring and evaluation of program delivery is a key component of this project
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	The prioritisation process will be undertaken on an annual basis, and adaptive management used to incorporate new information and learnings

10.5 Work Program

Milestone	Timeline
Sub-regional planning completed to June 06	March 05
Implementation of projects, aprtnership development	March 05-June 06
Monitoring and evaluation of projects	Ongoing
Evaluation of Natural Diversity Program	April-Jun 06

10.6 How the project has been designed and developed

The Program Delivery Structure is an outcome of the development of the Swan Region NRM Strategy. The Sub-regional structure for implementation of the Strategy has been developed through a community consultative process of mapping the catchments of the Swan Region over the last two years

10.7 Partners

List all partners who contribute in cash or kind. What other activities are *directly* linked to this project in an operational sense?
Key partners in this project include State and Local Government and Industry. Each Sub-region has a centre for operation except for Coast and Marine. These centres and their operating costs are supported through contributions from Local Governments, State Government and industry (Tiwest and Chevron Texaco).
This project also leverages investment into biodiversity in many ways, for example, the Swan Alcoa Landcare Program invests funds into community restoration projects and the project has encouraged Local Government to invest in bushland management.

10.8 Management Structure

The Natural Diversity Program Manager is responsible for the overall coordination of this project. Sub-regional investments are managed through community committees, with a Sub-regional Coordinator and Biodiversity Officers in each Sub-region.

10.9 Outputs and Timelines

Outputs achieved through this project may be reported through other projects which have been supported through the framework. Specific outputs reported through this project will cover a wide range of outputs and cannot be finalised until Sub-regional planning is complete.

10.10 Milestones

See above

10.11 Expected Outcomes for Natural Resource Condition

The Biodiversity projects implemented through the Natural Diversity Program will be successful and will have strong partnerships in place. Monitoring and evaluation will be used as the basis for adaptive management to further enhance the outcomes of Biodiversity projects

10.12 Risk Factors

The employment of suitable staff is a potential risk. The short-term nature of contracts for positions makes it difficult to employ suitably experienced staff.
Another risk to the project is the considerable coordination required across multiple stakeholders. Success of the project depends on obtaining the trust and goodwill of a large range of players.

10.13 Scope for Project Expansion or Contraction

The project does not need to be expanded, as the scope of the project has been set through extensive consultation. Conversely, if the project were to contract the natural Diversity Program Delivery could not be fully implemented.

10.14 Cost

Financial Year 2004-05

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	7		$632,000	90%	$587,000

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	7		$632,000	90%	$587,000

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	7		$632,000	90%	$587,000

10.15 Estimated Total Investment Influenced by the Project

10.16 Cost Effectiveness

The staff within the project will leverage NRM investment from partnerships, as well ensuring that all NHT funded projects are successful in implementing MAT's

10.17 Long Term Strategy

Adaptive management will be used to develop the aims and objectives of the project on a regular basis

10.18 For how long will this kind of project be needed?

This project will be ongoing for the duration of implementation of the strategy, however the total project cost may change over time as aims and objectives are refined.

10.19 Can the project become financially self-sustaining?

It is unlikely that the project can become self-sustaining, however stakeholders may fund some components of the project

10.20 Can the project become socially self-sustaining?

As partnerships are established, there will be less requirement for partnership initiation, and over time less need for partnership support. The aim is to build the capacity of partners so that their input becomes self-sustaining

INTEGRATED WATER MANAGEMENT REGIONAL DELIVERY PROGRAM

11. PROJECT IWM01: CARING FOR THE CANNING – CANNING ENVIRONMENTAL FLOWS

11.1 Summary

This project addresses the significantly reduced flow in the Canning, Wungong & Southern rivers since the construction of drinking water supply dams. It seeks to improve river flows, water quality, habitat diversity and reduce frequency of algal blooms by developing Environmental Water Provisions (EWPs).
It is expected that once EWPs have been established, they will be incorporated into an Allocation Plan for the Canning River system and will influence the Water Corporation's operations strategy for dams in the Canning catchment.

11.1.1 River Restoration and Environmental Flows

This project will also help to identify areas along the rivers that could benefit from river restoration in order to improve habitat, water quality and flow. Local community landcare groups and Local Government Authorities will play an important role in the project where river restoration is being carried out. Restoration techniques such as placing large woody debris along the river help to improve ecological values of the river and maximise the benefits of the water being released.

11.1.2 Background information

Since the 1940's water has been released to maintain summer flows in the Canning & Wungong rivers from the Water Corporation's scheme water supply pipelines. These releases of water were to provide for irrigation, domestic and stock water requirements that were lost as a result of the Canning Dam.
Water releases also occur in Wungong Brook, and commenced when construction of the Wungong Dam was completed in 1979.
Whilst these releases have ensured sufficient flows to accommodate for water users, further work is needed to understand the amount of flows required and the timing of releases to ensure ecological needs are satisfied at crucial periods.
The releases are co-ordinated by the Department of Environment, in partnership with the Water Corporation.

Why this is a Priority Project

The Canning Environmental Flows project addresses the following regional and national outcomes:

- The Swan Regional NRM Strategy target to develop EWPs for 50% of priority water resource assets by 2009.
- The National Council of Australian Governments (CoAG) commitment to develop EWPs for regulated river systems.

The project also works towards achieving regional outcomes in that it is establishing a framework/model for development of EWPs that can be applied to other river systems within the region eg. Helena River (currently no guidelines exist for developing EWPs in this region) and is building strong partnerships between State government, Local government, catchment and community groups, local communities and the Water Corporation.
The project complements on ground river restoration projects being carried out by local governments and local catchment groups. As well as a current study looking at ecological

water requirements (EWRs) of the Churchmans, Bickley & Munday Brooks by the Water Corporation.

11.2 Past Achievements

The project has been running since 1999. The *Caring for the Canning* Management Plan was finalised in 2002 and one of the key recommendations was to manage flows in the Canning River system through development of EWPs.
So far the key achievement has been the partnerships formed between state government, local government, Water Corporation and the community and the time that each of these stakeholders has invested in the project.
A keen community based Steering Committee has been formed and an enthusiastic panel of experts make up the inter-agency technical working group.
Three community workshops have been held to obtain community advice and assistance to determine community values for the Canning River System.
Eight flow monitoring sites have been installed along the Canning & Wungong rivers to collect flow data to assist in determining the ecological water requirements (EWRs) of these rivers.
A communications plan has been produced for communicating the project to the wider community and raising the profile of the project.

11.3 Incorporation of NHT Principles

1. Generates the greatest public benefits per dollar of public investment.	Project focuses on a public asset, targeting key areas of the river to maximise benefits of flow and addresses community desired future state of the river system. The project also complements river restoration projects being carried out in the region.
2. Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	The Canning River System is still able to be successfully managed for the benefit of the environment and the public & economic value of the river. There are very definite outcomes to improve flows for the environment.
3. Investment should not exceed the public benefits that result.	There is evidence to suggest that the public benefits far exceed the investment. The project will result in improved river system with increased amenity value, tourism, recreation & environmental values. Economic users of the river will also benefit from the development of a flow management strategy.
4. Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Development of EWPs seeks to allocate appropriate flow for protection of the environmental value as well as the economic & social value of the river.
5. Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Public priority is high. Investment also aimed at managing industry and private/commercial irrigation practises.
6. Targeted investment in NRM will be likely to result in an unequal distribution	This project aims to develop EWPs for the

of investment across the region.	river system as a whole, not at isolated reaches.
7. The processes required for setting priorities will involve ongoing learning and need constant feedback.	The process will involve continued consultation & communication with all stakeholders to gain feedback & input in setting suitable EWPs. The process of developing EWPs is evolving & the learnings gained can be applied to other regional river systems.
8. Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	The project priority is setting of EWPs to protect the environmental, social and economic values of the river.There is a timeframe priority to develop EWPs for 50% of priority water resource assets by 2009.

11.4 Work Program

It is envisaged that establishing EWPs for the Canning River system will be a staged process, taking place over a period of 5 years. The proposed stages are outlined in the attached table. Stage 1 is now complete and Stage 2 is currently underway.
The project is coordinated by the Department of Environment and conducted in partnership with the Water Corporation, Swan River Trust, Swan Catchment Council, local government authorities, community landcare groups and the local community.

11.5 How the project has been designed and developed

A key recommendation of the Swan Canning Cleanup Program (SCCP) Action Plan was to develop and implement a management plan for the Canning River. As a result of this recommendation the *Caring for the Canning* Management Plan was finalised in 2002. This management plan identified one of the major issues affecting the Canning River System was significantly reduced flow, contributing to degradation of ecological values of the river. The management plan made a recommendation to "Determine Environmental Water Provisions (EWPs) for the Canning River System".

The project has been developed with assistance from an inter-agency technical working group and in consultation with a community based steering committee. Input has also been sought from the general community through a series of workshops that were held in December 2003. The technical working group consists of relevant experts in the areas of hydrology, ecology, river restoration and stream flow measurement. The members of this group are experts within Department of Environment, Water Corporation, Swan River Trust and the University of Western Australia.

The members of the steering committee represent the views of economic users, social users and those concerned about the environment. In order for balanced representation from community, three persons were chosen from each of social, economic and environmental categories and one person representing the relevant local government authorities (LGA.). Both the technical working group and the steering committee meet regularly on a 2 monthly basis.

11.6 Partners

- Department of Environment
- Water Corporation
- Swan River Trust
- City of Gosnells
- Armadale Gosnells Landcare Group
- Swan Catchment Council
- University of Western Australia
- Local landholders
- Araluen Botanic Park

The following activities/ projects are either directly linked to this project or value add to the objectives of this project in some way:

- Local river restoration projects (Eg. Pioneer Park, Gosnells & Churchmans Bushland revegetation project), direct onground action activities funded through Swan Alcoa Landcare Program, Envirofunds or local government initiatives value add to provision of flows by creating improved habitat, restoring riparian vegetation, stabilising banks and improving quality. The EWPs project contributes to onground activities by providing improved flow and identifying areas that would benefit from restoration activities.
- Skills for Nature Program and River Restoration training courses assist in capacity building for community to conduct activities that will have a direct impact on the Canning River environment and catchment.
- Perth Biodiversity Project – protects locally significant bushland surrounding the river system and maintaining important biodiversity values associated with the river system. The Canning EWPs project contributes to the biodiversity project by providing flows to water dependent ecosystems to maintain biodiversity.
- Waterwise on the Farm – training landholders within the catchment in best management practises of water-use efficiency and fertiliser/pesticide management to reduce nutrients into the river system.
- Community Education programs – informing and educating the public about the importance of the river system and it's ecological function.
- Bush Forever – Protecting regionally significant bushland adjacent to the river. EWPs project aims to provide flows to protect adjacent bushland systems such as wetlands.
- Foreshore Assessment Project – identifying areas along the river that could benefit from river restoration for protection and enhancement of river values.

11.7 Management Structure

The project is managed by the Department of Environment (DoE). The DoE provides a full time project coordinator and part time supervising officer. The project coordinator coordinates both the Technical Working Group and the Steering Committee.
The technical working group develops strategy proposals for developing EWPs and the steering committee is consulted on these proposals.

11.8 Outputs and Timelines

Please see attached table (at end of document) for outputs and timelines.

11.9 Milestones

Please see attached table (at end of document) for Milestones.

11.10 Expected Outcomes for Natural Resource Condition

- Increased river flows
- Inundation of riparian vegetation to stimulate seed set (fringing vegetation).
- Flooding of remnant wetland areas and provide access to habitat for river fauna and to maintain vegetation health.
- Inundate trailing vegetation and riparian margins as spawning and recruitment habitat for native fish species such as Cobbler (icon species of the Canning River).
- Improve fish passage over obstacles.
- Flush pools to scour sediment deposits.
- Improved mixing in river pools so they do not become stratified and low in dissolved oxygen in bottom waters.
- Increased habitat & biodiversity
- Improved water quality
- Less frequent algal blooms

11.11 Risk Factors

Discontinued funding

The continuation of this project relies on external funding. Currently the Swan-Canning Cleanup Program provides operational costs, however NHT funds are required to provide salary for a full time project coordinator as well as part time senior supervising officer. Without this funding the DoE could not provide a coordinator to run the project and the project would not be able to continue.

There is an expectation within the community that action will be taken to improve the health of the Canning River system. If funding was to cease the Swan Catchment Council and DoE risk jeopardising the high level of stakeholder engagement that has already been carried out and may lose the confidence of the community, landholders, Local Government Authorities and community groups.

Funding partnerships with the Water Corporation are yet to be finalised. The Water Corporation is involved in all stages of the project in the hope that we can work towards negotiating an appropriate outcome for all involved parties including the environment.

11.12 Scope for Project Expansion or Contraction

- The project could be **expanded** to begin a process of developing EWPs for the Helena River.
- It may be possible to **contract** the NHT2 input if the Water Corporation agreed to match NHT funds on a dollar for dollar basis.

11.13 Cost

Show the total inputs to the project (both NHT2 and Non-NHT2), and the funds sought from NHT2.

First Six Months (to June 30th 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Coordinator salary	1FTE		$32,000	100%	$32,000
Baseline monitoring (Water Corporation)			~$10,000	-	-
Technical expertise	9 officers @ 1 hour/ month	~$59/ hour	$3186	100%	$3186
In kind hours (voluntary Steering Committee)	10 members @ 12 hours/ year	$15/ hour	$900		
Coordinator oncosts & office housing (DoE in kind)	1FTE		$28,800		
Community Education			$1000	100%	$1000
Operational costs (SCCP)			$10,000	-	-

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Coordinator salary	1FTE		$64,000	100%	$64,000
Technical expertise	9 officers @ 1hour/ month	~$59/ hour	$6372	100%	$6372
In kind hours (voluntary Steering Committee)	10 members @ 12 hours/ year	$15/ hour	$1800		
Coordinator oncosts & office housing (DoE in kind)	1FTE		$57,600		
Community Education			$1500	100%	$1500
Modelling costs	8 sites	~$10,000	$80,000	100%	$80,000
Consultant costs (Water Corporation)			$10,000	**	
Coordinator Training			$1500	100%	$1500
Operational costs (SCCP)			$20,000	**	-

** Partnership arrangements to be negotiated

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Coordinator salary	1FTE		$64,000	100%	$64,000
In kind hours (voluntary Steering Committee)	10 members @ 12 hours/ year	$15/ hour	$1800		
Coordinator oncosts & office housing (DoE in kind)	1FTE		$57,600		
Community Education			$3000	100%	$3000
Technical expertise	9 officers @ 1hour/ month	~$59/ hour	$6372	100%	$6372
Trial releases monitoring + Report & recommendations (Water Corporation)	Consultant		~$20,000	** 50%	$10,000
Consultation workshops to negotiate EWPs (facilitator costs)	Facilitator time (approx 10 hrs)	$80/hour	$800	100%	$800

** Partnership arrangements to be negotiated

11.14 Estimated Total Investment Influenced by the Project

The Canning Environmental Flows project is vital to improving the health of the Canning River System. The project is also the first of it's kind for regulated rivers in Western Australia and is helping to develop a process that can be used to develop EWPs for other river systems within the Swan NRM Region.

To date significant community investment has been made towards the project and there is an expectation within the community that action will be taken to improve the health of the Canning River system.

It is also important to note the partnership that has been forged between State and Local Government agencies and the Water Corporation in adopting a collaborative approach toward addressing the serious health issues confronting our major metropolitan river system. There has also been a significant investment made by technical experts across these agencies.

The Canning Environmental Flows project is paramount in successfully achieving the Swan Regional NRM Strategy target to develop EWPs for 50% of priority water resource assets by 2009.

Funds contributed to the project to date:

- Water Corporation: $9,750
- Swan Canning Cleanup Program: $38,240
- NHT: $96,000

Plus significant in kind hours from community, steering committee and technical experts.

11.15 Cost Effectiveness

The project is building on 'in-house' expertise and is more cost effective than hiring consultants to do the work. The project will also develop a framework and in-house knowledge base which can be used to develop EWPs for other river systems in the future eg. Helena River.

11.16 Long Term Strategy

This project is one component of the document *"Caring for the Canning: A plan to revitalise the Canning, Southern and Wungong Rivers"*. The plan also provides a direction towards a holistic management approach for the Canning River System and includes recommendations to implement seven separate management programs to achieve the vision of the plan. The *Caring for the Canning* is a key initiative of the Swan Canning Cleanup Program Action Plan. This project works towards achieving the first of seven management programs outlined in *Caring for the Canning* by developing EWPs for the Canning, Wungong & Southern Rivers. The seven management programs are:

- Manage the Flow regime
- Manage the Kent Street Weir
- Implementation & Training of best management practices
- Environmental evaluation and monitoring
- Restore Riparian zone
- Increase awareness and participation in catchment and river management
- Legislation and policy development

The establishment of EWP's for river systems is new to this State and consequently there are no defined methods, procedures or processes for development of EWP's for regulated river systems. The methods used in this project are therefore likely to be further developed with time and will be used as a model for developing EWP's for other regulated river systems in the region.

11.17 For how long will this kind of project be needed?

It is envisaged that the establishment of EWPs for the Canning River system will take a period of 5 years and then the EWPs will need to be continuously monitored and reviewed to ensure that they are meeting the desired social, economic and environmental objectives. In addition, the project may then be expanded to develop EWPs for the Helena River.

11.18 Can the project become financially self-sustaining?

In the short to medium term the project is dependent on external funding, however once EWPs have been incorporated into an Allocation Plan the Water Corporation will be responsible for reviewing and managing flows under their operating strategy for the Canning & Wungong Dams.

11.19 Can the project become socially self-sustaining?

This project will also help to identify areas along the rivers that could benefit from river restoration in order to improve habitat, water quality and flow. Local community landcare groups and Local Government Authorities will play an important role in the project where river restoration is being carried out. Restoration techniques such as placing large woody debris along the river help to improve ecological values of the river and maximise the benefits of the water being released.

Table 1: Developing Environmental Water Provisions for the Canning River System

Milestones	Timeframe (Financial year)	Outputs / tasks
Stage 1: Identify social, economic & ecological values	2003 to 2004	Establish Canning Environmental Flows Steering Committee. Raise profile of issue – marketing and communications strategy Establish technical working group to select sites and design an environmental flows strategy/interim EWPs & ecological/flow monitoring programme. Community consultation workshops Preliminary EWR study
Stage 2 : Investigate & model flows	2004 to 2005	Select sites Design flow investigation strategy Install low quality gauging stations Record stage height & cross sectional areas of channel Model flow data using HECRAS Baseline ecological monitoring
Stage 3: Trial flows & monitor	2005 to 2006	Examine proposed sites to evaluate whether meeting EWR targets (eg fish passage & habitat). Conduct trial environmental water release/s in specific river management section/s. Implement ecological and flow monitoring program (monitor fish passage, habitat, macroinverebrates). Consider river restoration/soft engineering that would benefit releases. Develop trigger levels for flow management.
Stage 4: Determine EWPs	2006	Develop and evaluate EWP options. Agree on 'best' EWP option for Canning River. Prepare draft Water Allocation Plan
Stage 5: Prepare Allocation Plan	2006 to 2007	Release final Water Allocation Plan Manage flows in accordance with final Water Allocation Plan Negotiate amendment of Water Corporation's Operating Strategy for dams in the Canning Catchment Ongoing ecological and flow monitoring Ongoing River restoration and catchment management Periodical review of EWPs

12. PROJECT IWM02: SWAN-CANNING FORESHORE ASSESSMENT PROJECT

12.1 Summary

Asset: Swan Canning Estuary
Threats: 1) incompatible planning and development and 2) inappropriate land and water management practices
Means: A comprehensive foreshore assessment has been designed based on the pressure-state-response model and is being applied across the Swan River Trust management area. The assessment involves a multi-method approach including literature and existing data review, desktop and field assessments and consultation. Information is geographically referenced and being collected at a range of spatial scales to enable local and regional assessment.
Information will enable definition of community aspirations, current landuse management, social and biophysical assets, and threatening processes. Information will be used to increase strategic focus and capacity for foreshore management. Specifically, the project will:

- fill critical gaps in knowledge
- develop decision support tools
- influence planning and development decision making/activities
- influence foreshore management practice
- establish mechanisms for adaptive management
- develop information resources
- establish mechanisms for information dissemination
- identify areas for program development

The project is focussed at an operational level but will incorporate higher-level strategic objectives and consultation in development of the Foreshore Management Strategy.
Location: The project encompasses the riparian zone within or abutting the Swan River Trust management area; the assessment of vegetative cover of the floodway and floodplain; the lateral connectivity to wetland areas; the connectivity to catchment wide biodiversity corridors and networks; and includes the estuarine sub-tidal terrace.
NOTE: SRT management area extends from the Fremantle traffic bridge along the Swan River to the confluence of Moondyne Brook, along the Canning River to the confluence of Stinton Creek, along the Helena River to the lower pipehead dam and along the Southern River to the Allen St crossover.

12.2 Outputs

- database of comprehensive baseline data and decision support tools
- development of a foreshore management strategy (including objectives hierarchy with resource condition and management action targets and practices guidelines)
- development of an investment plan
- development of a monitoring and evaluation plan (including identification of pressure, state and response indicators)
- establishment of adaptive management mechanisms
- development of a research framework
- preparation of information resources (including summary info and data sets to be made available to land managers, community groups and the general public)

The project **outcome** will be a healthier river with enhanced ecological, cultural and landscape values through more strategic foreshore management. In particular, decision support tools will facilitate more appropriate planning and development and contribute to development of best management practice. Public investment into foreshore protection and rehabilitation will be more strategically targeted and effective and on the ground outcomes for degree of effort will be more efficiently achieved as management responses will be better informed.

12.3 Why this is a Priority Project

The Foreshore Assessment Project addresses the following prioritised management actions

WATER THEME: Asset Value at Risk: Swan-Canning Estuary

REF	RANK	TARGET	RELEVANT MANAGEMENT ACTION	LINKS TO FORESHORE ASSESSMENT PROJECT
WR1		**MATTER FOR TARGET – AQUATIC ECOSYSTEMS INTEGRITY** **Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites by 2020, with quantified targets for major rivers and waterways in the Region set by 2005**		Issues addressed include: • Riparian vegetation community assemblages • Riverine physical structure
			RESOURCE ASSESSMENT	
WM1.1	**2**	100% of priority rivers and waterways in Region identified for protection by 2005	• Consolidate baseline data and analyse priority rivers and waterways condition • **Continue Foreshore Condition assessment project** • Establish baseline and consolidate ecosystem integrity condition	• Direct reference (project provides baseline data for Swan-Canning Estuary
			PLANNING	
WM1.2	**3**	100% of all relevant NRM legislation and policy reviewed and amendments recommended for the protection and management of the Region's major rivers and waterways by 2006	• Assist in the development and implementation of decision support tools for planners, identifying land use change scenarios and predicting impacts. • Continue to develop and implement sub regional and local action plans. • Continue the implementation of Riverplan	• Project develops a number of decision support tools of value to landuse planning, development and asset management • Data provides input for better targeted management plans
			ON-GROUND ACTION	
WM1.4	**5**	Develop and implement management and restoration programs for the Region's major rivers and waterways by 2007	• Implement strategic programs in areas identified in WM1.1 to manage and restore priority rivers and waterways • **Implement prioritised actions from Swan River Trust Foreshore Condition project**	• Direct reference • Project guides SRT Riverbank Program

REF	RANK	TARGET	RELEVANT MANAGEMENT ACTION	LINKS TO FORESHORE ASSESSMENT PROJECT
			• Continue large scale implementation of Riverbank and Swan Alcoa Landcare Program foreshore projects	
WM1.5	**1**	20% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in Region by 2009	• Coordinate, facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to protect major rivers	• Project outputs designed to increase capacity for foreshore management by filling critical information gaps
WR4		**MATTER FOR TARGET - TURBIDITY/SUSPENDED PARTICULATE MATTER IN AQUATIC ENVIRONMENTS** **Maintain and improve condition of aquatic environments in the Region, as measured at representative sites by 2020, with quantified targets for turbidity / suspended particulate matter set by 2005**		**1.1.1.1.1.1 Adresses sediment transport within estuary and identifies erosion sources from riverbanks of SRT management area**
			RESOURCE ASSESSMENT	
WM4.1	**3**	Establish monitoring systems to develop resource condition targets for turbidity/ suspended particulate matter by 2005	• Support undertaking of a sediment sourcing study to identify and assess active erosion areas and their impact on the Swan-Canning River system	• Project can provide input into Integrated regional information system • Provides data for within SRT management area
WM4.3	**2**	Implement identified remedial actions to address turbidity / particulate matter by 2007	• Implement strategic programs in priority areas identified in WM4.1 to remediate turbidity / particulate matter • Develop and implement program foreshore and riparian restoration on waterways • Develop and implement best management practice for minimising waterways and land erosion	• Project will identify and prioritise areas for restoration action • Project will directly guide Riverbank Program investment to ensure strategic outcomes
WM4.4	**1**	20% increase in community participation in education, restoration, protection and management activities for managing turbidity / particulate matter by 2009	• Coordinate, facilitate and support community groups • Develop and implement restoration plans to conserve and protect waterways and wetlands	• Project supports community action by filling information gaps and developing decision support and information resources • Project guides Riverbank Program investment and provides basis for consideration of SALP Funding

REF	RANK	TARGET	RELEVANT MANAGEMENT ACTION	LINKS TO FORESHORE ASSESSMENT PROJECT
			• Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation.	applications • Project provides input into development of restoration plans • Project will provide input into regional information system to enhance planning, implementation, monitoring and evaluation.

BIODIVERSITY THEME: is considered of relevance but details of links are yet to be completed.

Project Links:
The project supports Riverplan, the Swan Region Strategy for Natural Resource Management, proposed new SRT legislation and the Swan and Canning RiverPark. The project in particular enhances the strategic ability of SRT's Riverbank Program, which has a $1million per year budget for the next 4 years to help maintain and improve the health of the Swan-Canning Estuary. The project is also complimentary to the SRT's Swan-Canning Cleanup Program and Drainage Nutrient Intervention Program, which when considered collectively provide a holistic approach to river management.
The Foreshore Assessment project also compliments the EMRC Local Government NRM Policy Project and will build on and compliment initiatives such as the Caring for the Canning Strategy. Information will complement and facilitate foreshore management planning and assist with the development of protection and rehabilitation programs undertaken by state agency, local government and community groups to protect Swan-Canning Estuary.
Links to other NHT2 priority projects include the Canning Environmental Water Provisions and Perth Biodiversity Projects.
Leverage:
The Foreshore Assessment Project is guiding investment of the $1 million per year budget of public money through the SRT's Riverbank Program to protect the Swan-Canning Estuary. Local government and other partners, including community, are matching this funding and resulting in substantial investment in protection and enhancement of this iconic asset for the Swan Region.
By filling critical gaps in knowledge the foreshore assessment project will also have the capacity to lever improved planning and development decision making. Identification of high conservation areas based on defined criteria has the potential to lever change at the level of Local Government Town Planning Schemes. Improved understanding of assets, threats and natural system dynamics will facilitate more appropriate or improved foreshore management practices.

12.4 Past Achievements

Project Commencement: July 2003 with a 4 month delay in officer recruitment and subsequent delays in recruitment of field officers. **Current Duration of Project:** Project has been running for 1year & 5months.
Achievements (Outcomes):

- Development of a foreshore site assessment methodology that is relevant across the variable Swan-Canning Estuary landscape and useful at a range of spatial scales.
- Data collection/site assessments are providing critical data for development of decision support tools. This is providing direct input into the development of foreshore protection and rehabilitation projects ie. the project is facilitating more effective investment of public money through the SRT Riverbank Funding Program.
- Multiplier effects are resulting from partnerships with CALM WA Herbarium with the establishment of a SRT Regional Herbarium. Not only is CALM flora identification expertise assisting this project but the project is adding considerable value to CALM's Regional Herbarium collection. This information is also then available to land managers, community groups and the public interested in riparian vegetation within the Swan Region.

NOTE: There were significant delays in officer recruitment, resulting in the project being behind schedule in the first year. NHT funding was provided for the 03/04 financial year only. The past 5 months have relied on NHT carryover, local government support and increased funding from SRT. To date the project has been carried out with skeleton staff without the capacity to initiate all aspects of the project. With the field methodology developed and officers now onboard to undertake these assessments the consultation component and partnership development aspects now require priority attention.

12.5 Incorporation of NHT Principles

1. Generates the greatest public benefits per dollar of public investment.	Filling critical information gaps is allowing development of more targeted foreshore management responses and facilitating better prioritisation of activities within the SRT Riverbank Program. Information collection allows detection of threatening impacts for early intervention.
2. Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	The projects main focus is to prioritise areas for investment. Principle will be incorporated in prioritisation process.
3. Investment should not exceed the public benefits that result.	Partnership with other SRT Programs and LGA initiatives results in increased benefits with reduced effort.
4. Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	The projects main focus is to prioritise areas for investment. Principle will be incorporated in prioritisation process.
5. Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Information from project will be available to private land holders and will assist in the identification of priority needs for engagement. Links to Riverbank Program will enable establishment of strategic shore treatment trials to test the effectiveness of available products/technologies. Opportunities for industry development can be explored through partnership trials.
6. Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Compatible with current Riverbank Funding approach, which considers projects based on their merit. Investment will become increasingly targeted to high priority areas that result in high to sufficient benefits, this is not likely to be equal across the subregion.
7. The processes required for setting priorities will involve ongoing learning and need constant feedback.	Consistent with adaptive management approach.
8. Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	Consistent with adaptive management approach. It is expected that assumptions may need to be made regarding management actions required to achieve management objectives. These assumptions will generate hypotheses, which can then be tested within adaptive management framework.

12.6 Work Program

This next year (October 04-October 05) will be focused on site and desktop assessments, literature reviews and consultation. Partnerships will be develop to ensure maximum project benefit and duplication avoidance. Approximately 6 months will then be required for all data integration, interrogation, analysis and interpretation. It is expected that data analysis will be completed by April 06. It is then expected that an additional 6 months will be required to finalise documentation of the Foreshore Management Strategy and prepare preliminary information resources to be launched to stakeholders. The strategy will be launched by December 06.
For more detail see work schedule attached (Attachment 1)

12.7 How the project has been designed and developed

The project has been designed to be consistent with the Swan Region Strategy, the strategic objectives of the Swan River Trust and Riverplan. It's overarching purpose is to facilitate more strategic foreshore management, which combined with other initiatives, such as the Swan-Canning Cleanup Program will enable a more holistic approach to river management.

- A project framework has been established that recognises the importance of four key principles:
- Integration and communication of knowledge between research, management and operations must be fostered;
- Management responses should be based on an understanding of the state of the natural resource and the pressures it faces
- Management procedures should be flexible and adaptable
- Stakeholder ownership is essential

The project is considered to represent the first stage or establishment phase of an ongoing adaptive management cycle. The project is considered to comprise of baseline data collection, collation and analysis; preliminary decision support development; Foreshore Management Strategy development; preliminary information resources development and establishment of adaptive management mechanisms. The project will be considered complete with the launch and distribution of the Strategy and accompanying information resources.

12.8 Partners

NHT, Swan River Trust sections, Local Government, Sub-regional NRM groups, Community groups
Linked Operational Activities:

- implementation of Riverbank and SALP funded foreshore protection and restoration projects in partnership with local government, community groups and other project partners.
- Local government management and maintenance of foreshore reserves
- Local government development and implementation of foreshore management plans
- Community group on-ground action
- Swan River Trust field operations activities
- Private land owner management of private riverbanks/riparian zone

12.9 Management Structure

The project is managed within the Swan River Trust's Environmental Management Section under the Foreshore Protection and Rehabilitation Program. Dr Jane Latchford is Program Manager and Roweena Hart is the Project Manager.

12.10 Outputs and Timelines

See schedule (Attachment 1)

12.11 Milestones

See schedule (Attachment 1)

12.12 Expected Outcomes for Natural Resource Condition

The project most directly addresses the following:
MATTER FOR TARGET – AQUATIC ECOSYSTEMS INTEGRITY

Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites by 2020, with quantified targets for major rivers and waterways in the Region set by 2005
The project will identify at a minimum:

- Riparian vegetation communities for SRT management area
- Riverine physical structure

This will allow:

- development of a conceptual model for system
- identification of conservation landuse zones based on criteria (this will be based on CAR principles and application to each broad scale biogeomorphic zone
- development of resource condition targets required to protect system assets or conservation landuse zones
- development and prioritisation of management action targets required to achieve resource condition
- pressure, state and response indicators to be defined and targets set for ongoing monitoring and evaluation
- development of detailed management plans and restoration projects for on-ground implementation
- Riverbank Program investment to be guided to achieve strategic resource condition outcomes

Risk Factors

- No NHT Funding would prevent project completion
- Availability of data and imagery may limit completion of certain tasks
- Equipment failure or loss would result in time delays for completion of project milestones
- Unfavourable weather conditions may hinder progress
- Major pollution event/algal bloom or fish kill event as experienced over recent years within Swan-Canning estuary would result in time delays for completion of project milestones due to temporary diversion of staff, in particular field crew support

- Difficulties with site access may result in delays for completion of project milestones or may result in not all proposed areas being included

12.13 Scope for Project Expansion or Contraction

The Swan River Trust Environmental Management Section does not have the capacity to directly undertake expansion of the scope of the project. Contraction of the project is not considered feasible and would jeopardise the usefulness of the project and compromise achievement of expected outcomes. The project has been designed to be as streamlined as possible yet sufficiently detailed to provide meaningful data that will address key management issues and be adequately useful at an operational level.

12.14 Cost

First Six Months (to June 30th 2005)

	First 6 months (1 Jan 05 - 30 Jun 05) 6 months of Work Plan 1			
ITEM	Total Cost $	% NHT2	Total NHT2 $	Total SRT $
Eng. Contractor	$15,456	0%	$0	$15,456
L4 NRMO	$19,274	0%	$0	$19,274
L3 NRMO	$41,084	71%	$29,346	$11,738
L2 NRMO	$78,344	67%	$52,229	$26,115
SRT Field Ops. (@ L2NRMO)	$10,446	0%	$0	$10,446
NRM Sub-region (@ L4 NRMO)	$12,849	100%	$12,849	$0
TOTAL	$177,453		$94,424	$83,029
TOTAL SALARY REQUEST			$81,575	
GIS Support	$29,346	100%	$29,346	$0
Data Acquisition	$1,000	50%	$500	$500
Miscellaneous Costs	$2,000	50%	$1,000	$1,000
SRT Boat Useage	$1,000	0%	$0	$1,000
Vehicle Lease	$6,593	0%	$0	$6,593
Equipment	$4,000	50%	$2,000	$2,000
Consultation				
TOTAL OTHER	$43,939		$32,846	$11,093
TOTAL	$221,388		$127,270	$94,122

Financial Year 2005-06

	Financial Year 2005/2006 2 months of Work Plan 1 + Work Plan 2 + 6 months of Work Plan 3			
ITEM	Total Cost $	% NHT2	Total NHT2 $	Total SRT $
Eng. Contractor	$5,152	0%	$0	$5,152
L4 NRMO	$38,548	0%	$0	$38,548
L3 NRMO	$79,234	71%	$56,596	$22,638
L2 NRMO	$78,344	67%	$52,229	$26,115
SRT Field Ops. (@ L2NRMO)	$10,446	0%	$0	$10,446
NRM Sub-region (@ L4 NRMO)	$8,566	100%	$8,566	$0
TOTAL	$220,289		$117,391	$102,898
TOTAL SALARY REQUEST			$108,825	
GIS Support	$29,346	100%	$29,346	$0
Data Acquisition	$1,000	50%	$500	$500
Miscellaneous Costs	$2,000	50%	$1,000	$1,000
SRT Boat Useage	$1,000	0%	$0	$1,000
Vehicle Lease	$6,593	0%	$0	$6,593
Equipment				
Consultation	$2,000	50%	$1,000	$1,000
TOTAL OTHER	$41,939		$31,846	$10,093
TOTAL	$262,228		$140,671	$112,991

Financial Year 2006-07

	Financial Year 2006/2007 12 months of Work Plan 3			
ITEM	Total Cost $	% NHT2	Total NHT2 $	Total SRT $
Eng. Contractor	$0	0%	$0	$0
L4 NRMO	$38,548	0%	$0	$38,548
L3 NRMO	$76,300	71%	$54,500	$21,800
L2 NRMO	$0	67%	$0	$0
SRT Field Ops. (@ L2NRMO)	$0	0%	$0	$0
NRM Sub-region (@ L4 NRMO)	$0	100%	$0	$0
TOTAL	$114,847		$54,500	$60,347
TOTAL SALARY REQUEST			$54,500	
GIS Support	$14,673	100%	$14,673	$0
Data Acquisition				$0
Miscellaneous Costs	$1,000	50%	$500	$500
SRT Boat Useage				$0
Vehicle Lease				$0
Equipment				$0
Consultation	$3,000	50%	$1,500	$1,500
TOTAL OTHER	$18,673		$16,673	$2,000
TOTAL	$133,520		$71,173	$62,347

12.15 Estimated Total Investment Influenced by the Project

SRT Environmental Management Section

- $1 million/year for the next four years Riverbank Funding
- approximately $50,000/year to support SALP foreshore projects
- as much as $1 million/year for the next four years Local Government investment (matching Riverbank Funding)
- at least $50,000/year community support for Riverbank and SALP foreshore projects

SRT Waterways

- approximately $20,000 field operation activities

Other state government agency investments associated with management of public lands ie. DPI/WAPC and CALM

TOTAL INVESTMENT INFLUENCED = approximately $2.1million per year for the next 4 years

12.16 Cost Effectiveness

The project is considered cost effective for the following reasons

- will ensure investment is targeted to priority areas based on adequate assessment of baseline information
- will establish BMP based on a sound understanding of assets, threats and the natural system dynamics
- has capacity to influence land use planning and development decisions.

12.17 Long Term Strategy

The project method can be broadened to consider a greater range of issues. For example there is currently no structured approach included for considering issues such as recreational boating and vessel generated wave impacts on riverbanks. This issue is considered to be of particular importance and could be incorporated at further cost.

Furthermore, the project proposal currently does not have the capacity to address indigenous cultural heritage and land management practice to an extent that is justifiable. The inclusion of indigenous management principles, an overview of the cultural significance of sites and the inclusion of these areas as priorities for protection and rehabilitation would add immeasurable value to the proposed Foreshore Management Strategy. Opportunities for achieving greater indigenous involvement require further discussion.

There is also considerable opportunity to discuss intended project outputs to ensure these are best targeted to achieve project outcomes.

12.18 For how long will this kind of project be needed?

The Foreshore Assessment project has been developed within a broader framework of adaptive management. For the purpose of this NHT funding application this project will be considered to reach an endpoint with the completion and launch of the Foreshore Management Strategy and preliminary Information Resources. Expected completion is December 2006.

12.19 Can the project become financially self-sustaining?

Limited local government authorities have been approached to support this project. This has resulted in small contributions from both the City of Nedlands and City of Melville, with negotiations continuing with the City of Canning. While it is possible that additional resources could be obtained through local government support it is not feasible to rely on this funding as a major resource base for the project.

Funding made available from local government has enabled greater consideration to be given to particular issues faced by that LGA, which would have been more difficult or in addition to the current scope of the project.

12.20 Can the project become socially self-sustaining?

The development of active project partnerships is still required. Preliminary discussions were held with a number of potential project partners, however, this now requires follow up with more active engagement.

13. PROJECT IWM03: WATER QUALITY MONITORING AND EVALUATION FRAMEWORK

13.1 Summary

The objective of this project is to develop a coherent water quality monitoring and evaluation program across the Swan Region encompassing catchments, the Swan River estuary and the near-shore coastal zone. A current impediment to the setting of resource condition targets for water and marine as outlined in the Swan Region NRM Strategy is the lack of baseline water quality data collected in a coordinated and focused manner. An audit of the non-SCCP water quality monitoring activities has revealed there are considerable gaps, overlaps, considerable variation in data quality and usefulness as well as inconsistency in data storage and reporting methods.
This project aims to establish baseline water quality monitoring programs as a precursor to setting resource condition targets for water and marine. This will be achieved by coordinating a re-focusing of existing monitoring programs, establishment of new catchment monitoring investigations, training and capacity building for community groups and the standardisation of all data collection, storage and reporting methods. A marine and coastal condition assessment and monitoring program will also be established to identify current condition and potential indicators for the setting of targets.

13.2 Why this is a Priority Project

Because of the emphasis placed in the Strategy and in the Bilateral Agreement on the need for improved Monitoring and Evaluation

13.3 Past Achievements

New project

13.4 Incorporation of NHT Principles

The project has been developed with the guidance of the joint WA and Commonwealth Monitoring and Evaluation Framework.

1. Generates the greatest public benefits per dollar of public investment.	
2. Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	
3. Investment should not exceed the public benefits that result.	
4. Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	

5. Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	
6. Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	
7. The processes required for setting priorities will involve ongoing learning and need constant feedback.	
8. Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	

13.5 Work Program

The following project task/outcomes have been identified taking into account the guidance provided by the joint WA and Commonwealth Monitoring and Evaluation Framework.

- Develop a coherent view of all water related monitoring conducted in the region across all agencies, local government and community programs including Waterwatch
- Negotiate a partnership program to eliminate duplication and focus program on NAP/NHT regional strategy outcomes, State of the Environment and National Land and Water Audit Reporting.
- Establish common protocols, standards and methods across the region taking into account differing information needs of the partnership participants
- Provide training and capacity building using a partnership model along with guidance documents
- Ensure all water related data are captured in the generalised WIN database
- Develop Web based and other reporting tools
- Implement resource condition monitoring program in selected rivers and streams to identify biotic indicators of river condition with a view to develop resource condition targets.
- Develop an index of stream condition appropriate to the Swan Coastal Plain
- Conduct workshops and information assessments
- Identify coastal and marine resource condition indicators and assess data needs and gaps
- Implement the User's guide to Estuarine, Coastal, and Marine Indicators for Regional NRM Monitoring
- Develop appropriate monitoring programs for the nearshore marine zone for the identified indicators with a view to establishing existing condition and setting resource condition targets

13.6 How the project has been designed and developed

In the first year the focus of the project is on negotiating partnerships, setting up the framework, identifying gaps and initiating sampling programs. In the second and third years the focus shifts to running the programs and reporting. In both of these years we expect to be able to identify and set targets for a number of indicators including marine and coastal. Extensive community partnerships and consultations will accompany this activity.

13.7 Partners

List all partners who contribute in cash or kind. What other activities are *directly* linked to this project in an operational sense?

13.8 Management Structure

13.9 Outputs and Timelines

In the following table Year 1 refers to a full years activity.

Time	Activity	Milestone
Year 1		
Completion will depend on response time	Document all existing monitoring programs on SCP	Report on all activities and understanding of data usefulness
Programs can be added sequentially as they become known	Negotiate partnership agreements to pool resources to meet strategy objectives	Coherent M and E framework covering existing indicators and including coastal and marine areas
	Identify potential coastal and marine resource condition indicators and information gaps including marine pests	Report on indicators, knowledge gaps and information needs
	Establish common protocols	Completed guidance documents
	Provide partnership style capacity building within the catchment	Community group based programs integrated with M and E framework
	Develop database protocols for all Data to go to WIN	
	Develop web based reporting tools	Web Reporting scheme agreed to
	Identify river sites for environmental health assessments	Established sites and maps Draft list of potential indicators
	Commence initial monitoring of macro-invertebrates at all sites	Established program with QA protocols implemented
	Identify additional biotic indicators for estuarine health including fish and macrophytes.	Draft indicator and methods list
	Identify potential coastal and marine resource condition indicators and information gaps including marine pests	Report on indicators, knowledge gaps and information needs
	Develop indicative coastal and marine monitoring program	Report on program
Year 2	Implement full M and E framework for rivers including establishment of reference sites	Full program operating and communicated
	Implement initial coastal and marine program consistent with Peth coastal waters framework	Program implemented in partnership

Time	Activity	Milestone
	Implement environmental health program with trial indicators in rivers and estuary	Environmental Health program as component of the M and E
	Report on results via web and written	Web based score card reporting, written reports and recommendations
Year 3	Continue M and E programs	Programs continuing
	Set targets interim RCT's for mature indicators	Interim targets set, compliance rules established
	Continue web reporting	Web reports
	Evaluate and assess program performance	Report with recommendation for change

Milestones are indicated in the above table

13.10 Expected Outcomes for Natural Resource Condition

13.11 Risk Factors

Describe both "internal" risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and "external risks" (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).

13.12 Scope for Project Expansion or Contraction

13.13 Cost

Show the total inputs to the project (both NHT2 and Non-NHT2), and the funds sought from NHT2.

First Six Months (to June 30th 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)

Financial Year 2005-06

Item	Units (**d**)	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Program management, project design and technical oversight, training, coordination; reporting, communication	1.0 FTE	106,610[d]	106,610	**100**	**106,610**
PARTNERSHIP M AND E TOTALS			**1,096,923**	**8.8**	**96,923**
Data management	0.2 FTE	70,835	14,167	100	14,167
Data Analysis, interpretation and reporting	0.6 FTE	84,593	50,756	100	50,756
Field costs, analysis, consumables, maintenance, equipment			32,000	100	32,000
SRT –SCCP partner;salary, equipment, boats, analysis and reporting			1,000,000	0	0
Other partner contribution			100,000[a]	0	0
RIVER HEALTH PROGRAM TOTAL			**146,297**	**49**	**72,297**
Establish sites and indicators	0.5 FTE	84,593	42,297	100	42,297
Field and lab measurements			30,000	100	30,000
SRT flow measurement and sampling			74,000	0	0
COASTAL AND MARINE INDICATORS TOTAL			**48,305[B]**	**100**	**48,305**
Assess condition and indicators etc	0.5 FTE	96,610	48,305	100	48,305
ESTUARINE BIOTIC INDICATORS TOTAL			**75,000**	**26**	**25,000**
Survey costs			25,000	100	25,000
Other dept contribution			50,000[c]	0	0
Total for Year			**1,366,525**	**25**	**349,135**

(a) Only LGA and community included. Expected amount to be much higher as other partners contributions are identified.

(b) Does not yet take into account related activity such as the SCC funded Beach Health

(c) Includes SRT funded and supported activity but does not yet include Fisheries and related university studies which are not yet quantified but which may be substantial. Leverage through ARC linkage projects yet to negotiated

(d) All FTE estimates are fully loaded costs which include provision for accomodation, computing, vehicles, accounting and auditing services etc following the Dept requirements and provisions in the bilateral agreements. Basis is $10,000 for existing staff and $30,000 for new staff irrespective of level.

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Program management, project design and technical oversight, training, coordination; reporting, communication	0.6 FTE	106,610[d]	63,966	**100**	**63,966**
PARTNERSHIP M AND E TOTAL			**1,096,923**	**8.8**	**130,760**
Project coordination, training, QA, community technical support communication, reporting	0.6	84,593	50, 756	100	50,756
Data management	0.2 FTE	70,835	14,167	100	14,167
Data Analysis, interpretation and reporting	0.4 FTE	84,593	33,837		33,837
Field costs, analysis, consumables, maintenance			46,1667	100	46,1667
SRT –SCCP partner;salary, equipment, boats, analysis and reporting			1,000,000	0	0
Other partner contribution			100,000[a]	0	0
RIVER HEALTH PROGRAM TOTAL			**146,297**	**49**	**72,297**
Establish sites and indicators	0.5 FTE	84,593	42,297	100	42,297
Field and lab measurements			30,000	100	30,000
SRT flow measurement and sampling			74,000	0	0
COASTAL AND MARINE INDICATORS TOTAL			**48,305[B]**	**100**	**48,305**
Program Implementation	0.5 FTE	96,610	48,305	100	48,305
ESTUARINE BIOTIC INDICATORS TOTAL			**84,672**	**26**	**34,672**
Survey costs			34,672	100	34,672
Other dept contribution			50,000[c]	0	0
Total for Year			**1,366,525**	**25**	**350,000**

(a) Only LGA and community included. Expected amount to be much higher as other partners contributions are identified.

(b) Does not yet take into account related activity such as the SCC funded Beach Health
(c) Includes SRT funded and supported activity but does not yet include Fisheries and related university studies which are not yet quantified but which may be substantial Leverage through ARC linkage projects yet to negotiated
(d) All FTE estimates are fully loaded costs which include provision for accomodation, computing, vehicles, accounting and auditing services etc following the Dept requirements and provisions in the bilateral agreements. Basis is $10,000 for existing staff and $30,000 for new staff irrespective of level

13.14 Estimated Total Investment Influenced by the Project

13.15 Cost Effectiveness

13.16 Long Term Strategy

13.17 For how long will this kind of project be needed?

13.18 Can the project become financially self-sustaining?

13.19 Can the project become socially self-sustaining?

14. PROJECT IWM04: WETLAND WATCH

14.1 Summary

14.1.1 Assets & Threats

It has been estimated that 70-80% of wetlands on the Swan Coastal Plain have been either lost or seriously degraded due to filling, draining or clearing since European settlement. Of those wetlands that remain, only 15% are considered to retain high conservation values. These remaining wetlands are under significant threat from urban and rural encroachment. Many of these high value wetlands are located on private property and are outside of current protective measures such as Environmental Protection Policies and the Bush Forever scheme.
A significant threat to these wetlands is a lack of awareness, on the part of landowners and the general community, of the presence of many seasonal wetland types and the high biodiversity value of these systems. Another equally significant threat is insufficient capacity of landowners for wetland management. Given many of the remaining wetlands on the Swan Coastal Plain are located on private land, their sustainable management and conservation is in the hands of individual landowners.
This project will improve the sustainable management and conservation of selected wetlands on the Swan Coastal Plain focusing on high value wetlands on private land, including those conservation category wetlands listed in the revised Swan Coastal Plain Wetlands EPP. Wetland Watch is a wetland conservation project of WWF-Australia in partnership with the City of Armadale, City of Cockburn, Town of Kwinana, WA Museum, Water Corporation, Department of Environment and Government of Western Australia. The project is aimed at enhancing the sustainable management and conservation of wetlands on the Swan Coastal Plain, focusing on high value wetlands on private land. It is coming to the end of its 12 month pilot phase, and this project proposal outlines how the Wetland Watch project can be extended for another two years with the financial support of the Swan Catchment Council.

14.1.2 Means

The specific aims of Wetland Watch are as follows:

- Increase community and landowner's appreciation of the value of wetlands and other natural areas.
- Increase community capacity for the management and conservation of wetlands both on private and publicly owned lands.
- Secure the long-term conservation of wetlands on private property through the adoption of voluntary management agreements and conservation covenants by landowners.

14.1.3 Locations

In its pilot year the project focused on the Southern Swan Coastal Plain, specifically the City of Armadale, City of Cockburn and Town of Kwinana, with the aim of expanding the project in the future to both the north and south of Perth. Interest has been expressed from the Shire of Serpentine-Jarrahdale, City of Gosnells and the City of Rockingham in participating in the project in future years. This proposal sets out how the Wetland Watch project in its first year of SCC funding will continue working in the southern portion of the Swan Coastal Plain to allow continuity with the pilot year work and therefore maximise the wetland conservation benefits in that region. In the second year of SCC a second project officer would be employed

(0.6 FTE) so that the project can be extended into the Ellen/Brockman area of the Swan Region.

14.1.4 Expected Results

Expected results of the project include:

- Increased community awareness of wetland types and their values
- Increased participation in wetlands education, restoration and protection
- Increased area of wetlands under sustainable management and protection

14.2 Why this is a Priority Project

Wetland conservation has been identified as a priority issue in the Swan Region Strategy for natural Resource Management: Investment Plan. The Wetland Watch project will assist in addressing a number of the Investment Plan MATs.
Through Wetland Watch, wetland management and restoration plans will be prepared for priority high value wetlands located on private property. In addition to this Wetland Watch will facilitate the implementation of these plans by providing technical assistance to landowners as well as assisting in the preparation of funding applications for financial assistance.
Wetland Watch will assist in the implementation of the Swan NRM Strategy by addressing the following MAT's:

14.3 Relationship to the Strategy

WR2 RCT Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005)

WM2.4	MAT	Develop and implement management and restoration plans for priority wetlands by 2008.	- Further development and implementation of **Wetland Watch** program	- Area (hectares) of wetland protected - Area (hectares) of wetland rehabilitated
WM2.5	MAT	20% increase in community participation in wetlands education, restoration, protection and management activities by 2009	- Facilitate, support and promote community groups - Support development, resourcing and implementation of restoration plans to conserve and protect wetlands - Continue and expand existing community-training programs such as **Wetland Watch** etc through the integrated regional education and training program	- Number of community groups assisted - Number of other skills and training events held and number of participants (person Days)
BM1.4	MAT	100% of priority protected areas have an active conservation management response by 2006	• Preparation and implementation of management plans and/or threatabatement plans where required	-

In the first nine months of the pilot phase of the project, Wetland Watch has worked in conjunction with a number of groups, working collaboratively on a range of activities and projects. Wetland Watch has complemented projects aimed at increasing community awareness of the value of wetlands as well as working to improve wetland management and conservation. Wetland Watch has provided a vital link between existing wetland management and conservation activities, resulting in a number of highly successful collaborations. These projects include:

Activity/Project	*Involved Groups and Organisations*
The Water Corporation's – Waterwise Schools Program	- The Water Corporation - Forrestdale Primary School - Baldivis Primary School - WWF-Australia
WA Museum – Discovery Centre, School Holiday Activities	- WA Museum - The Threatened Species Network - The Friends of the Western Swamp Tortoise - WWF-Australia
Property Planning Workshops held at Forrestdale Lake (Ramsar Site)	- Armadale Gosnells Landcare Group - City of Armadale's Streamcare Project - WWF-Australia
Community Awareness Raising Events (including Frog Fests and Wetland Discovery Days)	- The Cockburn Wetlands Education Centre - The WA Gould League - The Baldivis Children's Forest Steering Committee - WWF-Australia

In addition to these projects, Wetland Watch is also an excellent complementary program to the recently released revised Swan Coastal Plain Wetlands EPP. Wetland Watch will provide awareness raising and support for both the broader community and landowners with EPP listed wetlands, both of which are essential for the effective implementation of the EPP.

14.4 Past Achievements

How long has the project been running? What are its achievements so far? Emphasise substantive ***outcomes*** (e.g. species or hectares protected, km of foreshore rehabilitated, better organisational arrangements effected, plans produced) rather than ***outputs*** (e.g. number of workshops, open days held).
Wetland Watch was launched in mid-April 2004. In the first nine months of the project the following outcomes have been achieved:

- Wetland management has been improved on 42 properties (approximately 80 hectares of remnant bushland and high value wetlands) through the provision of technical advice on a range of management issues including revegetation and weed control techniques,
- Property management plans are currently being developed for 15 wetland properties, or those properties adjacent to Forrestdale Lake – a registered Ramsar site (30 hectares),
- Nine wetland landowners have received funding for improved wetland management and conservation,
- Through the project six community and landowner events have been held. These events have been attended by in excess of 320 individuals.

Wetland Watch has been met with strong support from all sections of the community including state government agencies, local government, community groups and individual landowners. Other outcomes of the project have included:

- Assisting in the development, promotion and uptake of the Town of Kwinana and City of Cockburn Landowner Biodiversity Grants,
- Establishment of a partnership with Birds Australia WA to conduct bird surveys on private property,
- Wetland display at the WA Museum Discovery Centre for the 04/05 summer school holidays – attended by in excess of 16,000 individuals,

- Forrestdale Lake Primary School becoming a Waterwise Primary School as a direct result of the Wetland Watch Project Officer,
- Providing input into the 'Wetland Topic Booklets' created by the Water Corporation as part of their Waterwise Schools Program.

14.5 Incorporation of NHT Principles

1. Generates the greatest public benefits per dollar of public investment.	The project focuses on a number of wetlands recognised to be of high value located on public land such as the Ramsar listed Forrestdale Lake as well as wetlands within the Beeliar Regional Park, improving the management of these public assets for public benefit. In addition to this the project actively engages the public in wetland conservation through education events as well as the establishment of community groups. The project also aims to assist as many landholders with high conservation value wetlands on their properties, as is practical, to meet their individual needs to maximise improvements in wetland management and protection. Thus ensuring these assets remain in existence, and good condition, in the long term. The project will also provide landholder assistance to access other existing incentive programs and wetland programs. All these methods will ensure the greatest public good benefit can be achieved from the public investment in this project.
2. Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	The project methodology involves identifying recognised high conservation value wetlands and targeting the private landholders who own those wetlands by offering them assistance. Project efforts will then be focused on those landholders that request assistance, hence maximising the chance of getting good conservation outcomes for the most efficient effort. This ensures work is focused where there is a high probability of success. (Meanwhile the project also increases the awareness of other wetland landholders to foster a change in perception such that they reach the stage of motivation where they want assistance for management of their own wetland.) The project in year 1 will target the priority area of the southern Perth metropolitan region (where a majority of remnant wetlands are located), focusing on high value wetlands – a decision based on a careful scoping and planning process performed early in the project (See question 2.2 for more detail). In year 2 the priority area of Ellen/Brockman will also be addressed.

3. Investment should not exceed the public benefits that result.	Public benefits of this project include: improved management of wetlands in the Beeliar regional Park and adjacent to the Ramsar listed Forrestdale Lake area; increased community awareness of the importance of wetland conservation; increased community participation and expertise in wetland conservation and management; and improved nutrient management due maintaining wetland assets in good condition so they continue to contribute their nutrient stripping ecosystem service. The improved management and protection of privately owned high conservation value wetlands also has significant public benefits because of their conservation value, and importance of the ecosystem services they provide and their role in the ecological functioning of the Swan Region. Many of these benefits are hard to quantify, but they will be greater than the public investment proposed in this project.
4. Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	The priority placed on wetland conservation (including privately owned wetlands) in the Swan Region Strategy for NRM is high, and the net public benefit will be sufficient. The project represents a strong initial action to address the protection of wetland assets and the threats to them.
5. Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	The Swan Region priority for the Wetland Watch project and wetland conservation is high and therefore this principle is not relevant.
6. Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	At the beginning of this project a scoping and planning phase was performed to decide where the project should focus its initial efforts. (See also question 2.2) The southern part of the Swan Coastal Plain was identified as the appropriate focus for the pilot phase and both years of this extension project. The Ellen/Brockman will be also be addressed in the second year of this project. As a result other parts of the Swan region won't be covered in the proposed two-year period of this project. (But other Swan Region areas perhaps might be able to be covered in later years if the project is continued.)

7. The processes required for setting priorities will involve ongoing learning and need constant feedback.	WWF has regular project management and review processes that apply to this project which are designed to stimulate evaluation and learning from the project. In addition the project officer/s will meet regularly with the Project Manager and the Reference Committee to discuss the project, its progress and challenges and how to modify the project in light of that learning. This project is designed by WWF as an innovative project model, which it will continue to be evaluated and evolved. WWF will also continue to promote the learnings gained from the project to the full range of stakeholders.
8. Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	Priorities have been set for this project based on existing wetland mapping and classification data, and other relevant data, eg threatened species, threatened ecological communities. The project will be able to utilise the wetland mapping and assessment project proposed for the Ellen/Brockman area by the Swan Catchment Council for year 1, when the Wetland Watch project extend to that area in year 2. Project priorities will of course be reviewed when significant new relevant data becomes available.

14.6 Work Program

In order to increase community and landowner awareness and appreciation of wetland values and the need for their conservation the following activities will be conducted:

- Wetland field days will be held at locations including the Cockburn Wetlands Education Centre (Beeliar Regional Park) and Forrestdale Lake (Ramsar site). At each event a number of activities will be conducted including bird spotting, macroinvertebrate collection, frog spotting and bushland walks. Information on the rate of wetland disturbance and loss will be conveyed during these events. Local wetland landowners will be identified and personally invited to attend these events.
- Information in regard to wetland values and the need for wetland conservation, including the Wetland Watch brochure and newsletter, will be distributed to individual wetland landowners either through mail or a personal visit.

In order to increase landowner and community capacity for wetland management and to secure the conservation of wetlands, the following activities will be conducted:

Identification of significant wetlands to be targeted by the project, including those listed in the revised Swan Coastal Plain Wetlands EPP (2004), and those which fall outside of current protective mechanisms such as Bush Forever.

- Provision of technical advice and assistance to landowners including conducting workshops on technical management solutions and skills training in a number of areas including revegetation and control of pest plant species.
- Conducting flora and fauna surveys on selected high conservation value wetlands, providing valuable ecological data. The provision of these surveys will be used as an incentive to landowners to enter into voluntary management agreements. The

information gained from these surveys will be utilised in the preparation of wetland management and restoration plans for the surveyed properties.

- Securing best practice management and conservation of these wetlands through the brokering of a range of existing incentives to private landowners including; local government devolved grant funding, other funding sources and labour support. Wetland Watch could also provide assistance to landowners seeking to access the Swan Catchment Council's proposed private landholders wetland conservation incentive scheme. Landowners will also be strongly encouraged to sign voluntary management agreements and to enter into conservation covenants.

In the first year of funding from the Swan Catchment Centre, Wetland Watch will continue to work in the priority area of the southern metropolitan region (see below) including the City of Armadale, City of Cockburn and Town of Kwinana as well as extending into the City of Rockingham. In the second year of funding from the Swan Catchment Council it is proposed that the project continue to work in the southern metropolitan region as well as being extended, (by the addition of a 0.6 FTE project officer), into the northern metropolitan region, focusing on the Ellen-Brockman Catchment.

14.7 How the project has been designed and developed

The project uses an innovative methodology of engaging landowners in wetland management and conservation by brokering a range of incentives including the provision of personalised technical advice, training, flora and fauna surveys as well as support for accessing funding. The methodology behind Wetland Watch is based on the highly successful Woodland Watch project initiated by WWF in the Wheatbelt. Since 2000 achievements of the Woodland Watch project have included the following:

- 87 high quality woodland sites identified and assessed
- 85 landowners with high quality woodlands actively participating in the project
- 87 flora surveys conducted, leading to the discovery of possibly 13 new species, 12 new populations of rare or priority flora species, and range extensions for numerous other species
- 4, 500 hectares of bush placed under conservation agreements
- 37 landholders engaged in conservation covenants, Land for Wildlife and other voluntary conservation agreements
- Liaison with community conservation groups assisting local authorities develop conservation policies and plans
- Positive changes to attitudes among rural landholders regarding native vegetation on their land
- Improved awareness of the importance of woodlands and increased appreciation and desire for their protection

Before the commencement of Wetland Watch a thorough scoping and planning exercise took place over a 2 month period between August – September 2003. This process enabled WWF-Australia to determine an appropriate study area to pilot wetland watch based on the level of community support, level of local government support, opportunities for wetland conservation on private land and the availability of incentive programs for biodiversity conservation. From this study WWF-Australia has identified the amalgamated local government areas of Cockburn, Kwinana and Rockingham and the City of Armadale and Gosnells as the most suitable study areas to trial the Wetland Watch approach to wetland conservation under current circumstances.

WWF has identified the Ellen/Brockman area as another priority to expand the project into in the second year of this project.

14.8 Partners

Project Partners:

- City of Armadale
- City of Cockburn
- Town of Kwinana
- WA Museum
- Water Corporation
- Department of Environment
- WA Government – Minister for the Environment
- Murdoch University
- Cockburn Wetlands Education Centre
- Friends of the Cockburn Wetlands Centre
- Birds Australia Western Australia
- Armadale Gosnells Landcare Group
- City of Armadale's Streamcare Project
- Friends of Forrestdale Lake
- Local landowners

Activities linked to the project in an operational sense:

- *Water Corporation's Waterwise School Program* – Wetland Watch is actively encouraging schools in areas with high numbers of wetlands to become involved in the Waterwise School Program. In addition to this Wetland Watch is assisting with wetland based activities with these schools.
- *Frog Fests* – Frog Fests are a partnership between WWF-Australia and the WA Gould League aimed at increasing community awareness of local frog types, the need for their conservation and the importance of wetlands as frog habitat. Since 2003, 11 Frog Fests have been held and have been attended by in excess of 1,000 individuals. Frog Fests have been held at a number of locations including the Herdsman Lake Wildlife Centre and more recently the Cockburn Wetlands Education Centre and The Spectacles Wetlands in Kwinana.
- Per*th Biodiversity Project* – Though the Perth Biodiversity Project local government authorities are being encouraged to develop local biodiversity strategies. Wetland Watch is assisting in the achievement of these strategies by encouraging biodiversity conservation on private land. In addition to this Wetland Watch has assisted in the administration and promotion of Landowner Biodiversity Conservation Grants for both the City of Cockburn and Town of Kwinana.

14.9 Management Structure

14.9.1 Direct supervision of staff

Wetland Watch Project Officers will be directly managed by the WWF-Australia's Water Conservation Officer, James Duggie who manages the WWF's Western Australian Freshwater Program.

14.9.2 Project Management

The project will be managed by the WWF-Australia Water Conservation Officer with advice received from the Wetland Watch Reference Committee. The reference committee will be made up of representatives from the following groups:

- WWF-Australia
- Swan Catchment Council
- Water Corporation
- Department of Environment
- Local Government

14.10 Outputs and Timelines

Output description	Output unit of measure #1	Measure #1 Total quantity expected 12 months	Output unit of measure #2	Measure #2 Total quantity expected 12 months	Timeline Financial year
Increasing community and landowner awareness of wetland values through wetland field days etc	Number of field days held	3	Number of participants in person days	30	05/06
	Number of field days held	4	Number of participants in person days	40	06/07
Development and distribution of Wetland Watch newsletter	Editions of newsletter produced	2	Number of newsletters distributed	200	05/06
	Editions of newsletter produced	2	Number of newsletters distributed	300	06/07
Development of wetland information sheets	Number of information sheets developed	1	Number of copies of information sheets distributed	150	05/06
			Number of copies of information sheets distributed	200	06/07
Publication of newspaper articles on the project/ project related activities	Number of articles published	4			05/06
	Number of articles published	6			06/07
Community groups formed with WWF assistance to address wetland conservation and management	Number of community groups formed	1			05/06
	Number of community groups formed	1			06/07
Identification of high priority wetlands in the southern Perth metropolitan region	Number of high priority wetlands identified				05/06
Identification of high priority wetlands in the Ellen-Brockman Catchment	Number of high priority wetlands identified				06/07
Landowners wetland management and conservation workshops/ field trips held	Number of workshops held	2	Number of participants in person days	10	05/06
	Number of workshops held	2	Number of participants in person days	10	06/07
Assistance provided in the enhancement and rehabilitation of wetlands (technical advice and information)	Number of landowners provided with assistance	20	Area of wetlands enhanced/ rehabilitated	40	05/06
	Number of landowners provided with assistance	40	Area of wetlands enhanced/ rehabilitated	80	06/07

Output description	Output unit of measure #1	Measure #1 Total quantity expected 12 months	Output unit of measure #2	Measure #2 Total quantity expected 12 months	Timeline Financial year
Preparation and implementation of property management plans	Number of management plans prepared	10			05/06
	Number of management plans prepared	20			06/07
Number of landowners applying for grants through the Cockburn/Kwinana/Rockingham Biodiversity Grants program as well as other funding	Number of landowners assisted with grant applications	10			05/06
	Number of landowners assisted with grant applications	15			06/07
Engaging landowners in wetland restoration or protections projects	Number of landowners engaged in wetland restoration or protection projects	10	Number of hectares covered	20	05/06
	Number of landowners engaged in wetland restoration or protection projects	15	Number of hectares covered	30	06/07
Conducting vegetation surveys on selected high value wetlands	Number of surveys conducted	3			05/06
	Number of surveys conducted	5			06/07
Wetlands covered by voluntary management agreements (VMA's)	Number of VMA's signed	5	Number of hectares covered	10	05/06
	Number of VMA's signed	10	Number of hectares covered	10	06/07
Conservation covenants placed on wetlands	Number of conservation covenants initiated	2	Number of hectares covered	4	05/06
	Number of conservation covenants initiated	3	Number of hectares covered	6	06/07

14.11 Milestones

Milestones	Timeframe
1. Establish Wetland Watch in the southern metropolitan region of Perth (Armadale Cockburn and Kwinana)	2004
2. Engage landowners in priority wetland areas (Armadale Cockburn and Kwinana)	2004
3. Consolidate relationships with already involved landowners within Armadale, Cockburn and Kwinana	January 2005 – June 2005
4. Engage new landowners in priority wetland areas within Armadale, Cockburn and Kwinana	March 2005- June 2006
5. Extend Wetland Watch into Gosnells and Rockingham	July 2005 – December 2005
6. Engage new landowners within Gosnells and Rockingham	July 2005- June 2007
7. Extend Wetland Watch into the northern Swan NRM Region (Ellen-Brockman Catchment)	July 2006 – December 2006
8. Engage new landowners in priority wetland areas within the Ellen-Brockman Catchment	July 2006- June 2007

14.12 Expected Outcomes for Natural Resource Condition

- Maintain and improve condition of inland aquatic ecosystems integrity, as measured at Wetland Watch project sites.
- Increased recognition of the presence and value of seasonal wetland systems.
- Improved management and condition of high value wetlands.
- Initiation of active rehabilitation of wetlands on both private and public land leading to improved wetland condition.
- Conservation and protection of rare and threatened species.
- Wetland habitat restoration and protection.

14.13 Risk Factors

Internal:

Loss of Project Officer

The Project manager and Reference Committee have and will continue to have a good understanding of the project, and its progress. In addition good project records are being kept. Together these measures will minimise the disruption to a project, if we were unfortunate enough to loose a project officer.

Safety of Project Officer during Field Work

A system is in place so that WWF can keep track of movements of field officers. In addition WWF has a suite of OH&S policies that are in place, and others being actively developed to address safety issues.

External:

Securing long-term funding

In order to achieve substantial outcomes in improved management and conservation of wetlands on private land, considerable time is required. Wetlands have historically been viewed as wastelands and cheap land for development. In order to change this view and

achieve improved wetland management and conservation, an attitudinal and behavioural change is required on the part of landowners. Whilst this change may occur rapidly for some landowners, for the majority of landowners this move may take a number of years. Compounding this is the high number of wetlands and an even higher number of private wetland landowners. As such, securing long-term funding for Wetland Watch is essential to ensure that those landowners and community groups already working to improve the condition of wetlands are supported, and those who are not, are educated and assisted in changing their current practices.

Continued support from local government authorities

One of the key components of Wetland Watch is the support and in-kind assistance from local government authorities. The participating local government authorities have not only provided administrative support but also technical advice and expertise on the local environment (including landowner contact details and aerial photography).

Continued provision of incentives for conservation on private land

As mentioned previously in order to engage landowners in wetland management and conservation, Wetland Watch brokers a range of incentives to private landowners. One of the most important incentives is funding. The provision of funding is essential in allowing landowners to undertake active restoration works such as fencing, weed control and revegetation.

14.14 Scope for Project Expansion or Contraction

This is a two-year project, which would benefit from being further extended beyond the two-year period.

In its current pilot year the project has had 1 FTE, Project Officer. At this level Wetland Watch has the capacity to operate within a selected number of local government areas in the southern metropolitan region of Perth. Since April 2004 the project has operated within the City of Armadale, City of Cockburn and Town of Kwinana. In the next six months the project will be aiming to expand into the City of Gosnells and City of Rockingham. With 1 FTE this is the full extent of the area that the project can cover. With the appointment of an additional 0.6 FTE in the 06/07 financial year, the project will be able to expand into the northern metropolitan area focusing on the Ellen-Brockman Catchment.

In order to achieve significant improvements in wetland management and conservation a minimum of 2-3 years focused work is required in any one area. This period of time is essential for the following reasons:

- Within these priority areas, there are a high number of wetlands and an even higher number of wetland landowners. Fascinating Facts
    - The majority of wetlands are owned by a minimum of three landowners
    - In excess of 250 wetland landowners have been identified within the Cities of Armadale and Cockburn and Town of Kwinana).
- In order to achieve improved management and conservation of wetlands an attitudinal and behaviour change is required on the part of landowners and the general community. This type of change can only be achieved over an extended period of time.

In addition to focusing on wetlands and their associated vegetation communities, Wetland Watch will also assist in the improved management and conservation of upland vegetation communities fringing wetlands including Banksia and Eucalypt woodlands.

14.15 Cost

Show the total inputs to the project (both NHT2 and Non-NHT2), and the funds sought from NHT2.

First Six Months (to June 30th 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Not Applicable					

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project Coordinator	1 FTE	45,000	45,000	100%	45,000
Stakeholder Workshops		3,000	3,000	100%	3,000
Kilometre reimbursement		3,840	3,840	100%	3,840
Communications		2,000	1,500	100%	2,000
Consultants		3,000	2,000	100%	3,000
Telephone		300	300	100%	300
Field Equipment		1240	240	100%	1240
OH&S Equipment		200	200	100%	100
Training		800	800	100%	800
Office expenses & equipment		900	900	100%	900
Project Management		8,700	8,700	100%	8,700
Administration		4,500	4,500	100%	4,500

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project Coordinators	1.0 FTE 0.6 FTE	71,400	71,400	100%	71,400
Stakeholder Workshops		5,160	5,160	100%	5,160
Kilometre reimbursement		6,480	6,480	100%	6,480
Communications		2,500	2,500	100%	2,500
Consultants		3,000	3,000	100%	3,000
Telephone		300	300	100%	600
General Expenses		480	480	100%	480
OH&S Equipment		200	200	100%	200
Training		1,420	1,420	100%	1,420
Office Expenses		3,180	3,180	100%	3,180
Project Management		8,700	8,700	100%	8,700
Administration		4,500	4,500	100%	4,500

14.16 Estimated Total Investment Influenced by the Project

WWF will contribute significant in-kind support to the Wetland Watch project through support for the project, through the involvement of our Woodland Watch Project Manager, Western Australia Regional Manager, and Director of Conservation in the review and evaluation of the project and providing advice and guidance when required.
By increasing community and private landholder participation in wetland conservation and management the project will stimulate considerable additional expenditure, and labour effort.
The project will influence how various local government biodiversity grant schemes and the Swan Catchment Council's proposed private landholder wetland conservation incentive program is spent.
By partnering with the range of project partners, this project will be attracting significant in-kind contributions from those partners, this includes in-kind contributions from the City of Armadale, City of Cockburn and Town of Kwinana as well as the WA Museum, Cockburn Wetlands Education Centre, and Birds Australia.

14.17 Cost Effectiveness

Wetland Watch is utilising existing incentives to engage landowners and community groups in wetland management and conservation. By employing this method Wetland Watch is able to achieve significant improvement in wetland condition at a relatively low cost (major cost of the project is the provision of a project officer).
A key methodology of the project is to increase the awareness and motivation of landholders to take action on wetland conservation, management and protection themselves. It also provides technical advice and wetland management expertise to increase landholder and community capacity. This makes the project very cost effective.
The coordination of efforts from all the project partners also attracts in-kind support and stimulates more effort and inputs to assist in achieving outcomes than simply the direct investment in this project.
The project has drawn significantly on existing projects and organisations involved in wetland management and established partnerships with these groups. As a result of these partnerships a number of wetland education events are able to be held. These events include community education events as well as more specific landowner training events. Benefits of holding these events with other group and/or organisation include:

- Additional expertise
- Greater number of events able to be held
- Greater number of participants at these events
- Significant cost savings in event coordination

Wetland Watch has also established a partnership with Birds Australia WA to provide bird surveys for private landowners. The provision of these bird surveys by Birds Australia at no cost has meant a significant saving compared to employment of private consultants to undertake to survey work.

14.18 Long term Strategy

Wetland Watch is continually evolving and its methods adapting in order to achieve improved management to secure the conservation of remaining high value wetlands on the Swan Coastal Plain.

There is significant scope within the project to expand or contract efforts on various aspects of the project. For example, as is required, more of less effort can be put toward community education and associated events. Similarly over time the focus of the project may shift from wetlands on private land to those on public lands. These shifts in the project will be dictated by the project outcomes and will be guided by the Steering Committee.

14.19 For how long will this kind of project be needed?

It is envisaged that a minimum of three years will be required to see any substantial outcomes for improved wetland management and conservation in any one area. This time period will however be influenced by the resources of the project as well as the attitudes of private landowners in individual areas. After the project has been established in an area, the need for on-going landowners support will still be required (see 4.4 on how it is envisaged the project may become self-sustaining).

The task of addressing wetland conservation in the Swan region is a very large. The task will need substantial on-going investment for many years to come in one form or another. The role of the Wetland Watch project in that investment in the longer term will be determined by future assessments of the project's effectiveness. However WWF is confident the project will continue to play an important role in this work.

14.20 Can the project become financially self-sustaining?

WWF is a not-for-profit organisation that needs to attract external funding to be able to implement projects such as the Wetland Watch. Part of the project's methodology is to provide incentives and assistance to landholders; it is therefore unlikely the project could be successful if it attempted to run on a cost recovery basis. WWF has pro-actively sought alternative sources of funding for the project, and will continue to in the future.

- A diversity of funding sources has been sought for the project. These include:
- In-kind support from Local Government Authorities,
- In-kind support from other providers including WA Museum and the Department of Environment,
- Funding from the State Government and the Water Corporation.

Wetland Watch will continue to develop these partnerships and secure future funding from these sources. Wetland Watch will also look at securing other funding sources including the corporate sector. It will also ask other funding sources for specific aspects of the project eg. Funding for flora and fauna surveys.

14.21 Can the project become socially self-sustaining?

The establishment of links between project partners and others involved in wetland management and conservation is a key component of Wetland Watch. As mentioned above there are a large number of groups involved in the project both as official partners and as supporters of the project. These groups include community groups, local governments, state government agencies as well as other organisations. Wetland Watch will also encourage the establishment of community and landcare groups in key areas to provide support to involved landowners. The project will continue to strengthen these links as well as establish new ones as the project expands. Over time it is hoped that some of these groups may become more active in various aspects of the project, for example local governments may play a larger role in providing technical advice and assistance to landowners.

There are many benefits of the Wetland Watch project that should continue beyond the life of the project. These include:

- better communication between project partners;

- increased community and landholder awareness of wetland conservation and management issues;
- increased technical capacity of community and landholders with respect to wetland management;
- wetland management plans created;
- Voluntary Management Agreements entered into by landholders;
- Conservation Covenants entered into by landholders.

15. PROJECT IWM06A: RIBBONS OF BLUE/WATERWATCH WA – SWAN REGION

15.1 Summary

Ribbons of Blue/Waterwatch WA in the Swan Region is an environmental education and community environmental water monitoring program that raises awareness and understanding, provides educational opportunities, develops skills, and promotes behaviour change in a whole of catchment context.

The program aims to encourage local communities to be actively involved in learning about and protecting environmental water quality, and to share responsibility for the management of our waterways (rivers, streams), wetlands, groundwater and stormwater systems.

Ribbons of Blue Coordinators work with various stakeholders across the Swan-Canning catchment within the Metropolitan Scheme Boundary Area, extending south to Kwinana, north to Two Rocks, west to Rottnest Island and east to Wooroloo.

Stakeholders include students and adults from schools, community groups (Friends of groups, Scouts, Adult Learning Associations), catchment and sub-regional groups, NRM professionals, local government, metropolitan regional councils, universities and TAFE.

Coordinators train and provide support to stakeholders, providing technical expertise during fieldwork and facilitating awareness through a variety of environmental activities. They assist teachers and other educators (Scout, Guide and CALM Bushranger leaders) to plan on-going education and water quality monitoring programs, connecting fieldwork and other learning experiences to the Curriculum Framework, and linking these groups to the wider community for on-ground remedial action. Community groups are also assisted with the planning and implementation of long term water quality monitoring and evaluation programs.

Ribbons of Blue/Waterwatch WA in the Swan region addresses regional land, water, biodiversity, coastal and marine, and regional capacity assets. Threatening processes include limited knowledge and awareness.

15.2 Why this is a Priority Project

Say how the project relates to the prioritised management actions in Chapters 7 to 12 of the Swan Region Strategy for Natural Resource Management: Investment Plan. Briefly explain the “big picture” and whether this project either complements or is essential to other governmental, private sector or community activities that are underway to protect the particular asset. What “leverage” does the project exert?

The Ribbons of Blue program addresses the following management actions through its role in the provision of encouragement, knowledge, skills and support to the range of stakeholders:

LR1	**LAND SALINITY - Reduction in the area of salinity affected land within the Avon Upper Swan NAP region by 2020 (with a quantified target set by December 2005)**	
LM1.4	30% increase in community participation in land salinity education, mitigation and remediation actions by 2009	• Ribbons of Blue provide educational opportunities for students and adults, such as Saltwatch Bus Tours and Saltwatch Water Quality Snapshot. • Facilitate, support and motivate community and stakeholder involvement in land salinity actions.
WR1	**AQUATIC ECOSYSYTEMS INTEGRITY - Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites by 2020, with quantified targets for major rivers and waterways in the Region set by 2005**	
WM1.4	Develop and implement management and restoration programs for the Region's major rivers and waterways by 2007	• In partnership with Rivercare, support and provide technical advice to stakeholders implementing Riverbank and Swan Alcoa Landcare Program foreshore projects
WM1.5	20% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in Region by 2009	• Coordinate, facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to protect major rivers • Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program. • Continue existing strategic community-training programs such as SCCP Education program, Ribbons of Blue, Waterwise, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • Support water resources restoration and management training through tertiary institutions and TAFE's
WR2	**Maintain and improve condition of inland aquatic ecosystems integrity, as measured at representative sites by 2020, with quantified targets for priority wetlands in the Region set by 2005**	
WM2.5	20% increase in community participation in wetlands education, restoration, protection and management activities by 2009	• Facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to conserve and protect wetlands • Facilitate the inclusion of stormwater education, water use efficiency and water conservation into the regional training and education program. • Support wetland restoration and management training through tertiary institutions and TAFE's.

WR3	**NUTRIENTS IN AQUATIC ENVIRONMENT - Maximum concentrations for priority waterways do not exceed 0.1mg/L for total phosphorus and 1.0mg/L for total nitrogen by 2020**	
WM3.4	20% increase in community participation in nutrient intervention education, restoration, protection and management activities by 2009	• Facilitate, coordinate, support and motivate community groups • Continue implemention of rural landholder education and support programs to address nutrient export in high risk areas. • Include stormwater education, water use efficiency and water conservation into the regional training and education program. • Continue and expand existing community-training programs such as Swan-Canning Cleanup Program education initiatives, Great Gardens workshops, Ribbons of Blue, Wetland Watch and Skills for Nature Conservation, through the integrated regional education and training program • Continue to provide incentives for landholders and land managers such as the Swan Alcoa Landcare Program. • Support wetland restoration and management training through tertiary institutions and TAFE's.
WR4	**TURBIDITY/SUSPENDED PARTICULATE MATTER IN AQUATIC ENVIRONMENTS - Maintain and improve condition of aquatic environments in the Region, as measured at representative sites by 2020, with quantified targets for turbidity / suspended particulate matter set by 2005**	
WM4.4	20% increase in community participation in education, restoration, protection and management activities for managing turbidity / particulate matter by 2009	• Coordinate, facilitate and support community groups • Develop and implement restoration plans to conserve and protect waterways and wetlands • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation. • Continue and expand existing community-training programs such as River Restoration training, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • Support waterways and wetland restoration and management training through tertiary institutions and TAFE's.

W5	**SURFACE WATER SALINITY IN FRESH WATER AQUATIC ENVIRONMENTS - Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region, as measured at representative sites by 2020, with quantified targets to reduce salinity set by 2005**	
WM5.4	20% increase in community participation in salinity education, mitigation and remediation activities by 2009	• Coordinate, facilitate and support community groups • Develop and implement restoration plans to address surface water salinity • Develop an integrated regional information system to enhance planning, implementation, monitoring and evaluation. • Continue and expand existing community-training programs such as River Restoration training, Ribbons of Blue, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program • Support land management, waterways and wetland restoration and management training through tertiary institutions and TAFE's
BR2	**SIGNIFICANT SPECIES AND ECOLOGICAL COMMUNITIES - 50% of critical habitat for identified significant species and ecological communities protected by 2014**	
BM2.5	30% increase in the participation of the community and stakeholders in education, mitigation and remediation activities to conserve and protect significant species and ecological communities by 2008	• Coordinate, facilitate and support community involvement • Establish collaborative partnerships to ensure the conservation management and recovery planning of significant species and significant ecological communities
CMR1	**ESTUARINE, COASTAL AND MARINE HABITATS INTEGRITY - Maintain and improve condition of terrestrial coastal habitats in the Region, as measured at representative sites by 2020, with a quantified target set by 2005**	
CMM1.5	30% increase in community participation in biodiversity education, mitigation and remediation actions by 2009	• Coordinate, facilitate and support community and stakeholder involvement • Training and capacity building for Local Government Authorities and community on coastal biodiversity/ecology • Include stormwater education, water use efficiency and water conservation into the regional training and education program. • Continue and expand existing community-training programs such as Swan-Canning Cleanup Program education initiatives, Great Gardens workshops, Ribbons of Blue, Wetland Watch and Skills for Nature Conservation, through the integrated regional education and training program • Continue to provide incentives for landholders and land managers such as the Swan Alcoa Landcare Program.

The program complements and links with other government and community activities that:

- Work to protect and manage environmental surface water and groundwater resources and their associated ecosystems
- Provide learning opportunities to increase understanding and knowledge of natural resource management issues and concepts

Ribbons of Blue exerts considerable leverage with students, teachers and other education providers, community groups and the general public due to the range of services the program provides. It is also a widely recognised statewide program.

15.3 Past Achievements

- Celebrating 15 years in the Swan region, Ribbons of Blue was initiated as a school environmental education program in 1989. Since becoming part of the Australia-wide Waterwatch network in 1994, the strong association with schools has been retained, while the program has expanded to include greater community involvement.
- Relocation of Swan region team to the Swan Catchment Centre, thus forming part of the Department of Environment Swan Regional Education Unit.
- Swan region team has grown from 0.5FTE to 3 FTE.
- Review and restructure of strategic and operational plan in 2002. New strategic directions set to closer align with Swan Region NRM Strategy.
- The program has evolved significantly over the past several years. It has shifted from a very reactive school-based program to working very strategically with community and catchment groups and designing an education program that includes educational opportunities and empowers teachers to be confident in delivering water quality and catchment management concepts.
- Stakeholders have expanded and varied to include students and adults. Specifically to include adult learning associations and other long term education groups such as Scouts, Girl Guides and CALM Bushrangers.
- As part of the Regional Education Unit, Ribbons of Blue assisted in the development of an education strategy that integrates the SCCP-funded programs delivered through the Swan Catchment Centre. These include Swan River Education Kit, Swan River Community Action Program (including Swan River Action Kit and community service talks), Ribbons of Blue/Waterwatch WA, Skills for Nature Conservation training calendar and community training (River Restoration, Groundwater, Acid Sulfate Soils) programs.
- Strong promotion of the Swan River Education Kit through Ribbons of Blue following the dormancy of the Kit for numerous years. Ribbons of Blue provide professional development for teachers wanting to utilise the Kit and promote the Kit as an important tool for delivering environmental education.
- Provide key educational events annually – Saltwatch Bus Tour, Saltwatch Snapshot, National Macroinvertebrate Snapshot, AquaFest, Water Wonders Snapshot, Nutrient Snapshot and Floatwell Design Competition.
- Celebrating 10 years of Macroinvertebrate Snapshot in 2004, a nationally recognised educational opportunity. Over 5100 students and adults from 153 groups have participated over the past 5 years.
    - Provide at least 6 teacher professional development and skills training workshops annually.
    - Address several recommended actions, goals and objectives of the Swan-Canning CleanUp Program Action Plan 1999-2004 (to reduce nutrients entering the Swan-Canning Estuary).

15.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Funding is directed into relevant skills training and education opportunities.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Ribbons of Blue build regional capacity and provide skills to protect and manage surface water and groundwater resources and their associated ecosystems in priority areas in the Swan Region.
(3) Investment should not exceed the public benefits that result.	
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	

15.5 Work Program

The work program extends over 18 months due to a crossover in the calendar year education program and financial year planning.
The work program is outlined in the strategic and operational plan developed for both 2004 and 2005.
Refer to attached Strategic and Operational Plan 2004 and 2005.

15.6 How the project has been designed and developed

Ribbons of Blue has been designed using the Statewide Ribbons of Blue and National Waterwatch Australia strategic frameworks, and developed specifically in the Swan region according to stakeholder needs and the relevant water quality issues. The program continually evolves and is further developed from valuable feedback received from focus groups, questionnaires, evaluations and workshops.
The Swan region strategic and operational plan is based on four objectives with specific strategies, activities and outcomes.
Refer to attached *Strategic and Operational Plan 2004 and 2005.*

15.7 Partners

- Swan River Trust's flagship environmental management program, Swan Canning Clean-Up Program
- Department of Environment
- Swan Catchment Council
- Department of Education and Training

The following activities/ projects are either directly linked to Ribbons of Blue or value add to the objectives of the program in some way:

- On-ground local action activities, specifically wetland, river and stormwater system restoration projects that aim to improve water quality, restore habitat, increase awareness and understanding and provide an educational opportunity. This also links the Rivercare and Ribbons of Blue programs that often work in partnership to deliver workshops and technical advice.
- Skills for Nature Conservation Training Calender and Community Training Program (River Restoration, Groundwater and Acid Sulfate Soils training courses) that assist in capacity building for community and landowners to conduct positive activities that will have a direct impact on wetlands, waterways and groundwater across the Swan region.
- Partnership agreement with Department of Agriculture that recognises the opportunity to provide students and community groups with formal opportunities to be educated about declared aquatic plants.
- In addition to the other SCCP-funded programs delivered through the Regional Education Unit, Ribbons of Blue/Waterwatch WA complement other education programs and community service providers involved in capacity building and community engagement relating to sustainable natural resource management. These include Water Corporation's Waterwise School Program, Phosphorus Action Group, Rottnest Island's Community Service Program, Conservation Volunteers Australia, Scouts Australia, CALM Bushrangers, Greening Australia's Stepping Stone Program and CSIRO Education CREST Program.

15.8 Management Structure

Ribbons of Blue in the Swan region is managed at the operational level by the Swan Goldfields Agricultural Region of the Department of Environment. Specifically, the program forms part of the Regional Education Unit housed at the Swan Catchment Centre.
As Ribbons of Blue is a statewide program, a State Team that coordinates statewide events, maintains strong partnerships with Department of Education and Training and provides specialised support/advice relating to education, supports the regional team.

15.9 Outputs and Timelines

Refer to attached document *Business Management 2004/2005 for NHT deliverable.*
Milestones for remainder of 2004/2005:
Provide series of Professional Development and workshops for Teachers in Term 1 2005:

- Getting involved in Ribbons of Blue
- Swan River Education Kit workshop
- Using Ribbons of Blue/Waterwatch WA resources
- Water Quality Monitoring Skills Workshop

Plan and implement Saltwatch Bus tours for primary and secondary students
Plan and implement Saltwatch Snapshot event for community and students
Continue support to groups implementing water quality monitoring programs

15.10 Expected Outcomes for Natural Resource Condition

Outcomes of Ribbons of Blue Swan region Strategic and Operational Plan:

- Local communities have increased awareness and understanding of water quality issues and natural resource management strategies within the Swan region.
- Local communities have the capacity, skills and knowledge to participate in the protection and management of water quality in the Swan region.
- Local school communities undertaking environmental education through water quality activities linked to the curriculum framework.
- Communities working in partnership with local and state government agencies in local action projects which address water quality issues in the Swan region.
- Local communities collecting water quality data that meets QA/QC protocols and can be shared and used in decision making.
- Improved water quality in the Swan region.
- National, state, regional and local priorities are met and the integrity of the program is continued.

15.11 Risk Factors

15.11.1 Internal Risks

- Loss of key staff that have in-depth knowledge of program and strong working relationships with stakeholders
- Reduced number of staff
- Changes in branding
- Relationship with State Support Team including disparity in roles and responsibilities, communication breakdown, etc

15.11.2 External Risks

- A change in stakeholder needs (water quality monitoring, technical advice), particularly state and local government, and sub-regional/catchment groups.

15.12 Scope for Project Expansion or Contraction

Ribbons of Blue/Waterwatch WA have the capacity to move towards monitoring and evaluation in addition to maintaining awareness raising and educational outcomes. Essentially the education and community monitoring components would be separated and salary and operational funding would transfer accordingly. Links would still be maintained between the two components particularly for data confidence procedures during educational opportunities such as snapshot events and skills training.

15.12.1 Education Program

Strengthen the current education program by increasing regional capacity opportunities and continue to work more closely with other capacity building programs and partners.

15.12.2 Community monitoring/Measurement

As a way to address the changing needs of the subregional groups and local government working to achieve Swan NRM Strategy targets, the existing Rivercare program could be broadened to include the community water monitoring component. This would provide:

- higher level technical support in ecosystem restoration, monitoring and evaluation

- accurate and standardised collection and management of water quality data across the region that can be entered on the WIN database (Department of Environment)
- Rivercare/Ribbons of Blue officers coordinating and performing water quality monitoring programs to address specific NRM targets

15.13 Cost

First Six Months (to June 30th 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Salary and oncosts	1 FTE		40,015	100	40,015
Swan-Canning CleanUp Program			60,000	0	0
Department of Environment			2,250	0	0
Total			102,265		40,015

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Salary and oncosts			35,000	100	35,000
Swan-Canning CleanUp Program			120,000	0	0
Department of Environment			4,500	0	0
Total			159,500		35,000

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Salary and oncosts			35,000	100	35,000
Swan-Canning CleanUp Program			120,000	0	0
Department of Environment			4,500	0	0
Total			159,500		35,000

15.14 Estimated Total Investment Influenced by the Project

15.15 Cost Effectiveness

Ribbons of Blue targets a wide range of stakeholders across the Region and works strategically with other programs and groups to deliver capacity building opportunities.

15.16 Long term Strategy

Yes, through on going 'needs analysis' and detailed feedback from stakeholders and partners.

15.17 For how long will this kind of project be needed?

Infinite, particularly as these types of programs are an important component of community development and have a role in the constant recruitment of stakeholders into natural resource management.

15.18 Can the project become financially self-sustaining?

There is limited opportunity to become financially self-sustaining, especially since the program involves working with schools. Currently the Department of Education and Training has limited resources for teachers to attend more than one professional development/workshop per year and for schools to pay to be involved in Ribbons of Blue educational opportunities.

15.19 Can the project become socially self-sustaining?

Limited.

16. PROJECT IWM06B: COMMUNITY EDUCATION AND TRAINING: RIVER RESTORATION AND GROUNDWATER SUB-PROJECTS

16.1 Summary

The Community Education and Training Priority Project is comprised of three sub-projects. Only two of those are considered here: the Groundwater and River Restoration sub-projects. The Skills for Nature Conservation sub-project is being considered separately.
The Groundwater and River Restoration sub-projects have been operating since July 2003 out of the Swan Catchment Centre. Together they address the need for skills and knowledge in surface and groundwater protection, management and restoration in the Swan region for the general community and NRM professionals. Strong partnerships have been developed with Department of Environment and sub-regional groups to deliver this component of the project in specific target areas where there is a demand for these types of education and training. Although some general training events have been run, the majority of the workshops have been targeted at priority areas within the Swan region, for example the Canning River in Gosnells, the Ellen Brook Catchment and Bannister Creek in Lynwood.
These two sub-projects address regional water, land, biodiversity and regional capacity assets including:

- Management of productive agricultural land and soil
- Conservation of natural diversity in waterways and wetlands
- Maintenance of adequate water quality in surface and groundwater
- Building regional capacity in surface and groundwater protection, management and restoration

and the threats to these assets including:

- Acidification through Acid Sulfate Soils
- Erosion and sedimentation
- Water use issues for example environmental flows
- Contamination by nutrients and pollutants
- Degradation of riparian vegetation through weeds, altered hydrology, clearing etc…
- Lack of technical knowledge and skills in NRM in community and NRM professionals

This is achieved through delivering training events that focus on transferring knowledge and skills needed by community and NRM professionals to address these issues. For example, in 2003 a workshop was delivered in partnership with DoE and City of Gosnells on environmental flows aimed at community members and NRM professionals involved in the Canning River environmental flows project and the restoration project in Pioneer Park, Gosnells that is linked to this project.

16.2 Why this is a Priority Project

This project addresses the following management actions through its role in the provision of knowledge, skills, motivation and support to the general community and NRM professionals in the protection and management of wetlands, waterways and groundwater:

Water management actions		
WM1.5	20% increase in community participation in education, restoration, protection and management activities of the major rivers and waterways in Region by 2009	• Coordinate, facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to protect major rivers
WM2.5	20% increase in community participation in wetlands education, restoration, protection and management activities by 2009	• Facilitate, support and motivate community groups • Support development, resourcing and implementation of restoration plans to conserve and protect wetlands
WM3.4	20% increase in community participation in nutrient intervention education, restoration, protection and management activities by 2009	• Facilitate, coordinate, support and motivate community groups
WM4.4	20% increase in community participation in education, restoration, protection and management activities for managing turbidity / particulate matter by 2009	• Coordinate, facilitate and support community groups • Develop and implement restoration plans to conserve and protect waterways and wetlands • Continue and expand existing community-training programs such as River Restoration training, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for Wildlife through the integrated regional education and training program
WM5.4	20% increase in community participation in salinity education, mitigation and remediation activities by 2009	• Coordinate, facilitate and support community groups • Continue and expand existing community-training programs such as River Restoration training, Ribbons of Blue, Wetland Watch, Skills for Nature Conservation, Urban Nature and Land for

		Wildlife through the integrated regional education and training program
Regional capacity management actions		
RCM1.4	Develop a regional capacity framework supported by an integrated regional management information system by 2006.	• Coordinate an integrated regional education and training program addressing land, water and biodiversity and cultural heritage themes

The project complements and links up with other government and community activities that operate through the Swan Catchment Centre, local governments and catchment groups. Examples include Ribbons of Blue, rivercare activities undertaken by Department of Environment, existing training programs run through the Swan Catchment Centre such as the Acid Sulfate Soils program and catchment group activities and projects.

16.3 Past Achievements

The Groundwater and River Restoration sub-projects have been running since July 2003. Through the delivery of eight workshops to 140 participants the project has increased the skills and knowledge of participants on a wide range of river restoration and groundwater issues which will allow them to undertake or participate in the restoration and management of river restoration and groundwater assets. These training events are also a chance for like-minded people to meet and network and, as such, provide an important mechanism for ongoing motivation and involvement of these target audiences in NRM activities. In addition partnerships between Swan Catchment Centre, other Department of Environment staff, catchment groups and local government have been developed and strengthened providing a capacity within these groups for this training program to continue and links to other complementary programs and projects to be developed.

Several of the river restoration training events have involved on-ground works. For example, in August 2004 a riffle-building workshop was held in partnership with Department of Environment and Yellagonga Catchment Group with a group of volunteers from the Friends of Yellagonga. In addition to learning about the theory behind in-stream habitat creation and erosion control the group built two riffles in an eroded reach of Church St Drain, which drains into Lake Joondalup through Yellagonga Regional Park to create in-stream habitat and control erosion. This is one of the first steps in the rehabilitation of this drain into a living stream. In October 2004 a fish way was built at the confluence of St Lennards Brook and the Swan River as part of a workshop on stream rehabilitation which was run in partnership with Department of Environment and the Eastern Metropolitan Regional Council. The workshop was targeted at the Small Property Action Network, a newly formed group of property owners who are interested in rehabilitating a section of the brook.

An important outcome of two of the community groundwater workshops was the opportunity for the catchment groups involved to form groundwater protection groups involving some of the workshop participants.

16.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	All project funds are directed into relevant training and education events aimed at community members and NRM professionals involved in protecting, restoring and managing surface and groundwater resources in the Swan region.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	This project addresses building regional capacity to undertake protection and management of groundwater, wetlands and waterways in priority areas in the Swan region.
(3) Investment should not exceed the public benefits that result.	The investment in this project is relatively small. Approximately $17 600 has been spent over the last 18 months (operational costs) for the benefit of building capacity in the general community and NRM professionals and achieving on-ground action.
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	This project focuses on priority natural areas, such as the Ellen Brook Catchment, and where there are gaps in community capacity to manage these areas.
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	The partnership approach through which this project has been implemented allows priority areas and gaps in the capacity to manage these areas to be identified and training to be targeted to meet these needs.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	

16.5 Work Program

This will depend on the sub-regional planning process and the priorities that are identified through this process. Some possible training events for the period until June 2005 that have been discussed by the partnerships include:

- Introduction to groundwater field day delivered in partnership with Ellen-Brockman Integrated Catchment Group targeted at bore owners in this local area
- 2-day intermediate-level groundwater workshop delivered in partnership with Department of Environment targeted at NRM professionals
- River restoration workshop(s) delivered in partnership with Department of Environment aimed at general community and NRM professionals

16.6 How the project has been designed and developed

16.6.1 Overview

The Community Education and Training Priority Project was developed in 2003 to maintain momentum and continue to build community capacity in the region prior to the Swan Region Strategy for NRM being implemented. Capacity building activities in the areas of biodiversity conservation and the rehabilitation and protection of waterways, wetlands and groundwater were identified as priorities. The three sub-projects under this priority project are:

- Sub-project 1 – Skills for Nature Conservation Training Calender (See Skills for Nature Project)
- Sub-project 2 – Groundwater Education and Training
- Sub-project 3 – River Restoration Training

16.6.2 Sub-project 2: Groundwater Education and Training

The groundwater sub-project has been implemented through partnerships with Land and Water Quality Branch of Department of Environment and catchment groups with workshops being developed to meet the needs of the target audience at the time. To date three events have been delivered:

- Groundwater Field Day delivered to community members of the Swan Valley region
- Getting to Know Groundwater workshop delivered to NRM professionals
- ABCs of Groundwater delivered to community members in the Ellen Brook Catchment

16.6.3 Sub-project 3: River Restoration Training

The river restoration sub-project has been implemented through partnerships with Rivercare staff from Swan Goldfields Agricultural region of Department of Environment, catchment groups and local government with workshops being developed to meet the needs of the target audience at the time. To date five workshops have been delivered including:

- Environmental flows workshop delivered to community members in the Gosnells area (including the Canning River community steering group) and NRM professionals
- Restoring Waterway Habitats workshop delivered to community members and NRM professionals

- Creating Wetland Habitat workshop delivered to community members in Chittering area
- Riffle building workshop held with Friends of Yellagonga
- Riffle building workshops held with Small Property Action Network

Since these two sub-projects were first implemented there has been a shift from delivering workshops based mainly on groundwater and river restoration theory to delivering workshops that have both theory and practical components, such as the riffle-building workshops, that develop both knowledge and practical skills in management and restoration.

16.7 Partners

To date the following partners have contributed in-kind support:

- Department of Environment
- City of Gosnells
- Bannister Creek Catchment Group
- Chittering Landcare Centre
- North East Catchment Committee
- Ellen-Brockman Integrated Catchment Group
- Eastern Metropolitan Regional Council
- Swan Region Ribbons of Blue
- Yellagonga Catchment Group

Other activities that are linked to this training program include:

- Skills for Nature Conservation Training Calender which provides training on biodiversity conservation to community and NRM professionals
- Swan Region Ribbons of Blue program
- Rivercare activities undertaken by Department of Environment
- Additional community education programs run through the Swan Catchment Centre, for example the Acid Sulfate Soils training program
- Catchment group activities

16.8 Management Structure

This project is managed and directed through Swan Catchment Centre.

16.9 Outputs and Timelines

16.10 Milestones

16.11 Expected Outcomes for Natural Resource Condition

Groundwater Education and Training sub-project:

- Community members motivated to actively participate in protecting local groundwater quality
- Increased capacity of community members and NRM professionals to manage and protect groundwater, particularly in areas when groundwater quality is at risk

River Restoration sub-project:

- Increased capacity of community members and NRM professionals to mange, protect and restore wetlands and waterways

16.12 Risk Factors

Specific risk	Description of risk	Likelihood and impact	Strategies to manage identified risks
Short-term funding cycles	Allocation of short-term funding restricts the ability of the project to plan and influence regional targets	Moderate likelihood. It will be difficult to maintain momentum and reliable access to trained presenters.	Request that funding is allocated so that core capacity to deliver remains secure for longer term.
Insufficient qualified staff	If there are insufficient qualified staff to deliver the training it could lead to poor outcomes by affecting on-ground outcomes and hence natural resource condition targets	Unlikely to moderate likelihood.	Maintain collaboration with recognised staff.
Threat to partnership model	The partnerships with each sub-project could alter.	Low- moderate	Maintain collaboration with partners. Develop strategies that ensure delivery occurs in spite of changes to partnerships.
Availability to participants	Above risks can alter the number of workshops that are delivered	Low-moderate	Ensure the workshops are delivered through the Swan Region in a targeted method where it is most needed.
Ongoing on-ground action	In the absence of the availability of the training there is a risk of fewer active participants and lower skills in those already actively involved in on-ground action.	Low-moderate	Plan or ensure access to alternative modes of delivery.

16.13 Scope for Project Expansion or Contraction

Since they were first implemented, the Groundwater and River Restoration sub-projects have evolved from delivering workshops to a broad target audience to delivering workshop to a specific target audience in a specific geographic area which are identified on a needs basis. Both of these projects are very flexible in terms of when and where workshops are delivered and have the capacity, both within the Swan Catchment Centre and the partnerships with Department of Environment, sub-regional groups and local government, to change direction as the capacity of the Region changes. There is scope within these projects to continue delivering training events based around groundwater and river restoration in the short to medium term at the current level or to expand the projects if there is an increased need for these types of training as the Swan Region Strategy for NRM is implemented. Additionally, the focus of the projects could be changed or additional focus areas included, for example salinity management and acid sulfate soils, to meet the needs of community members or NRM professionals.

16.14 Cost

The total amount sought from NHT for the 2004/2005 financial year for this project was:

- $47,683 for salary and on-costs (0.5 FTE Level 2)
- $12,902 for operational costs

First Six Months (to June 30th 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Salary	1 FTE	47,800	23,900	100	23,900
Operating expenses			13,000	100	13,000
Total			36,900		36,900

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Salary	1 FTE	47,800	47,800	100	47,800
Operating expenses			13,000	100	13,000
Total			60,800		60,800

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Salary	1 FTE	47,800	47,800	100	47,800
Operating expenses			13,000	100	13,000
Total			60,800		60,800

16.15 Estimated Total Investment Influenced by the Project

16.16 Cost Effectiveness

16.17 Long Term Strategy

Capacity building programs will continue to change with the needs of the community and NRM professionals. There is scope in this project to continue to strengthen links with:

- Swan Catchment Centre training programs such as Acid Sulfate Soils
- Swan Region Ribbons of Blue program
- Rivercare activities in the region including Department of Environment and catchment groups
- Foreshore Condition Assessment project
- Existing Environmental Flows project and future projects
- Inclusion of salinity management training events in Ellen-Brockman and Eastern Hills sub regions

16.18 For how long will this kind of project be needed?

16.19 Can the project become financially self-sustaining?

16.20 Can the project become socially self-sustaining?

17. PROJECT IWM06C: RIVER RESTORATION

17.1 Summary

17.2 Why this is a Priority Project

17.3 Past Achievements

17.4 Incorporation of NHT Principles

Describe how this project incorporates the NHT2 Investment Principles given in the table below.

1. Generates the greatest public benefits per dollar of public investment.	
2. Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	
3. Investment should not exceed the public benefits that result.	
4. Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	
5. Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	
6. Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	
7. The processes required for setting priorities will involve ongoing learning and need constant feedback.	
8. Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	

17.5 Work Program

17.6 How the project has been designed and developed

17.7 Partners

17.8 Management Structure

17.9 Outputs and Timelines

17.10 Milestones

17.11 Expected Outcomes for Natural Resource Condition

17.12 Risk Factors

17.13 Scope for Project Expansion or Contraction

17.14 Cost

First Six Months (to June 30th 2005)

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Officer	1 FTE		29,346	100	29,346
Operational expenses			1,371	100	1,371
Fixed and Corporate costs, (95% of salary)			27,878	0	0
Section and Vehicle costs.			1,500	0	0
Total			**60,095**		**30,717**

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Officer	1 FTE	64,246	64,246	100	64,246
Operational expenses		2,742	2,742	100	2,742
Fixed and Corporate costs, (95% of salary)			61,033	0	0
Section and Vehicle costs.			5,000	0	0
Total			**133,021**		**66,988**

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Officer	1 FTE	64,246	64246	100%	64,246
Operational expenses		2,742	2742	100%	2,742
Fixed and Corporate costs, (95% of salary)			61033	0	
Section and Vehicle costs.			5000	0	
Total			**133,021**		**66,988**

17.15 Estimated Total Investment Influenced by the Project

17.16 Cost Effectiveness

17.17 Long Term Strategy

17.18 For how long will this kind of project be needed?

17.19 Can the project become financially self-sustaining?

17.20 Can the project become socially self-sustaining?

Project iwm10: Integrated Water Management Implementation Framework

17.21 Summary

This project provides the framework for coordination and delivery of the Integrated Water Management Regional Delivery Program. The broad outcomes of the project are:
Support implementation of the projects within the Integrated Water Management Program

- Develop partnerships with key stakeholders to develop and implement Integrated Water Management projects
- Coordinate activities within the Integrated Water Management Program to maximise efficiency and outcomes
- Implement monitoring and evaluation programs

The framework consists of:

- Integrated Water Management Program Manager: The role of this position is to ensure that the MAT's within the Integrated Water Management Delivery Program are being met within given timeframes, to coordinate the delivery of the program across the Swan Region, to provide support and training to sub-regional staff within their program, to form partnerships at a strategic level to implement projects and to coordinate the monitoring and evaluation of the program.
- Part-time Communications Officer: The Communications Officer will assist with organising of events related to the program, coordinate a communications plan for the program and produce displays and information required within the program
- Part-time Local Government Officer: This position will ensure Local Government involvement in biodiversity projects, assist them to reach biodiversity goals for their area and assist them to partner with other stakeholders such as State Government and community
- Indigenous Officer: The Indigenous Officer will ensure that indigenous issues are considered within the delivery program, that indigenous people are involved in the decision making processes and engaged where possible in the delivery of projects.
- Sub-regional Officers: There is a Sub-regional Coordinator in each of the five regions of the Swan. A portion of their time will be committed to setting the priorities for Integrated Water Management within their sub-region in partnership with the Program Manager, developing partnerships within the Sub-region and supporting and coordinating the activities of the Sub-regional Integrated Water Management Officers. There are 7.5 Sub-regional Integrated Water Management Officers, two in the north, one in the north-east, one in the east and 3.5 in the south. The role of these officers is to support the delivery of Integrated Water Management Projects in their region, develop partnerships with Local Government, community and other stakeholders to develop and implement Integrated Water Management projects and to carry out monitoring and evaluation of projects within their region

17.22 Why this is a Priority Project

The Swan Region has a population of over 1.4 million people, and it is the pressures which they place on environmental assets which is the major threat to NRM. Behaviour change at at a State Government, Local Government, industry and community level is essential if we are to protect our natural resources.

Partnership development is also essential to effective NRM in this region, and coordination of the large number of stakeholders involved in working with the environment in some way.

The investment in the Integrated Water Management Framework reflects this requirement for initiating behaviour change, coordinating effort and developing partnerships.

The project meets the MAT's in the Swan Region Strategy in the following way:

Assets addressed

Water

Threats addressed

Nutrient export and enrichment, erosion, sedimentation, chemical and pesticide contamination, salinity, acidification, ecosystem fragmentation, drainage modification, introduced aquatic pests, industrial discharge, groundwater and surface water contamination, water abstraction, stormwater discharge, altered hydrology, fragmentation of natural resources.

17.23 Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Inland aquatic ecosystems integrity (rivers and wetlands)	WR1 Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005). WR2 Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for wetlands in the Region set by 2005).	WM1.1 WM1.2 WM1.3 WM1.4 WM1.5 WM2.1 WM2.2 WM2.3 WM2.4 WM2.5	
Nutrients in aquatic environments	WR3 Maximum concentrations, for priority waterways, do not exceed 0.1 mg/L for total phosphorus and 1.0 mg/L for total nitrogen, by 2020	WM3.1 WM3.2 WM3.3 WM3.4	
Turbidity/suspended particulate matter in aquatic environments	WR4 Maintain and improve condition of aquatic environments in the Region, as measured at representative sites, by 2020 (with quantified targets for turbidity/suspended particulate matter set by 2005).	WM4.1 WM4.2 WM4.3 WM4.4	
Surface water salinity in freshwater aquatic environments	WR5 Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region, as measured at representative sites, by 2020 (with quantified targets to reduce salinity set by 2005)	WM5.1 WM5.2 WM5.3 WM5.4	

17.24 Past Achievements

N/A – a new project

17.25 Incorporation of NHT Principles

(1) 1. Generates the greatest public benefits per dollar of public investment.	Most assets in the Region are public assets, and this project aims to achieve large-scale behaviour change to protect biodiversity assets
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Prioritisation of strategic actions will be assisted through this project
(3) Investment should not exceed the public benefits that result.	Investment in this project is mostly on public assets
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	The prioritisation process will be assisted by this project
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Investment in industry development will be an aim for private landholders
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Investment in the Sub-regions has been unequal and prioritised according to NRM issues
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	Monitoring and evaluation of program delivery is a key component of this project
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	The prioritisation process will be undertaken on an annual basis, and adaptive management used to incorporate new information and learnings

17.26 Work Program

Milestone	Timeline
Sub-regional planning completed to June 06	March 05
Implementation of projects, partnership development	March 05-June 06
Monitoring and evaluation of projects	Ongoing
Evaluation of Integrated Water Management Program	April-Jun 06

17.27 How the project has been designed and developed

The Program Delivery Structure is an outcome of the development of the Swan Region NRM Strategy. The Sub-regional structure for implementation of the Strategy has been developed through a community consultative process of mapping the catchments of the Swan Region over the last two years

17.28 Partners

List all partners who contribute in cash or kind. What other activities are *directly* linked to this project in an operational sense?
Key partners in this project include State and Local Government and Industry. Each Sub-region has a centre for operation except for Coast and Marine. These centres and their operating costs are supported through contributions from Local Governments, State Government and industry (Tiwest and Chevron Texaco).
This project also leverages investment into Integrated Water Management in many ways, for example, the Swan Alcoa Landcare Program invests funds into community restoration projects and the project has encouraged Local Government to invest in water management.

17.29 Management Structure

The Integrated Water Management Program Manager is responsible for the overall coordination of this project. Sub-regional investments are managed through community committees, with a Sub-regional Coordinator and Integrated Water Management Officers in each Sub-region.

17.30 Outputs and Timelines

Outputs achieved through this project may be reported through other projects which have been supported through the framework. Specific outputs reported through this project will cover a wide range of outputs and cannot be finalised until Sub-regional planning is complete.

17.31 Milestones

See above

17.32 Expected Outcomes for Water Resource Condition

The Integrated Water Management projects implemented through the Integrated Water Management Program will be successful and will have strong partnerships in place. Monitoring and evaluation will be used as the basis for adaptive management to further enhance the outcomes of Integrated Water Management projects

17.33 Risk Factors

Describe both “internal” risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and “external risks” (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).
The employment of suitable staff is a potential risk. The short-term nature of contracts for positions makes it difficult to employ suitably experienced staff.
Another risk to the project is the considerable coordination required across multiple stakeholders. Success of the project depends on obtaining the trust and goodwill of a large range of players.

17.34 Scope for Project Expansion or Contraction

Geographical scope, the number of management actions incorporated in the project, range of assets addressed, financial, human resources, period of time allowed for the project.
The project does not need to be expanded, as the scope of the project has been set through extensive consultation. Conversely, if the project were to contract the Integrated Water Management Program Delivery could not be fully implemented.

17.35 Cost

Financial Year 2004-05

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	8.5		$606,000	90%	$606,000

3.2 Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	8.5		$606,000	90%	$606,000

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	8.5		$606,000	90%	$606,000

17.36 Estimated Total Investment Influenced by the Project

17.37 Cost Effectiveness

Why is the project a cost-effective way of addressing the threat to asset value?
The staff within the project will leverage NRM investment from partnerships, as well ensuring that all NHT funded projects are successful in implementing MAT's

17.38 Long Term Strategy

Adaptive management will be used to develop the aims and objectives of the project on a regular basis

17.39 For how long will this kind of project be needed?

This project will be ongoing for the duration of implementation of the strategy, however the total project cost may change over time as aims and objectives are refined.

17.40 Can the project become financially self-sustaining?

E.g. what plans are there to diversify funding sources?

It is unlikely that the project can become self-sustaining, however stakeholders may fund some components of the project

17.41 Can the project become socially self-sustaining?

E.g. what actions are in place to extend active partnerships involved with the project?
As partnerships are established, there will be less requirement for partnership initiation, and over time less need for partnership support. The aim is to build the capacity of partners so that their input becomes self-sustaining

18. PROJECT SP01: SME TRACKING, AUDITING AND BENCHMARKING

18.1 Summary

At present it is difficult to not only track sme's in terms of location and business description, but also we need to target their practices as it impacts on NRM.
Sustainable production programs target point source pollution and deal with the problem before it enters landfill and waterways.
This project consists of three aspects;

1. Develop a database via the Local Govt. rates notice which will show the name and address of the business, but more importantly a business description eg printer, retail nursery, automobile mechanic. The only database available at present is via the DPI, which is only up dated every 4 years and is difficult to access. I have had preliminary discussions with DPI regarding this proposal but they have expressed interest in the concept. It will be a useful tool for a number of reasons such as comparative analysis across industrial precincts, supplying data for targeting specific areas of concern and research by industry, Governments and educational institutions.
2. Both solid and liquid waste are critical problems which has been shown via data and anecdotal evidence. Cumulatively sme's have a severe impact on all assets (over 125,000 sme's) and even with state strategies in place, solid waste is still growing and the illegal dumping of waste (solid and liquid) to ground and surface water has led to the introduction of the Unauthorised Discharge Regulations targeting sme's. The database would not only contain a description of the sme but also allow each Local Government to track the performance of each sme and take appropriate action if required.
3. To deal with the NRM impact by sme's we need to ensure our data is up to date, timely and useful in terms of program development. This project is essential to quantify and qualify how much waste is produced, which industries produce what waste and how it is disposed of, (eg illegally, contractors, to landfill, etc). This database will be used by industry, State and Local Gov's to plan initiatives to prioritise, target and develop solutions to tackle this problem.

This project targets point source pollution before it enters landfill and waterways threatening all assets throughout the catchment; land, water, biodiversity, coastal and marine, air, cultural and regional capacity.

18.2 Why this is a Priority Project

Reducing the pollution hazard from light industry is an urgent issue that has been ignored for too long. This project attempts to reduce multiple threats to the environment, particularly groundwater and surface water contamination.

Threats addressed: Land: Chemical and pesticide contamination, Development and/or change in land. **Water:** Nutrient export and enrichment, Chemical and pesticide contamination, Drainage modification, Industrial discharge, Groundwater and surface water contamination, Stormwater discharge. **Biodiversity:** Chemical and pesticide contamination. **Coastal and Marine:** Chemical and pesticide contamination, Coastal and marine infrastructure developments, Stormwater discharge, Industrial discharge. **Regional Capacity:** Willingness in the community for change, Inadequate industry involvement NRM, Adoption of NRM principles and processes at State or Local Government levels.

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Soil Condition, Inland aquatic ecosystems integrity, Estuarine, coastal & marine habitats integrity, Nutrients in aquatic environments, Turbidity/suspended particulate matter in aquatic environments.	Maintain & improve soil condition. Maintain & improve condition of inland ecosystem integrity. Maximum concentrations do not exceed 0.1 mg/L for phosphorous &1.0 mg/L nitrogen. Quantified targets for turbidity/suspended particulate matter.	LM2.4, WM1.5, 4	LM2.3, LM2.5, WM2.5, WM3.1, WM3.4, WM4.2, WM4.4, BM2.5, CMM2.4, CMM2.6, RCM1.1, RCM1.

18.3 Past Achievements

How long has the project been running? What are its achievements so far? Emphasise substantive ***outcomes*** (e.g. species or hectares protected, km of foreshore rehabilitated, better organisational arrangements effected, plans produced) rather than ***outputs*** (e.g. number of workshops, open days held).

NA – new project

18.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Aims to benchmark, audit and locate every sme in the SCC region in a very cost effective manner
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	This project should set benchmarking and the foundations to develop strategic planning based on relevant data for NTM program delivery. All industrial areas drin either to the Swan River or important wetland systems such as Yellegonga
(3) Investment should not exceed the public benefits that result.	Investment has been designed to ensure the project is sustainable & ownership taken by key stakeholders eg Local Gov, etc. Assets to be protected are all public
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Designed to be used by Local Gov, agencies, etc at minimal investment.

(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	This project targets point source industrial pollution/cleaner production issues with extensive impact on NRM assets, which are all in public ownership
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	This program targets all sme' across the region. Investment will be made only in areas where there is significant industrial zoning.
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	The program has been designed to be updated annually and designed to be used as a working tool. The data will allow for setting priorities.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	See part 7. As stated priorities will be influenced by participation of Local Authorities, and will target those with significant industrial zonings

18.5 Work Program

The work program will:

(1) Incorporate a business address and business description on all rates notices in every Local Authority..
(2) Design of audit proforma and software package to track the performance of sme's and take appropriate action if required in every Local Authority.
(3) Solid and liquid benchmarking audit of sme's to quantify and qualify how much waste is produced, which industries producing what waste, how it is disposed of (eg illegally, contractors, landfill, etc.). This will be via snap shot audits across the metropolitan area capturing as many industrial precincts and industry types as possible.

18.6 How the project has been designed and developed

This project has been developed in consultation with key stakeholders who have provided data, and anecdotal evidence and who have very strong concerns about the lack of engagement in this area by sme's The Department of Environment, the Chamber of Commerce and Industry, Industry Associations and Local Authorities have been heavily involved in the development of the program. Early issues identified were the lack of information about what light industries were operating in any industrial area, what waste they were generating and how they were disposing of waste. There was also a critical information gap regarding best practice by sme's themselves.
The project aims to assist Local Government to extend the auditing duties of their Environmental Health Officers to assist light industry to move towards best management practice. This utilises existing resources in a cost-effective manner. The project development also included a strong monitoring and evaluation component so that the success of the project could be evaluated.

18.7 Partners

List all partners who contribute in cash or kind. What other activities are *directly* linked to this project in an operational sense?

- City of Bayswater are involved in a pilot program within their industrial area. They have contributed officer time to carry out audits and have developed the initial database to record their findings.
- The Motor Trades Association has provided simple audit sheets for their industry and has provided training to the City of Bayswater staff
- The Waste Management Board has contributed advice and assistance to the project, and a grant of $120,000 for a pilot project in the Bellevue Industrial Area
- CSBP has contributed $5000 for the production of fact sheets for sme's on stormwater management
- The Swan River Trust has provided $20,000 to further develop information resources for sme's

The future expansion of the light industry program is heavily dependant on the further development of the databases so that Local Government can effectively participate in the program

18.8 Management Structure

The project will be managed by the Sustainable Production Program Manager of the Swan Catchment Council. Projects will be piloted in several Local Governments, including Bayswater, Swan, Wanneroo and Joondalup, and they will be supported by the three Sustainable Production Officers within the sub-regions of the Swan.

18.9 Outputs and Timelines

Outputs	Timelines
Development and trialing of sme database to record location and business activities	July 05 to Jun 06
Development and trialing of sme tracking and auditing database	July 05 to Jun 06
Snapshot audit of sme waste production and disposal	July 05 to Jun 06

18.10 Milestones

See above

18.11 Expected Outcomes for Natural Resource Condition

In the first year pilot programs for auditing light industry will be run with sic Local Governments. The information collected will be used to set the baseline data for light industry practices. The ongoing auditing program will assist the businesses identified as not meeting minimum environmental standards improve their practices.
The pilot programs will then be expanded to include other Local Governments with industrial areas. The result for NRM will be:

- Best management practices adopted by sme's
- Reduced illegal dumping of waste by sme's
- Reduced pollution of surface and groundwater

- Best management practices for waste recycling/reuse established
- Reduced waste to landfill

18.12 Risk Factors

Describe both "internal" risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and "external risks" (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).
Local government may refuse to participate in the program due to concerns regarding the ongoing cost

18.13 Scope for Project Expansion or Contraction

It is intended that this project will expand to include all LGA's with industrial areas, and will also include all light industry types

18.14 Cost

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Sme tracking database	1	$30,000	$50,000	60%	$30,000
Sme audit database	1	$20,000	$40,000	50%	$20,000
Waste audit	1	$60,000	$180,000	35%	$60,000
TOTAL					$110,000

18.15 Estimated Total Investment Influenced by the Project

There is considerable investment by the waste management Board and local Government in developing the project to this point. If this project does not proceed the work to date will be of no value

18.16 Cost Effectiveness

Why is the project a cost-effective way of addressing the threat to asset value?
This project uses existing resources of local governments to carry out the majority of the work. The NHT contribution is to develop resources to make this task more effective. The program is designed to be self sustaining in the long term

18.17 Long Term Strategy

See above

18.18 For how long will this kind of project be needed?

Once the project development is complete, the project will become self-sustaining

18.19 Can the project become financially self-sustaining?

See above

18.20 Can the project become socially self-sustaining?

The aim of the project is for sme tracking to become a core part of local government business. It is an objective of the project that sme's take control of their practices and move towards bmp's supported by industry associations.

19. PROJECT SP02: SME AIR EMISSIONS STUDY

19.1 Summary

SME's are often located in close proximity to urban/residential areas and with Perth's expected growth this will only increase. The majority of SME's are not licensed and we have no information on the type or amount of emissions they generate. We also have no information on the type, number and location of SME's. There is an urgent need to ascertain whether emissions from SME's are cause for public concern.
There is an urgent need to increase resources in the study of emissions in a collaborative manner. The funding would allow data collection and analysis at targeted SME industrial precincts and provide the date required to develop policy and programs to deal with this issue. The aim if the project is to validate current information concerning sme's via an emissions inventory. This will be achieved through ambient screenings carried out over the next 2/3years through out industrial precincts within the catchment.

19.2 Why this is a Priority Project

There is an urgent need to systematically tackle this problem. We are constantly warned via data and research of the greenhouse effect, leading to global warming and climate change. There is a need to increase resources in the study of emissions in a collaborative manner including sme's, we need good data to develop policy and programs to deal with this issue.

Threats addressed: ***Air***; Fossil fuels consumption and use, industrial pollution and accidents, loss of vegetation, climate changes, public health.

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Improved air quality with RCT's set for air quality by 2005.	Collect/analyse baseline and trend information	AM1.1	
	Work with DoE and associated partners to set RCT's for air quality.	AM1.1 AM1.2	
	Inventory of sme's emissions linked to National Pollution Inventory 2008	AM1.2	
	Partnerships with Air Coordinating Committee	AM1.2	
	Support community/stakeholder participation relating to air quality improvement.	AM2.1 AM2.1	
Set RCT's to manage climate risk and reduce risk of environmental, economic or social outcomes from drought or coastal impacts.	Support research risk of climate change to NRM		
	Support research into climate variability.	AM2.1	
	Support an education program on Climate change and long term climate variability.		

19.3 Past Achievements

NA, New Project

19.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Project focuses on identifying and analysing high risk emissions. Will underpin further work to reduce emissions from SME's and reduce public and personal exposure.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Project will validate existing information on high-risk emissions, personal and public exposure concerns and contribute to the Perth Air Quality Management Plan (AQMP) objectives under the Cleaner Production Initiative.
(3) Investment should not exceed the public benefits that result.	High public benefit. This project will result in increased knowledge and certainty of air emissions produced by SME's, increased knowledge of potential health impacts from exposure and underpin programs to support air emission reductions, thereby helping to achieve the Perth AQMP's aim of cleaner air for Perth. .
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Will ensure effort focussed, minimising priority emissions and reduce public and personal exposure.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Project underpins work with SME's in supporting them to reduce emissions and incorporate this aim into their business procedures long term.
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	No unequal distribution of investment as the project will increase the capacity of all SME's as program is expanded across Perth.
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	The process will involve continuous monitoring and evaluation with all stakeholders to gain feedback to ensure air emission outcomes are achieved.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	This project is designed to gather and develop the meagre information available upon which air quality decisions will be made. Thus, high-risk, and therefore, high priority areas will be targeted.

19.5 Work Program

The work program will establish an emissions inventory within the Catchment. This will be achieved through passive sampling of air emissions with emphasis on exotic emissions within specified industrial precincts.
The data analysis will identify high risk emissions in line with the Catchment recognising air as asset necessary for life support systems, supporting healthy ecosystems and public health concerns in relation to air quality.
The data will be the basis for developing programs targeting sme's bmp's in relation to air emissions.

19.6 How the project has been designed and developed

The community and key stakeholders have strong concerns about the lack of sme emissions information with consequences outlined through the Strategy (threats). There is a critical need to feel this data/information gap to enable the characterisation of sme air emissions and measure the chemical compounds arising from sme's in targeted areas impacting on assets. This project will address this gap, enabling concurrent and future projects to continue including a critical information gap regarding bmp's by sme's themselves.
This program will complement the SME Data and Tracking Project, enabling this project to quickly identify and target air emission hotspots and problematic, specific industry types.
This project has been developed in partnership with staff from the Perth Air Quality Management Plan (AQMP)

19.7 Partners

List all partners who contribute in cash or kind. What other activities are *directly* linked to this project in an operational sense?

- Department of Environment (AQMP):$20,000, Chemistry Centre: data analysis,
- Curtin University: academic (r&d),
- Local Government and Trade Associations: initiating collaborative partnerships to ensure the success of implementation of bmp's.

Much of the support will be in kind.

19.8 Management Structure

The project will be co-managed by DoE Cleaner Production Program Manager and the SCC Sustainable Production Manager in consultation with targeted Local Authorities and supported by the other partners (2.3).

19.9 Outputs and Timelines

1.1.1.1.1.2 Outputs	**1.1.1.1.1.3 Timelines**
Id of sme industrial precincts & sampling sites.	July05-Sept 05
Id & analysis of emissions	Sept05-March07
Tracing/tracking emission source/s	Sept05-March07
Id priority emission & future management of id sme's.(report)	April07-June07

19.10 Milestones

See above

19.11 Expected Outcomes for Natural Resource Condition

The project's data and analysis will be used to set baseline data essential to underpin further studies to id, reduce and manage air emission pollutants. Further studies/projects will reduce these risks leading to cleaner air and increase awareness of the issues impacting on /healthy' air and promote NRM ethos.

19.12 Risk Factors

The study of the impact of sme air emissions throughout Australia is very limited so there may be an element of trial and error as we initiate r&d, and trial projects in this emerging area of concern.

19.13 Scope for Project Expansion or Contraction

From this project resources be will developed to encourage change management practices by sme's. It is intended that this project and material's developed will be available throughout this Catchment and other industrial precincts throughout Australia.

19.14 Cost

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Monitoring equipment	20	$50/mth	$12.000	100%	$12,000
Air analysis	20	$100/mth	$24,000	100%	$24,000
Fte	X2 p/time		$34,000	30%	$14,000
TOTAL					$50,000

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Monitoring equipment	20	$50/mth	$9,000	100%	$9,000
Air Analysis	20	$100/mth	$18,000	100%	$18,000
Fte	X2 p/time		$34,000	30%	$14,000
Report	Fte/print		$5,000	100%	$5,000
TOTAL					$46,000

19.15 Estimated Total Investment Influenced by the Project

There has been considerable investment by the Air Quality Coordinating Committee and partners (2.3) in developing the project to this point. This investment is essential to validate expert assumptions and provide a catalyst for further investment in this area. If this project did not proceed it would be a major setback to the objectives of Perth's AQMP.

19.16 Cost Effectiveness

The project builds on existing state initiatives. The NHT contribution will be used for sampling, analysis and gathering the information to develop programs to underpin sme air quality bmp's.

19.17 Long Term Strategy

Part of the ongoing 30 year Perth AQMP. Will provide baseline data for concurrent and subsequent projects, see above.

19.18 For how long will this kind of project be needed?

Baseline data will be collected over three years, but monitoring will be continuous to ensure the success of air emission programs developed from baseline data and 2, maintain an air watch program within sme industrial precincts.

19.19 Can the project become financially self-sustaining?

Monitoring will become less intensive (see above) but will be needed to maintain an air watch regime with sme's expected to improve their bmp's (user pays principal).

19.20 Can the project become socially self-sustaining?

Concurrent and subsequent projects work with sme's, educational facilities and Trade Associations to develop emission reduction and affordable cleaner production programs, with industry/s taking ownership of initiatives as a key objective.

20. PROJECT SP04: MULTI-USER DECISION SUPPORT TOOL FOR SALINITY

20.1 Summary

The Avon Upper Swan is at risk from increasing salinity, and information about remediation actions is spread over many sources, and is time-consuming to access. There is a need for a simple user-friendly planning tool for use by NRM Officers, community and local government.
The proposed decision tool will provide land managers and landholders with a management tool to increase their capacity to establish sustainable farming systems in high-risk salinity areas. This decision support tool will be developed in consultation with stakeholders, will be web based and on CD so that further information can be added.

20.2 Why this is a Priority Project

This relates to priority target: Land salinity

- **LR1 Reduction in the area of salinity affected land within the Avon Upper Swan NAP region by 2020 with quantified target set by December 2005.**
- LM1.1 Target: Priority areas for salinity risk management established in the Avon Upper Swan Region by 2005.
- LM1.2 All Local & State Gov planning agencies using local area land capability & suitable information by 2009.
- LM1.3 Implementation of actions to address land salinity in priority areas of the Avon Upper Swan NAP Region by 2009.
- LM1.4 30% increase in community participation in land salinity education, mitigation & remediation actions by 2009.

The State Salinity Strategy (2000) identified salinity as the greatest environmental threat facing Western Australia, potentially affecting up to 30% of the State. Within the Region, land salinisation is most likely to occur in the inland areas of Chittering. Further work is needed to identify the areas at risk, and develop appropriate management strategies
This project is a priority project because it will:

- Identify priority areas at high risk of salinity within Avon Upper Swan region.
- Develop a web based decision support tool to identify high-risk areas to guide on-ground work that will lead to sustainable farming practices.
- Train landholders and land managers in the use of decision support tool
- Provide incentives to landholders to undertake on-ground work to rehabilitate saline lands and increase its productivity.

This tool will be able to be used by other regions within high risk salinity areas.

20.3 Past Achievements

New Project

20.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Project focuses on identifying and rehabilitating high-risk areas of salinity to increase productivity and reduce waterlogging and erosion.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Project will identify the high-risk salinity areas for rehabilitation.
(3) Investment should not exceed the public benefits that result.	High public benefit. This project will result in increased knowledge and capacity of landholders and land managers to carry out on-ground works in high-risk salinity areas, increase productivity, reduce waterlogging and erosion.
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Seeks to ensure increased productivity of saline soils and reduce the area affected by salinity.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Project aims to increase the capacity of landholders to undertake sustainable production to protect the land asset. Public outcome is a reduction in saline water and sediment transported into the river systems.
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	No unequal distribution of investment as the project will increase the capacity of all landholders.
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	The process will involve continuous monitoring and evaluation with all stakeholders to gain feedback to ensure sustainable land management outcomes are achieved.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	This project is designed to improve and update the information upon which land management decisions will be made. Thus, high-risk, and therefore, high priority areas will be targeted.

20.5 Work Program

This program has been designed as two year project with the stages outlined below. The project will managed by the Ellen-Brockman Integrated Catchment Group in partnership with the Shires of Chittering & Mundaring, City of Swan and DoE.

20.6 How the project has been designed and developed

As stated previously salinity was identified as the greatest environmental threat facing WA and the Strategy identified the Upper Avon at high risk. NRM officers need to identify high risk areas and prioritise these areas for remediation. However at present there are no tools available that allow this to happen in an efficient and timely manner. This Support Tool is designed to have all relevant data available on one site allowing Officers to map, prioritise and target these high risk areas. It will also allow them to monitor the area/s on an ongoing basis.

A consultant will be engaged in the first year of the project to scope and develop the decision support tool.

A scoping study will be carried out to identify:

- The geographic extent of the region that will be the subject of the decision support tool.
- The land use and NRM issues relating to salinity.
- The target groups and their information/knowledge needs.

This will be followed by a data/knowledge audit that will identify existing data/information and any gaps. The aims of the audit component are to determine the available data and information relevant to the Brockman River and Wooroloo Brook catchments to be incorporated into the decision support tool.

The development of the tool will then occur using the information/data produced by the knowledge audit. The data will meet the objectives of this project and identify the high risk areas of salinity.

Extension training will be undertaken to enable the key stakeholders (farmers, land managers and planners) to use the decision tool to identify areas for on-ground remediation in year 2 of the project.

In year 2 demonstration sites will be identified and on-ground work carried out. This will be followed by a series of field days and workshops to investigate the outcome and evaluate to assess the demonstration sites in terms of salinity remediation. This will increase the capacity of landholders to undertake alternative options for sustainable land use and increased productivity.

This decision support tool has the capacity to be expanded to identify other NRM and farm productivity issues.

Consultation with Department of Agriculture re production of Agmaps and methodology required.

20.7 Partners

- Shire of Chittering
- Shire of Mundaring
- City of Swan
- Department of Environment.
- Department of Agriculture.

This decision tool is designed to ensure all partners contribute all relevant data to achieve an effective tool, not only in development of the tool but ensure ongoing input to ensure the decision making tool is up to date.

20.8 Management Structure

The project will be managed by the Ellen-Brockman Integrated Catchment Group in consultation with partners.

20.9 Outputs and Timelines

OUTPUT	ACTIVITY	TIME (M/Yr)	MILESTONE
Prioritisation of high risk areas	Scoping and development of decision support tool.	05/05-11/05	Launch of decision support tool.
	Identification and prioritisation of high risk areas	11/05-01/06	Selection of priority areas
On-Ground works	Selection of sites for remediation in identified high-risk areas	01/06-02/06	4 sites chosen per Catchment
	Survey and construct grade banks and other surface water control measures.	02/06-05/06	Area and length of surface water control mechanisms in place
	Construct raised beds	04/06-08/06	Area of raised beds constructed and planted .
	Establish perennial species	08/06-10/06	Area of Perennial species planted.
Extension and evaluation	Conduct decision support tool training day	11/05-02/06	Conduct 1 Training day per Catchment
	Conduct workshops and field days to demonstrate on-ground remediation projects.	02/06-12/06	Conduct 2 workshops/field days per catchment.
Communication	Produce articles for the LCDCs newsletters, local newspapers and the Mundaring Shire's *Greenpage* newsletter	01/05-12/06	Publication of articles each year
	Produce display for local Shows	01/05-12/06	Demo sites and results of project promoted at each local show
	Produce final report	11/06-12/06	Final report submitted

20.10 Milestones

See schedule above

20.11 Expected Outcomes for Natural Resource Condition

Land Management Targets	1.1.1.1.1.4 Land Management Actions	Project Outcomes
Priority areas for salinity risk management established in the Avon Upper Swan Region by 2005.	• Facilitate salinity risk mapping, integrated surface water and groundwater quality monitoring and established salinity trends • Assist interpretation of results and ground truthing with land managers • Identify priority areas for remedial actions based upon risk assessment • 1-5 year priority actions from the WA State Salinity Strategy implemented by 2009	• Identification of priority areas at high risk of salinisation, waterlogging, erosion and acid sulphate soils within both Catchments in the first twelve months of the project.
Implementation of onground-actions to address salinity in priority areas of the Avon Upper Swan NAP region by 2009.	• Implementation of large scale dryland salinity remedial actions in the identified priority areas • Develop and implement land-use and management support programs (eg decision planning tools, best practice guidelines, workshops, education and training, demonstrations) addressing dryland salinity and restoration • Assist the development and implementation of management strategies for saline sites or those at risk, including property and catchment planning	• Development of a sustainable land management tool to assist in the establishment of sustainable farming practises within the first twelve months of the project. • Train 60 landholders and land managers in the use of the sustainable land management tools by the second year of the project. • Provision of incentives to landholders to undertake on-ground works in the second year of the project.
20 % increase in community participation in land salinity education, mitigation and remediation actions by 2009.	• Facilitate, support and motivate community and stakeholder involvement in land salinity actions • Facilitate bast practice training in land salinity management through community training programs such as Property Planning and Heavenly Hectares through the integrated regional education and training program • Develop a landholder information service on sustainable land management • Develop and implement an integrated regional information system to enhance planning, implementation, monitoring and evaluation	• Development of a sustainable land management tool to assist in the establishment of sustainable farming practises within the first twelve months of the project. • Train 60 landholders and land managers in the use of the sustainable land management tools by the second year of the project. • Provision of incentives to landholders to undertake on-ground works in the second year of the project.
Regional soil health program developed with implementation of identifies remedial actions in identified priority areas by 2009	• Develop and implement programs for priority areas for water erosion control, water logging remediation and management of acid sulphate soils risk, including implementing industry best practice guidelines	• Development of a sustainable land management tool to assist in the establishment of sustainable farming practises within the first twelve months of the project

Land Management Targets	1.1.1.1.1.4 Land Management Actions	Project Outcomes
30 % increase in land managers, planners and community participation in soil condition education, mitigation and remediation activities by 2009	• Facilitate, support and motivate community groups • Develop and implement a training and support program for best management practises relating to soil condition and remediation • Facilitate the implementation of Acid Sulphate soils management protocols, guidelines and training • Continue and expand community-training programs such as Property Planning and Heavenly Hectares through the integrated community education and training program • Rural and semi-rural landholders to have access to market based instruments/incentives for sustainable land management by 2007	• Development of a sustainable land management tool to assist in the establishment of sustainable farming practises within the first twelve months of the project. • Train land managers and planners in the use of the sustainable land management tools by the second year of the project. • Provision of incentives to landholders to undertake on-ground works in the second year of the project.

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20.12 Risk Factors

Describe both "internal" risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and "external risks" (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).
Internal risks;

- Unable to find appropriate consultant
- Key staff resign with project knowledge, eg not documented.
- External risks;
- Withdrawal of partners
- Lack of support from community
- Lack of support from landholders
- Funding not approved

20.13 Scope for Project Expansion or Contraction

This decision tool has the capacity to be expanded to identify other NRM and farm productivity issues and can used in other regions.

20.14 COST

First Six Months (to June 30th 2005): NA

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Consultancy			$30,000	100%	$30,000
Project Management	.2 fte	$8600pa	$8600	100%	$8600
GIS support			$7500	100%	$7500
Workshops/Field Days	3	$3000per workshop	$9000	100%	$9000
Communications	News Letters Printing distribution	$10,000	$10,000	100%	$10,000
TOTAL					**$65,100**

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Consultancy			$1,800	100%	$1,800
Project Management	.2 fte	$8,600pa	$8,600	100%	$8,600
Workshops/field days	10	$1550 per workshop	$15500	100%	$15,500
Perennial plants		$8,000	$8,000	100%	$8,000
Survey/Earthworks		$24,100	$24,100	100%	$26,000
Communications		$5000	$5000	100%	$5,000
TOTAL					**$64,900**

20.15 Estimated Total Investment Influenced by the Project

Salinity has the potential to affect up to 30% of the state. Significant amount of this problem impacts directly on farm land thus the long term economic sustainability of affected farm land. A significant proportion of Ellen-Brockman Catchment is under threat from salinity.

20.16 Cost Effectiveness

Why is the project a cost-effective way of addressing the threat to asset value?
The decision tool will affectively give landholders, managers and NRM Officers the ability to quickly and efficiently identify problem areas and provide the tools to implement remediation plans. The tool will be able to be used in other areas and regions.

20.17 Long Term Strategy

The decision making tool can be changed/upgraded, as new and modified data is acquired to up date the decision making tool.

20.18 For how long will this kind of project be needed?

This decision making tool will be required as long as the salinity problem is an NRM threat.

20.19 Can the project become financially self-sustaining?

Once the tool is operating the only costs will be to ensure the tool is up to date relevant and timely to NRM and the needs of land holders and managers.

20.20 Can the project become socially self-sustaining?

Ellen-Brockman Integrated Catchment Group will work closely with partners to ensure the decision tool is constantly reviewed and updated so that landholders and managers can make informed decisions in consultation with these key partners.

21. PROJECT SP10: SUSTAINABLE PRODUCTION IMPLEMENTATION FRAMEWORK

21.1 Summary

Provide a brief summary of the project. What assets and threats does it address, by what means, and in what locations. What are the expected results?
This project provides the framework for coordination and delivery of the Sustainable Production Regional Delivery Program. The broad outcomes of the project are:

- Support implementation of the projects within the Sustainable Production Program
- Develop partnerships with key stakeholders to develop and implement Sustainable Production projects
- Coordinate activities within the Sustainable Production Program to maximise efficiency and outcomes
- Implement monitoring and evaluation programs

The framework consists of a:

- Sustainable Production Program Manager: The role of this position is to ensure that the MAT's within the Sustainable Production Delivery Program are being met within given timeframes, to coordinate the delivery of the program across the Swan Region, to provide support and training to sub-regional staff within their program, to form partnerships at a strategic level to implement projects and to coordinate the monitoring and evaluation of the program.
- Part-time Communications Officer: The Communications Officer will assist with organising of events related to the program, coordinate a communications plan for the program and produce displays and information required within the program
- Part-time Local Government Officer: This position will ensure Local Government involvement in Sustainable Production projects, assist them to reach Sustainable Production goals for their area and assist them to partner with other stakeholders such as State Government and community
- Indigenous Officer: The Indigenous Officer will ensure that indigenous issues are considered within the delivery program, that indigenous people are involved in the decision making processes and engaged where possible in the delivery of projects.
- Sub-regional Officers: There is a Sub-regional Coordinator in each of the five regions of the Swan. A portion of their time will be committed to setting the priorities for Sustainable Production within their sub-region in partnership with the Program Manager, developing partnerships within the Sub-region and supporting and coordinating the activities of the Sub-regional Sustainable Production Officers. There are 4.5 Sub-regional Sustainable Production Officers, 1 in the north, 1 in the north-east, 1 in the east and 1.5 in the south. The role of these officers is to support the delivery of Sustainable Production Projects in their region, develop partnerships with Local Government, community and other stakeholders to develop and implement Sustainable Production projects and to carry out monitoring and evaluation of projects within their region

21.2 Why this is a Priority Project

The Swan Region has a population of over 1.4 million people, and it is the pressures which they place on environmental assets which is the major threat to NRM. Behaviour change at at a State Government, Local Government, industry and community level is essential if we are to protect our natural resources. The Sustainable Production Program encompasses light industry and intensive and broadacre agriculture.
Partnership development is also essential to effective NRM in this region, and coordination of the large number of stakeholders involved in working with the environment in some way.
The investment in the Sustainable Production Framework reflects this requirement for initiating behaviour change, coordinating effort and developing partnerships.
The project meets the MAT's in the Swan Region Strategy in the following way:

Assets addressed

Land, Water, Aquatic Biodiversity, Coastal and Marine, Air

Threats addressed

Chemical and pesticide contamination, development and/or change in land use, nutrient export and enrichment, drainage modification, industrial discharge, groundwater and surface contamination, water abstraction, stormwater discharge, agricultural management practices, inadequate industry involvement in N

Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Land salinity	LR1 Reduction in the area of land affected by salinity, within the Avon Upper Swan NAP Region by 2020	LM 1.3 LM1.4	LM1.1 LM 1.2
Soil Condition	LR2 Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulphate soils by 2020	LM2.1 LM2.3 LM2.4 LM2.5	LM2.2
Inland aquatic ecosystems integrity	WR1 Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.4 WM1.5	WM1.2 WM 1.3
Estuarine, coastal and marine habitats integrity	WR2 Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005) CMR2 maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020	WM2.3 WM2.4 WM2.5 CMM2.3 CMM2.4 CMM2.5 CMM2.6	WM2.1 WM2.2

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Nutrients in aquatic environments	WR3 Maximum concentrations, for priority waterways, do not exceed o.1mg/L for total P and 1.0mg/L for total N by 2020	WM3.1 WM3.2 WM3.3 WM3.4	
Turbidity/suspended particulate matter in aquatic environments	WR4 Maintain and improve condition of aquatic environments in the Region, as measured at representative sites by 2020	WM4.2 WM4.3 WM4.4	WM4.1
Surface water salinity in freshwater aquatic environments	Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region as measured at representative sites by 2020	WM5.3 WM5.4	WM5.1 WM5.2
	AR1 Continue to progress towards improved air quality, with RCT's to be set by 2005	AM1.2	

21.3 Budget

$368,000 per year for three years

21.4 Past Achievements

N/A – a new project

21.5 Incorporation of NHT Principles

Describe how this project incorporates the NHT2 Investment Principles given in the table below.

(1) Generates the greatest public benefits per dollar of public investment.	Most assets in the Region are public assets, and this project aims to achieve large-scale behaviour change to protect assets
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Prioritisation of strategic actions will be assisted through this project
(3) Investment should not exceed the public benefits that result.	Investment in this project is to protect public assets
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	The prioritisation process will be assisted by this project
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Investment in industry development will be an aim for all sectors

(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Investment in the Sub-regions has been unequal and prioritised according to light industry and agricultural threats
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	Monitoring and evaluation of program delivery is a key component of this project
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	The prioritisation process will be undertaken on an annual basis, and adaptive management used to incorporate new information and learnings

21.6 Work Program

Milestone	Timeline
Sub-regional planning completed to June 06	March 05
Implementation of projects, partnership development	March 05-June 06
Monitoring and evaluation of projects	Ongoing
Evaluation of Sustainable Production Program	April-Jun 06

21.7 How the project has been designed and developed

The Program Delivery Structure is an outcome of the development of the Swan Region NRM Strategy. The Sub-regional structure for implementation of the Strategy has been developed through a community consultative process of mapping the catchments of the Swan Region over the last two years

21.8 Partners

Key partners in this project include State and Local Government and Industry. Each Sub-region has a centre for operation except for Coast and Marine. These centres and their operating costs are supported through contributions from Local Governments, State Government and industry (eg Tiwest and Chevron Texaco).
This project also leverages investment into Sustainable Production in many ways, for example, CSBP and the Nursery Industry Association have invested funds into industry information sheets, Local Governments such as Bayswater are investing in auditing programs of their industrial areas and the Waste Management Board has provided funding for a waste management project in Bellevue.

21.9 Management Structure

The Sustainable Production Program Manager is responsible for the overall coordination of this project. Sub-regional investments are managed through community committees, with a Sub-regional Coordinator and Sustainable Production Officers in each Sub-region.

21.10 Outputs and Timelines

Outputs achieved through this project may be reported through other projects which have been supported through the framework. Specific outputs reported through this project will cover a wide range of outputs and cannot be finalised until Sub-regional planning is complete.

21.11 Milestones

See above

21.12 Expected Outcomes for Natural Resource Condition

The Sustainable Production projects implemented through the Sustainable Production Program will be successful and will have strong partnerships in place. Monitoring and evaluation will be used as the basis for adaptive management to further enhance the outcomes of Sustainable Production projects

21.13 Risk Factors

The employment of suitable staff is a potential risk. The short-term nature of contracts for positions makes it difficult to employ suitably experienced staff.
Another risk to the project is the considerable coordination required across multiple stakeholders. Success of the project depends on obtaining the trust and goodwill of a large range of players.

21.14 Scope for Project Expansion or Contraction

The project does not need to be expanded, as the scope of the project has been set through extensive consultation. Conversely, if the project were to contract the Sustainable Production Program Delivery could not be fully implemented.

21.15 Cost

Financial Year 2004-05

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	4.5		$413,000	91%	$368,000

3.2 Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	4		$413,000	91%	$368,000

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	4		$413,000	91%	$368,000

21.16 Estimated Total Investment Influenced by the Project

- Local Government: $100,000
- Waste Management Board: $120,000
- Industry: $30,000
- Total $250,000

21.17 Cost Effectiveness

The staff within the project will leverage NRM investment from partnerships, as well ensuring that all NHT funded projects are successful in implementing MAT's

21.18 Long Term Strategy

Adaptive management will be used to develop the aims and objectives of the project on a regular basis

21.19 For how long will this kind of project be needed?

This project will be ongoing for the duration of implementation of the strategy, however the total project cost may change over time as aims and objectives are refined.

21.20 Can the project become financially self-sustaining?

It is unlikely that the project can become self-sustaining in the short term, however industry stakeholders are expected to move towards sustainable practice in the long term

21.21 Can the project become socially self-sustaining?

As partnerships are established, there will be less requirement for partnership initiation, and over time less need for partnership support. The aim is to build the capacity of partners so that best management practice becomes self-sustaining

SUSTAINABLE PRODUCTION REGIONAL DELIVERY PROGRAM

22. PROJECT SP01: SME TRACKING, AUDITING AND BENCHMARKING

22.1 Summary

At present it is difficult to not only track sme's in terms of location and business description, but also we need to target their practices as it impacts on NRM.
Sustainable production programs target point source pollution and deal with the problem before it enters landfill and waterways.
This project consists of three aspects;

1. Develop a database via the Local Govt. rates notice which will show the name and address of the business, but more importantly a business description eg printer, retail nursery, automobile mechanic. The only database available at present is via the DPI, which is only up dated every 4 years and is difficult to access. I have had preliminary discussions with DPI regarding this proposal but they have expressed interest in the concept. It will be a useful tool for a number of reasons such as comparative analysis across industrial precincts, supplying data for targeting specific areas of concern and research by industry, Governments and educational institutions.
2. Both solid and liquid waste are critical problems which has been shown via data and anecdotal evidence. Cumulatively sme's have a severe impact on all assets (over 125,000 sme's) and even with state strategies in place, solid waste is still growing and the illegal dumping of waste (solid and liquid) to ground and surface water has led to the introduction of the Unauthorised Discharge Regulations targeting sme's. The database would not only contain a description of the sme but also allow each Local Government to track the performance of each sme and take appropriate action if required.
3. To deal with the NRM impact by sme's we need to ensure our data is up to date, timely and useful in terms of program development. This project is essential to quantify and qualify how much waste is produced, which industries produce what waste and how it is disposed of, (eg illegally, contractors, to landfill, etc). This database will be used by industry, State and Local Gov's to plan initiatives to prioritise, target and develop solutions to tackle this problem.

This project targets point source pollution before it enters landfill and waterways threatening all assets throughout the catchment; land, water, biodiversity, coastal and marine, air, cultural and regional capacity.

22.2 Why this is a Priority Project

Reducing the pollution hazard from light industry is an urgent issue which has been ignored for too long. This project attempts to reduce multiple threats to the environment, particularly groundwater and surface water contamination.

Threats addressed: Land: Chemical and pesticide contamination, Development and/or change in land. **Water:** Nutrient export and enrichment, Chemical and pesticide contamination, Drainage modification, Industrial discharge, Groundwater and surface water contamination, Stormwater discharge. **Biodiversity:** Chemical and pesticide contamination. **Coastal and Marine:** Chemical and pesticide contamination, Coastal and marine infrastructure developments, Stormwater discharge, Industrial discharge. **Regional Capacity:** Willingness in the community for change, Inadequate industry involvement NRM, Adoption of NRM principles and processes at State or Local Government levels.

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Soil Condition, Inland aquatic ecosystems integrity, Estuarine, coastal & marine habitats integrity, Nutrients in aquatic environments, Turbidity/suspended particulate matter in aquatic environments.	Maintain & improve soil condition. Maintain & improve condition of inland ecosystem integrity. Maximum concentrations do not exceed 0.1 mg/L for phosphorous &1.0 mg/L nitrogen. Quantified targets for turbidity/suspended particulate matter.	LM2.4, WM1.5, 4	LM2.3, LM2.5, WM2.5, WM3.1, WM3.4, WM4.2, WM4.4, BM2.5, CMM2.4, CMM2.6, RCM1.1, RCM1.

22.3 Past Achievements

NA – new project

22.4 Incorporation of NHT Principles

Describe how this project incorporates the NHT2 Investment Principles given in the table below.

(1) Generates the greatest public benefits per dollar of public investment.	Aims to benchmark, audit and locate every sme in the SCC region in a very cost effective manner
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	This project should set benchmarking and the foundations to develop strategic planning based on relevant data for NTM program delivery. All industrial areas drin either to the Swan River or important wetland systems such as Yellegonga
(3) Investment should not exceed the public benefits that result.	Investment has been designed to ensure the project is sustainable & ownership taken by key stakeholders eg Local Gov, etc. Assets to be protected are all public
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Designed to be used by Local Gov, agencies, etc at minimal investment.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	This project targets point source industrial pollution/cleaner production issues with extensive impact on NRM assets, which are all in public ownership
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	This program targets all sme' across the region. Investment will be made only in areas where there is significant industrial zoning.
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	The program has been designed to be updated annually and designed to be used as a working tool. The data will allow for setting priorities.

(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	See part 7. As stated priorities will be influenced by participation of Local Authorities, and will target those with significant industrial zonings

22.5 Work Program

The work program will:

(1) Incorporate a business address and business description on all rates notices in every Local Authority..

(2) Design of audit proforma and software package to track the performance of sme's and take appropriate action if required in every Local Authority.

(3) Solid and liquid benchmarking audit of sme's to quantify and qualify how much waste is produced, which industries producing what waste, how it is disposed of (eg illegally, contractors, landfill, etc.). This will be via snap shot audits across the metropolitan area capturing as many industrial precincts and industry types as possible.

22.6 How the project has been designed and developed

This project has been developed in consultation with key stakeholders who have provided data, and anecdotal evidence and who have very strong concerns about the lack of engagement in this area by sme's The Department of Environment, the Chamber of Commerce and Industry, Industry Associations and Local Authorities have been heavily involved in the development of the program. Early issues identified were the lack of information about what light industries were operating in any industrial area, what waste they were generating and how they were disposing of waste. There was also a critical information gap regarding best practice by sme's themselves.

The project aims to assist Local Government to extend the auditing duties of their Environmental Health Officers to assist light industry to move towards best management practice. This utilises existing resources in a cost-effective manner. The project development also included a strong monitoring and evaluation component so that the success of the project could be evaluated.

22.7 Partners

List all partners who contribute in cash or kind. What other activities are *directly* linked to this project in an operational sense?

- City of Bayswater are involved in a pilot program within their industrial area. They have contributed officer time to carry out audits and have developed the initial database to record their findings.
- The Motor Trades Association has provided simple audit sheets for their industry and has provided training to the City of Bayswater staff
- The Waste Management Board has contributed advice and assistance to the project, and a grant of $120,000 for a pilot project in the Bellevue Industrial Area
- CSBP has contributed $5000 for the production of fact sheets for sme's on stormwater management
- The Swan River Trust has provided $20,000 to further develop information resources for sme's

The future expansion of the light industry program is heavily dependant on the further development of the databases so that Local Government can effectively participate in the program

22.8 Management Structure

The project will be managed by the Sustainable Production Program Manager of the Swan Catchment Council. Projects will be piloted in several Local Governments, including Bayswater, Swan, Wanneroo and Joondalup, and they will be supported by the three Sustainable Production Officers within the sub-regions of the Swan.

22.9 Outputs and Timelines

Outputs	Timelines
Development and trialing of sme database to record location and business activities	July 05 to Jun 06
Development and trialing of sme tracking and auditing database	July 05 to Jun 06
Snapshot audit of sme waste production and disposal	July 05 to Jun 06

22.10 Milestones

See above

22.11 Expected Outcomes for Natural Resource Condition

In the first year pilot programs for auditing light industry will be run with sic Local Governements. The information collected will be used to set the bsaeline data for light industry practices. The ongoing audting program will assist the businesses identified as not meeting minimum environmental standards improve their practices.
The pilot programs will then be expanded to include other Local Governments with industrial areas. The result for NRM will be:

- Best management practices adopted by sme's
- Reduced illegal dumping of waste by sme's
- Reduced pollution of surface and groundwater
- Best management practices for waste recycling/reuse established
- Reduced waste to landfill

22.12 Risk Factors

Describe both "internal" risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and "external risks" (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).
Local government may refuse to participate in the program due to concerns regarding the ongoing cost

22.13 Scope for Project Expansion or Contraction

Geographical scope, the number of management actions incorporated in the project, range of assets addressed, financial, human resources, period of time allowed for the project.
It is intended that this project will expand to include all LGA's with industrial areas, and will also include all light industry types

22.14 Cost

Show the total inputs to the project (both NHT2 and Non-NHT2), and the funds sought from NHT2.

22.15 Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Sme tracking database	1	$30,000	$50,000	60%	$30,000
Sme audit database	1	$20,000	$40,000	50%	$20,000
Waste audit	1	$60,000	$180,000	35%	$60,000
TOTAL		$110,000	$270,000		$110,000

22.16 Estimated Total Investment Influenced by the Project

There is considerable investment by the waste management Board and local Government in developing the project to this point. If this project does not proceed the work to date will be of no value

22.17 Cost Effectiveness

Why is the project a cost-effective way of addressing the threat to asset value?
This project uses existing resources of local governments to carry out the majority of the work. The NHT contribution is to develop resources to make this task more effective. The program is designed to be self sustaining in the long term

22.18 LONG TERM STRATEGY

See above

22.19 For how long will this kind of project be needed?

Once the project development is complete, the project will become self-sustaining

22.20 Can the project become financially self-sustaining?

See abov

22.21 Can the project become socially self-sustaining?

E.g. what actions are in place to extend active partnerships involved with the project?
The aim of the project is for sme tracking to become a core part of local government business. It is an objective of the project that sme's take control of their practices and move towards bmp's supported by industry associations.

23. PROJECT SP02: SME AIR EMISSIONS STUDY

23.1 Summary

SME's are often located in close proximity to urban/residential areas and with Perth's expected growth this will only increase. The majority of SME's are not licensed and we have no information on the type or amount of emissions they generate. We also have no information on the type, number and location of SME's. There is an urgent need to ascertain whether emissions from SME's are cause for public concern.

There is an urgent need to increase resources in the study of emissions in a collaborative manner. The funding would allow data collection and analysis at targeted SME industrial precincts and provide the date required to develop policy and programs to deal with this issue.

The aim if the project is to validate current information concerning sme's via an emissions inventory. This will be achieved through ambient screenings carried out over the next 2/3years through out industrial precincts within the catchment.

23.2 Why this is a Priority Project

There is an urgent need to systematically tackle this problem. We are constantly warned via data and research of the greenhouse effect, leading to global warming and climate change. There is a need to increase resources in the study of emissions in a collaborative manner including sme's, we need good data to develop policy and programs to deal with this issue.

Threats addressed: ***Air***; Fossil fuels consumption and use, industrial pollution and accidents, loss of vegetation, climate changes, public health.

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Improved air quality with RCT's set for air quality by 2005.	Collect/analyse baseline and trend information	AM1.1	
	Work with DoE and associated partners to set RCT's for air quality.	AM1.1	
	Inventory of sme's emissions linked to National Pollution Inventory 2008	AM1.2	
	Partnerships with Air Coordinating Committee	AM1.2	
	Support community/stakeholder participation relating to air quality improvement.	AM2.1	
Set RCT's to manage climate risk and reduce risk of environmental, economic or social outcomes from drought or coastal impacts.	Support research risk of climate change to NRM	AM2.1	
	Support research into climate variability.	AM2.1	
	Support an education program on Climate change and long term climate variability.		

23.3 Past Achievements

NA, New Project

23.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Project focuses on identifying and analysing high risk emissions. Will underpin further work to reduce emissions from SME's and reduce public and personal exposure.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Project will validate existing information on high-risk emissions, personal and public exposure concerns and contribute to the Perth Air Quality Management Plan (AQMP) objectives under the Cleaner Production Initiative.
(3) Investment should not exceed the public benefits that result.	High public benefit. This project will result in increased knowledge and certainty of air emissions produced by SME's, increased knowledge of potential health impacts from exposure and underpin programs to support air emission reductions, thereby helping to achieve the Perth AQMP's aim of cleaner air for Perth. .
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Will ensure effort focussed, minimising priority emissions and reduce public and personal exposure.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Project underpins work with SME's in supporting them to reduce emissions and incorporate this aim into their business procedures long term.
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	No unequal distribution of investment as the project will increase the capacity of all SME's as program is expanded across Perth.
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	The process will involve continuous monitoring and evaluation with all stakeholders to gain feedback to ensure air emission outcomes are achieved.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	This project is designed to gather and develop the meagre information available upon which air quality decisions will be made. Thus, high-risk, and therefore, high priority areas will be targeted.

23.5 Work Program

The work program will establish an emissions inventory within the Catchment. This will be achieved through passive sampling of air emissions with emphasis on exotic emissions within specified industrial precincts.
The data analysis will identify high risk emissions in line with the Catchment recognising air as asset necessary for life support systems, supporting healthy ecosystems and public health concerns in relation to air quality.
The data will be the basis for developing programs targeting sme's bmp's in relation to air emissions.

23.6 How the project has been designed and developed

The community and key stakeholders have strong concerns about the lack of sme emissions information with consequences outlined through the Strategy (threats). There is a critical need to feel this data/information gap to enable the characterisation of sme air emissions and measure the chemical compounds arising from sme's in targeted areas impacting on assets. This project will address this gap, enabling concurrent and future projects to continue including a critical information gap regarding bmp's by sme's themselves.
This program will complement the SME Data and Tracking Project, enabling this project to quickly identify and target air emission hotspots and problematic, specific industry types.
This project has been developed in partnership with staff from the Perth Air Quality Management Plan (AQMP)

23.7 Partners

- Department of Environment (AQMP):$20,000,
- Chemistry Centre: data analysis,
- Curtin University: academic (r&d),
- Local Government and Trade Associations: initiating collaborative partnerships to ensure the success of implementation of bmp's.

Much of the support will be in kind.

23.8 Management Structure

The project will be co-managed by DoE Cleaner Production Program Manager and the SCC Sustainable Production Manager in consultation with targeted Local Authorities and supported by the other partners (2.3).

23.9 Outputs and Timelines

Outputs	Timelines
Id of sme industrial precincts & sampling sites.	July05-Sept 05
Id & analysis of emissions	Sept05-March07
Tracing/tracking emission source/s	Sept05-March07
Id priority emission & future management of id sme's.(report)	April07-June07

23.10 Milestones

See above

23.11 Expected Outcomes for Natural Resource Condition

The project's data and analysis will be used to set baseline data essential to underpin further studies to id, reduce and manage air emission pollutants. Further studies/projects will reduce these risks leading to cleaner air and increase awareness of the issues impacting on /healthy' air and promote NRM ethos.

23.12 Risk Factors

The study of the impact of sme air emissions throughout Australia is very limited so there may be an element of trial and error as we initiate r&d, and trial projects in this emerging area of concern.

23.13 Scope for Project Expansion or Contraction

From this project resources be will developed to encourage change management practices by sme's. It is intended that this project and material's developed will be available throughout this Catchment and other industrial precincts throughout Australia.

23.14 COST

Show the total inputs to the project (both NHT2 and Non-NHT2), and the funds sought from NHT2.

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Monitoring equipment	20	$50/mth	$12.000	100%	$12,000
Air analysis	20	$100/mth	$24,000	100%	$24,000
Fte	X2 p/time		$34,000	30%	$14,000
			$70,000		$50,000

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Monitoring equipment	20	$50/mth	$9,000	100%	$9,000
Air Analysis	20	$100/mth	$18,000	100%	$18,000
Fte	X2 p/time		$34,000	30%	$14,000
Report	Fte/print		$5,000	100%	$5,000
			$66,000		$46,000

23.15 Estimated Total Investment Influenced by the Project

There has been considerable investment by the Air Quality Coordinating Committee and partners (2.3) in developing the project to this point. This investment is essential to validate expert assumptions and provide a catalyst for further investment in this area. If this project did not proceed it would be a major setback to the objectives of Perth's AQMP.

23.16 Cost Effectiveness

The project builds on existing state initiatives. The NHT contribution will be used for sampling, analysis and gathering the information to develop programs to underpin sme air quality bmp's.

23.17 Long Term Strategy

Part of the ongoing 30 year Perth AQMP. Will provide baseline data for concurrent and subsequent projects, see above.

23.18 For how long will this kind of project be needed?

Baseline data will be collected over three years, but monitoring will be continuous to 1, ensure the success of air emission programs developed from baseline data and 2, maintain an air watch program within sme industrial precincts.

23.19 Can the project become financially self-sustaining?

Monitoring will become less intensive (see above) but will be needed to maintain an air watch regime with sme's expected to improve their bmp's (user pays principal).

23.20 Can the project become socially self-sustaining?

Concurrent and subsequent projects work with sme's, educational facilities and Trade Associations to develop emission reduction and affordable cleaner production programs, with industry/s taking ownership of initiatives as a key objective.

24. PROJECT SP04: MULTI-USER DECISION SUPPORT TOOL FOR SALINITY

24.1 Summary

The Avon Upper Swan is at risk from increasing salinity, and information about remediation actions is spread over many sources, and is time-consuming to access. There is a need for a simple user-friendly planning tool for use by NRM Officers, community and local government.

The proposed decision tool will provide land managers and landholders with a management tool to increase their capacity to establish sustainable farming systems in high-risk salinity areas. This decision support tool will be developed in consultation with stakeholders, will be web based and on CD so that further information can be added.

24.2 Why this is a Priority Project

This relates to priority target: Land salinity

- **LR1 Reduction in the area of salinity affected land within the Avon Upper Swan NAP region by 2020 with quantified target set by December 2005.**
- LM1.1 Target: Priority areas for salinity risk management established in the Avon Upper Swan Region by 2005.
- LM1.2 All Local & State Gov planning agencies using local area land capability & suitable information by 2009.
- LM1.3 Implementation of actions to address land salinity in priority areas of the Avon Upper Swan NAP Region by 2009.
- LM1.4 30% increase in community participation in land salinity education, mitigation & remediation actions by 2009.

The State Salinity Strategy (2000) identified salinity as the greatest environmental threat facing Western Australia, potentially affecting up to 30% of the State. Within the Region, land salinisation is most likely to occur in the inland areas of Chittering. Further work is needed to identify the areas at risk, and develop appropriate management strategies

This project is a priority project because it will:

- Identify priority areas at high risk of salinity within Avon Upper Swan region.
- Develop a web based decision support tool to identify high-risk areas to guide on-ground work that will lead to sustainable farming practices.
- Train landholders and land managers in the use of decision support tool
- Provide incentives to landholders to undertake on-ground work to rehabilitate saline lands and increase its productivity.

This tool will be able to be used by other regions within high risk salinity areas.

24.3 Past Achievements

New Project

24.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Project focuses on identifying and rehabilitating high-risk areas of salinity to increase productivity and reduce waterlogging and erosion.
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Project will identify the high-risk salinity areas for rehabilitation.
(3) Investment should not exceed the public benefits that result.	High public benefit. This project will result in increased knowledge and capacity of landholders and land managers to carry out on-ground works in high-risk salinity areas, increase productivity, reduce waterlogging and erosion.
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Seeks to ensure increased productivity of saline soils and reduce the area affected by salinity.
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Project aims to increase the capacity of landholders to undertake sustainable production to protect the land asset. Public outcome is a reduction in saline water and sediment transported into the river systems.
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	No unequal distribution of investment as the project will increase the capacity of all landholders.
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	The process will involve continuous monitoring and evaluation with all stakeholders to gain feedback to ensure sustainable land management outcomes are achieved.
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	This project is designed to improve and update the information upon which land management decisions will be made. Thus, high-risk, and therefore, high priority areas will be targeted.

24.5 Work Program

This program has been designed as two year project with the stages outlined below. The project will managed by the Ellen-Brockman Integrated Catchment Group in partnership with the Shires of Chittering & Mundaring, City of Swan and DoE.

24.6 How the project has been designed and developed

As stated previously salinity was identified as the greatest environmental threat facing WA and the Strategy identified the Upper Avon at high risk. NRM officers need to identify high risk areas and prioritise these areas for remediation. However at present there are no tools available that allow this to happen in an efficient and timely manner. This Support Tool is designed to have all relevant data available on one site allowing Officers to map, prioritise and target these high risk areas. It will also allow them to monitor the area/s on an ongoing basis.

A consultant will be engaged in the first year of the project to scope and develop the decision support tool.
A scoping study will be carried out to identify:

- The geographic extent of the region that will be the subject of the decision support tool.
- The land use and NRM issues relating to salinity.
- The target groups and their information/knowledge needs.

This will be followed by a data/knowledge audit that will identify existing data/information and any gaps. The aims of the audit component ate to determine the available data and information relevant to the Brockman River and Wooroloo Brook catchments to be incorporated into the decision support tool.

The development of the tool will then occur using the information/data produced by the knowledge audit. The data will meet the objectives of this project and identify the high risk areas of salinity.

Extension training will be undertaken to enable the key stakeholders (farmers, land managers and planners) to use the decision tool to identify areas for on-ground remediation in year 2 of the project.

In year 2 demonstration sites will be identified and on-ground work carried out. This will be followed by a series of field days and workshops to investigate the outcome and evaluate to assess the demonstration sites in terms of salinity remediation. This will increase the capacity of landholders to undertake alternative options for sustainable land use and increased productivity.

This decision support tool has the capacity to be expanded to identify other NRM and farm productivity issues.

Consultation with Department of Agriculture re production of Agmaps and methodology required.

24.7 Partners

- Shire of Mundaring
- City of Swan
- Department of Environment.
- Department of Agriculture.

This decision tool is designed to ensure all partners contribute all relevant data to achieve an effective tool, not only in development of the tool but ensure ongoing input to ensure the decision making tool is up to date.

24.8 Management Structure

The project will be managed by the Ellen-Brockman Integrated Catchment Group in consultation with partners.

24.9 Outputs and Timelines

OUTPUT	ACTIVITY	TIME (M/Yr)	MILESTONE
Prioritisation of high risk areas	Scoping and development of decision support tool.	05/05-11/05	Launch of decision support tool.
	Identification and prioritisation of high risk areas	11/05-01/06	Selection of priority areas
On-Ground works	Selection of sites for remediation in identified high-risk areas	01/06-02/06	4 sites chosen per Catchment
	Survey and construct grade banks and other surface water control measures.	02/06-05/06	Area and length of surface water control mechanisms in place
	Construct raised beds	04/06-08/06	Area of raised beds constructed and planted .
	Establish perennial species	08/06-10/06	Area of Perennial species planted.
Extension and evaluation	Conduct decision support tool training day	11/05-02/06	Conduct 1 Training day per Catchment
	Conduct workshops and field days to demonstrate on-ground remediation projects.	02/06-12/06	Conduct 2 workshops/field days per catchment.
Communication	Produce articles for the LCDCs newsletters, local newspapers and the Mundaring Shire's *Greenpage* newsletter	01/05-12/06	Publication of articles each year
	Produce display for local Shows	01/05-12/06	Demo sites and results of project promoted at each local show
	Produce final report	11/06-12/06	Final report submitted

24.10 Milestones

See schedule above

24.11 Expected Outcomes for Natural Resource Condition

Land Management Targets	Land Management Actions	Project Outcomes
Priority areas for salinity risk management established in the Avon Upper Swan Region by 2005.	• Facilitate salinity risk mapping, integrated surface water and groundwater quality monitoring and established salinity trends • Assist interpretation of results and ground truthing with land managers • Identify priority areas for remedial actions based upon risk assessment • 1-5 year priority actions from the WA State Salinity Strategy implemented by 2009	• Identification of priority areas at high risk of salinisation, waterlogging, erosion and acid sulphate soils within both Catchments in the first twelve months of the project.
Implementation of onground-actions to address salinity in priority areas of the Avon Upper Swan NAP region by 2009.	• Implementation of large scale dryland salinity remedial actions in the identified priority areas • Develop and implement land-use and management support programs (eg decision planning tools, best practice guidelines, workshops, education and training, demonstrations) addressing dryland salinity and restoration • Assist the development and implementation of management strategies for saline sites or those at risk, including property and catchment planning	• Development of a sustainable land management tool to assist in the establishment of sustainable farming practises within the first twelve months of the project. • Train 60 landholders and land managers in the use of the sustainable land management tools by the second year of the project. • Provision of incentives to landholders to undertake on-ground works in the second year of the project.
20 % increase in community participation in land salinity education, mitigation and remediation actions by 2009.	• Facilitate, support and motivate community and stakeholder involvement in land salinity actions • Facilitate bast practice training in land salinity management through community training programs such as Property Planning and Heavenly Hectares through the integrated regional education and training program • Develop a landholder information service on sustainable land management • Develop and implement an integrated regional information system to enhance planning, implementation, monitoring and evaluation	• Development of a sustainable land management tool to assist in the establishment of sustainable farming practises within the first twelve months of the project. • Train 60 landholders and land managers in the use of the sustainable land management tools by the second year of the project. • Provision of incentives to landholders to undertake on-ground works in the second year of the project.
Regional soil health program developed with implementation of identifies remedial actions in identified priority areas by 2009	• Develop and implement programs for priority areas for water erosion control, water logging remediation and management of acid sulphate soils risk, including implementing industry best practice guidelines	• Development of a sustainable land management tool to assist in the establishment of sustainable farming practises within the first twelve months of the project

Land Management Targets	Land Management Actions	Project Outcomes
30 % increase in land managers, planners and community participation in soil condition education, mitigation and remediation activities by 2009	• Facilitate, support and motivate community groups • Develop and implement a training and support program for best management practises relating to soil condition and remediation • Facilitate the implementation of Acid Sulphate soils management protocols, guidelines and training • Continue and expand community-training programs such as Property Planning and Heavenly Hectares through the integrated community education and training program • Rural and semi-rural landholders to have access to market based instruments/incentives for sustainable land management by 2007	• Development of a sustainable land management tool to assist in the establishment of sustainable farming practises within the first twelve months of the project. • Train land managers and planners in the use of the sustainable land management tools by the second year of the project. • Provision of incentives to landholders to undertake on-ground works in the second year of the project.

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24.12 Risk Factors

Internal risks;

- Unable to find appropriate consultant
- Key staff resign with project knowledge, eg not documented.

External risks;

- Withdrawal of partners
- Lack of support from community
- Lack of support from landholders
- Funding not approved

24.13 Scope for Project Expansion or Contraction

Geographical scope, the number of management actions incorporated in the project, range of assets addressed, financial, human resources, period of time allowed for the project.
This decision tool has the capacity to be expanded to identify other NRM and farm productivity issues and can used in other regions.

24.14 COST

First Six Months (to June 30th 2005): NA

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Consultancy			$30,000	100%	$30,000
Project Management	0.2 FTE	$8600/yr	$8600	100%	$8600
GIS support			$7500	100%	$7500
Workshops/Field Days	3	$3000/ workshop	$9000	100%	$9000
Communications	News Letters Printing distributio n	$10,000	$10,000	100%	$10,000
TOTAL					**$65,100**

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Consultancy			$1,800	100%	$1,800
Project Management	.2 fte	$8,600pa	$8,600	100%	$8,600
Workshops/field days	10	$1550 per workshop	$15500	100%	$15,500
Perennial plants		$8,000	$8,000	100%	$8,000
Survey/Earthworks		$24,100	$24,100	100%	$26,000
Communications		$5000	$5000	100%	$5,000
TOTAL					**$64,900**

24.15 Estimated Total Investment Influenced by the Project

Salinity has the potential to affect up to 30% of the state. Significant amount of this problem impacts directly on farm land thus the long term economic sustainability of affected farm land. A significant proportion of Ellen-Brockman Catchment is under threat from salinity.

24.16 Cost Effectiveness

The decision tool will affectively give landholders, managers and NRM Officers the ability to quickly and efficiently identify problem areas and provide the tools to implement remediation plans. The tool will be able to be used in other areas and regions.

24.17 Long term Strategy

24.18 Can the project's aims and methods be further developed?

The decision making tool can be changed/upgraded, as new and modified data is acquired to up date the decision making tool.

24.19 For how long will this kind of project be needed?

This decision making tool will be required as long as the salinity problem is an NRM threat.

24.20 Can the project become financially self-sustaining?

E.g. what plans are there to diversify funding sources?
Once the tool is operating the only costs will be to ensure the tool is up to date relevant and timely to NRM and the needs of land holders and managers.

24.21 Can the project become socially self-sustaining?

E.g. what actions are in place to extend active partnerships involved with the project?
Ellen-Brockman Integrated Catchment Group will work closely with partners to ensure the decision tool is constantly reviewed and updated so that landholders and managers can make informed decisions in consultation with these key partners.

25. PROJECT SP05: LINKING BEST MANAGEMENT PRACTICES WITH PROPERTY PLANNING

25.1 Summary

The Vegetable Growers Association has access to substantial industry funds collected through a levy. There is an opportunity for the Catchment Council to invest in a program that adds value to a current industry funded project that has as its main aim a greater water use efficiency in the vegetable industry through best management irrigation.

Auditors are employed to work with the top 20% of vegetable growers to implement water use efficiency measures. Investment through the Council could broaden the scope of the industry project to: -

- Compile the range of best management practice measures applicable to the vegetable industry;
- Prepare property management plans with key landholders identified through the industry program;
- Establish best practice farms in conjunction with an extension/eduction program;

The project could be further developed to implement best management property plans through a joint landholder/NHT incentive program.

The framework established for this intensive agriculture sector could be evaluated for adoption in the other irrigated agriculture sector (fruit, nuts, grapes, turf etc.)

25.2 Why is this a Priority Project?

Intensive horticulture is extensive in the Swan Region, and it is potentially a large contributor to falling groundwater levels and to ground and surface water contamination. There is an urgent need to identify best practice in partnership with the industry associations, and to assist the industry to adopt the guidelines. The information and techniques can be adopted for all intensive agriculture sectors.

25.3 Past Achievements

N/A New project

25.4 Incorporation of NHT Principles

(1) Generates the greatest public benefits per dollar of public investment.	Groundwater is a public asset, and this project will protect groundwater levels and wetlands. Groundwater and stormwater contamination affect wetland and river systems
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	This project is strategic in that it will develop BMP's in partnership with the industry, which wioll encourage adoption. All wetlands and river systems in the Swan are threatened with water pollution issues, many of which are caused by intensive horticulture
(3) Investment should not exceed the public benefits that result.	All assets to be protected are public assets
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	The project aims to move to rapid adoption of the BMP's

(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Assets are public, however investment is targeting industry development
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Intensive horticulture is concentrated on the periphery of the urban region
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	Feedback from the industry will be sought at all levels and at all points of the project
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	There is no detailed information on the contribution of intensive horticulture to water quality issues, however anecdotal evidence indicates a problem

25.5 Work Program

The project will begin in August 2005, with the following milestones:

- Compile the range of best management practice measures applicable to the vegetable industry; (August – Feb 2005)
- Prepare property management plans with key landholders identified through the industry program; (Feb – July 2006)
- Establish best practice farms in conjunction with an extension/eduction program; (Feb – July 2006)

25.6 How the project has been designed and developed

The project has been developed in close consultation with David Ellement, who is the Industry development officer for the Vegetable Growers Association.

The Vegetable Growers Association has access to substantial industry funds collected through a levy. There is an opportunity for the Catchment Council to invest in a program that adds value to a current industry funded project that has as its main aim a greater water use efficiency in the vegetable industry through best management irrigation. This project will expand the Vegetable Growers project to look at BMP's for the industry.

25.7 Partners

The North Metro and SERCUL catchment groups will provide substantial support to this project, as will the Vegetable Growers Association. The Swan Catchment Council will provide coordination through the Sustainable Production Program Manager.

25.8 Management Structure

Coordination will be provided by the Swan Catchment Council Sustainable Production Program Manager, and a Steering Committee will comprise the Vegetable Growers Association, key industry representatives, the swan catchment Council and the catchment groups.

25.9 Outputs and Timelines

The project will begin in August 2005, with the following milestones:

- Compile the range of best management practice measures applicable to the vegetable industry; (August – Feb 2005)

- Outputs: Best management practices produced
- Prepare property management plans with key landholders identified through the industry program; (Feb – July 2006)
- Outputs: Property plans developed
- Establish best practice farms in conjunction with an extension/eduction program; (Feb – July 2006)
- Outputs: Best management farms established

25.10 Milestones

See above

25.11 Expected Outcomes for Natural Resource Condition

- Reduced groundwater usage leading to better wetland water levels
- Improved surface and groundwater quality due to lower export of contaminants from intensive horticulture activities

25.12 Risk Factors

Application is being made in year three for a devolved grants scheme to assist the uptake of the BMP's. If this is not successful, uptake may be slower

25.13 Scope for Project Expansion or Contraction

The project can be expanded through a devolved grants scheme as described above. There is also potential to look at the full range of intensive agriculture.industries

25.14 COST

Show the total inputs to the project (both NHT2 and Non-NHT2), and the funds sought from NHT2.

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
FTE	1	$100,000	$150,000	65%	$100,000
Production of BMP's	1	$ 20,000		100%	$ 20,000
TOTAL		$120,000			$120,000

25.15 Estimated Total Investment Influenced by the Project

The vegetable growers and State government are investing $900,000 in the development of waterwise guidelines for the industry. This project adds value to this investment by producing information on other BMP's to be used with the target audience

25.16 Cost Effectiveness

This project uses the industry itself to promote the BMP's to its stakeholders, to increase uptake.

25.17 Long Term Strategy

Adaptive management will be used through the project to refine outcomes and methods. Additional funds will be sought to assist with grants to encourage uptake

25.18 For how long will this kind of project be needed?

This project should be taken up by the industry sectors and become self-sustaining within three years

25.19 Can the project become financially self-sustaining?

See above

25.20 Can the project become socially self-sustaining?

See above

26. SUSTAINABLE PRODUCTION IMPLEMENTATION FRAMEWORK

26.1 Summary

Provide a brief summary of the project. What assets and threats does it address, by what means, and in what locations. What are the expected results?
This project provides the framework for coordination and delivery of the Sustainable Production Regional Delivery Program. The broad outcomes of the project are:

- Support implementation of the projects within the Sustainable Production Program
- Develop partnerships with key stakeholders to develop and implement Sustainable Production projects
- Coordinate activities within the Sustainable Production Program to maximise efficiency and outcomes
- Implement monitoring and evaluation programs

The framework consists of a:

- Sustainable Production Program Manager: The role of this position is to ensure that the MAT's within the Sustainable Production Delivery Program are being met within given timeframes, to coordinate the delivery of the program across the Swan Region, to provide support and training to sub-regional staff within their program, to form partnerships at a strategic level to implement projects and to coordinate the monitoring and evaluation of the program.
- Part-time Communications Officer: The Communications Officer will assist with organising of events related to the program, coordinate a communications plan for the program and produce displays and information required within the program
- Part-time Local Government Officer: This position will ensure Local Government involvement in Sustainable Production projects, assist them to reach Sustainable Production goals for their area and assist them to partner with other stakeholders such as State Government and community:
- Indigenous Officer: The Indigenous Officer will ensure that indigenous issues are considered within the delivery program, that indigenous people are involved in the decision making processes and engaged where possible in the delivery of projects.
- Sub-regional Officers: There is a Sub-regional Coordinator in each of the five regions of the Swan. A portion of their time will be committed to setting the priorities for Sustainable Production within their sub-region in partnership with the Program Manager, developing partnerships within the Sub-region and supporting and coordinating the activities of the Sub-regional Sustainable Production Officers. There are 4.5 Sub-regional Sustainable Production Officers, 1 in the north, 1 in the north-east, 1 in the east and 1.5 in the south. The role of these officers is to support the delivery of Sustainable Production Projects in their region, develop partnerships with Local Government, community and other stakeholders to develop and implement Sustainable Production projects and to carry out monitoring and evaluation of projects within their region

26.2 Why this is a Priority Project

The Swan Region has a population of over 1.4 million people, and it is the pressures which they place on environmental assets which is the major threat to NRM. Behaviour change at at a State Government, Local Government, industry and community level is essential if we are to protect our natural resources. The Sustainable Production Program encompasses light industry and intensive and broadacre agriculture.

Partnership development is also essential to effective NRM in this region, and coordination of the large number of stakeholders involved in working with the environment in some way. The investment in the Sustainable Production Framework reflects this requirement for initiating behaviour change, coordinating effort and developing partnerships.

The project meets the MAT's in the Swan Region Strategy in the following way:

Assets addressed
Land, Water, Aquatic Biodiversity, Coastal and Marine, Air

Threats addressed
Chemical and pesticide contamination, development and/or change in land use, nutrient export and enrichment, drainage modification, industrial discharge, groundwater and surface contamination, water abstraction, stormwater discharge, agricultural management practices, inadequate industry involvement in N

Relationship to Implementation of Strategy

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Land salinity	LR1 Reduction in the area of land affected by salinity, within the Avon Upper Swan NAP Region by 2020	LM 1.3 LM1.4	LM1.1 LM 1.2
Soil Condition	LR2 Maintain and improve soil condition, as measured at representative sites, including extent of water erosion, waterlogging and acid sulphate soils by 2020	LM2.1 LM2.3 LM2.4 LM2.5	LM2.2
Inland aquatic ecosystems integrity	WR1 Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for major rivers and waterways in the Region set by 2005)	WM1.4 WM1.5	WM1.2 WM 1.3
Estuarine, coastal and marine habitats integrity	WR2 Maintain and improve condition of inland aquatic ecosystem integrity, as measured at representative sites, by 2020 (with quantified targets for priority wetlands in the Region set by 2005) CMR2 maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020	WM2.3 WM2.4 WM2.5 CMM2.3 CMM2.4 CMM2.5 CMM2.6	WM2.1 WM2.2

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Nutrients in aquatic environments	WR3 Maximum concentrations, for priority waterways, do not exceed o.1mg/L for total P and 1.0mg/L for total N by 2020	WM3.1 WM3.2 WM3.3 WM3.4	
Turbidity/suspended particulate matter in aquatic environments	WR4 Maintain and improve condition of aquatic environments in the Region, as measured at representative sites by 2020	WM4.2 WM4.3 WM4.4	WM4.1
Surface water salinity in freshwater aquatic environments	Maintain and improve condition of surface waters in priority catchments in the Avon Upper Swan Region as measured at representative sites by 2020	WM5.3 WM5.4	WM5.1 WM5.2
	AR1 Continue to progress towards improved air quality, with RCT's to be set by 2005	AM1.2	

26.3 Past Achievements

N/A – a new project

26.4 Incorporation of NHT Principles

Describe how this project incorporates the NHT2 Investment Principles given in the table below.

(1) Generates the greatest public benefits per dollar of public investment.	Most assets in the Region are public assets, and this project aims to achieve large-scale behaviour change to protect assets
(2) Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Prioritisation of strategic actions will be assisted through this project
(3) Investment should not exceed the public benefits that result.	Investment in this project is to protect public assets
(4) Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	The prioritisation process will be assisted by this project
(5) Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Investment in industry development will be an aim for all sectors
(6) Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Investment in the Sub-regions has been unequal and priotised according to light industry and agricultural threats
(7) The processes required for setting priorities will involve ongoing learning and need constant feedback.	Monitoring and evaluation of program delivery is a key component of this project
(8) Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	The prioritisation process will be undertaken on an annual basis, and adaptive management used to incorporate new information and learnings

26.5 Work Program

Milestone	Timeline
Sub-regional planning completed to June 06	March 05
Implementation of projects, partnership development	March 05-June 06
Monitoring and evaluation of projects	Ongoing
Evaluation of Sustainable Production Program	April-Jun 06

26.6 How the project has been designed and developed

The Program Delivery Structure is an outcome of the development of the Swan Region NRM Strategy. The Sub-regional structure for implementation of the Strategy has been developed through a community consultative process of mapping the catchments of the Swan Region over the last two years

26.7 Partners

Key partners in this project include State and Local Government and Industry. Each Sub-region has a centre for operation except for Coast and Marine. These centres and their operating costs are supported through contributions from Local Governments, State Government and industry (eg Tiwest and Chevron Texaco).

This project also leverages investment into Sustainable Production in many ways, for example, CSBP and the Nursery Industry Association have invested funds into industry information sheets, Local Governments such as Bayswater are investing in auditing programs of their industrial areas and the Waste Management Board has provided funding for a waste management project in Bellevue.

26.8 Management Structure

The Sustainable Production Program Manager is responsible for the overall coordination of this project. Sub-regional investments are managed through community committees, with a Sub-regional Coordinator and Sustainable Production Officers in each Sub-region.

26.9 Outputs and Timelines

Outputs achieved through this project may be reported through other projects which have been supported through the framework. Specific outputs reported through this project will cover a wide range of outputs and cannot be finalised until Sub-regional planning is complete.

26.10 Milestones

See above

26.11 Expected Outcomes for Natural Resource Condition

The Sustainable Production projects implemented through the Sustainable Production Program will be successful and will have strong partnerships in place. Monitoring and evaluation will be used as the basis for adaptive management to further enhance the outcomes of Sustainable Production projects

26.12 Risk Factors

Describe both "internal" risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and "external risks" (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).
The employment of suitable staff is a potential risk. The short-term nature of contracts for positions makes it difficult to employ suitably experienced staff.
Another risk to the project is the considerable coordination required across multiple stakeholders. Success of the project depends on obtaining the trust and goodwill of a large range of players.

26.13 Scope for Project Expansion or Contraction

Geographical scope, the number of management actions incorporated in the project, range of assets addressed, financial, human resources, period of time allowed for the project.
The project does not need to be expanded, as the scope of the project has been set through extensive consultation. Conversely, if the project were to contract the Sustainable Production Program Delivery could not be fully implemented.

26.14 Cost

Financial Year 2004-05

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	4.5		$413,000	91%	$368,000

3.2 Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	4		$413,000	91%	$368,000

26.15 Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	4		$413000	91%	$368000

26.16 Estimated Total Investment Influenced by the Project

- Local Government: $100,000
- Waste Management Board: $120,000
- Industry: $ 30,000
- Total $250,000

26.17 Cost Effectiveness

The staff within the project will leverage NRM investment from partnerships, as well ensuring that all NHT funded projects are successful in implementing MAT's

26.18 Long Term Strategy

Adaptive management will be used to develop the aims and objectives of the project on a regular basis

26.19 For how long will this kind of project be needed?

This project will be ongoing for the duration of implementation of the strategy, however the total project cost may change over time as aims and objectives are refined.

26.20 Can the project become financially self-sustaining?

It is unlikely that the project can become self-sustaining in the short term, however industry stakeholders are expected to move towards sustainable practice in the long term

26.21 Can the project become socially self-sustaining?

E.g. what actions are in place to extend active partnerships involved with the project?
As partnerships are established, there will be less requirement for partnership initiation, and over time less need for partnership support. The aim is to build the capacity of partners so that best management practice becomes self-sustaining

COASTAL & MARINE REGIONAL DELIVERY PROGRAM

27. PROJECT CM01: ECOLOGICAL ASSESSMENT AND MANAGEMENT OF COASTAL NATURAL AREAS IN THE SWAN REGION (STAGE 1 & STAGE 2)

27.1 Summary

The project aims to evaluate and identify priority coastal areas in the Swan Region for management by:

- Undertake desktop assessment of coastal natural areas using natural area initial assessment desktop template to identify extent of coastal natural areas, tenure, agency responsible for management
- Apply the natural area initial assessment field and summary templates to coastal natural areas to identify the ecological values and management requirements of these areas.
- Integration of information collected from natural area initial assessment templates into a regional database (database is currently being developed by the Perth Biodiversity Project)
- Utilise the Perth Biodiversity Project database to prepare maps, summary statistics and a report highlighting the ecological values, management needs and priorities for action of all natural areas surveyed.
- Distribute funds to undertake management actions within priority coastal natural areas

27.2 Why is this a Priority Project?

STRATEGY
CMR1 – CMM1.1
Maintain and improve terrestrial coastal habitats condition.
INVESTMENT PLAN
The *Swan Region Strategy for Natural Resource Management: Investment Plan* recognises that
"Consistent with the emphasis on improving management information, planned expenditure is higher in the first two years, though it is to be expected that s knowledge improves, more proposals for "on-ground" actions will be forth coming."
The gap analysis showed that integration of existing data is needed and that there was not an adequate regional system of management.

27.3 Incorporation of NHT Principles

Describe how this project incorporates the NHT2 Investment Principles given in the table below.

1. Generates the greatest public benefits per dollar of public investment.	Allows for accountability that future investment is having a benefit by establishing a consistent baseline.
2. Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Strategic value as it establishes the baseline and decision support tools for effective management.
3. Investment should not exceed the public benefits that result.	
4. Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	
5. Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	
6. Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	
7. The processes required for setting priorities will involve ongoing learning and need constant feedback.	On-going assessment against the baseline is needed to measure change over time.
8. Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	

27.4 Work Program

PHASE 1 – Stage 1
Undertake desktop assessment of coastal natural areas

- complete natural area initial assessment templates for coastal areas
- Identify owners and managers of natural areas and contact them seeking permission to undertake field assessments
- Training of coastal officer in the use of information from the Perth Region Plant Biodiversity (reference plot and reference plot information)

PHASE 2
Field assessment of coastal natural areas

- Visit reference sites and reference plots to provide benchmark for ecological assessment of coastal natural areas
- Undertake natural area initial assessment field and summary templates on coastal natural areas

PHASE 3
Compile information on coastal natural areas and identify management priorities

- Input information collected into natural area initial assessment database
- Generate summaries of ecological values, management requirements for each coastal natural areas (threat abatement plans)
- Determine priority coastal natural areas and management actions

PHASE 4 - Stage 2
Develop a program for funding management actions for priority coastal natural areas

- Negotiate involvement of management agency and facilitate appropriate sharing of responsibility and cost for implementing appropriate management actions.
- Identify, skills and possible delivery of training to land managers to implement appropriate actions
- Deliver funding to assist in implementing priority management actions
- Where possible engage community in delivery of management actions

PHASE 5
Implementation of management actions

27.5 How the project has been designed and developed

This project has been developed in collaboration with and technical expertise from the following people:

Erica Higginson – Coastal & Marine Coordinator SCC
Brett dal Pozzo – Northern Metropolitan Coastcare Officer
Kristel Wenziker – Southern Metropolitan Coastcare Officer
Ryan Taylor - Perth Biodiversity Project

27.6 Partners

List all partners who contribute in cash or kind. What other activities are *directly* linked to this project in an operational sense?
Stakeholders

- Perth Biodiversity Project
- Local Governments
    - City of Wanneroo
    - City of Joondalup
    - City of Stirling
    - Town of Cambridge
    - City of Nedlands
    - Town of Cottesloe
    - Town of Mosman Park
    - Town of East Fremantle
    - City of Fremantle
    - City of Cockburn
        - Town of Kwinana

Organisations that may hold relevant information

- Coastal Local Governments
- Department for Planning and Infrastructure – Bush Forever
- Department of Environment
- Perth Biodiversity Project
- Department of Conservation and Land Management
- Wildflower Society
- Universities
- Coastcare groups

Note: Negotiations still need to be undertaken and partnerships formalised

27.7 Management Structure

- Project coordination Coastal and Marine Facilitator Swan Region and the Manager Perth Biodiversity Project
- Work undertaken by a project officer to based in Local Government or the WALGA (still needs to be negotiated)

27.8 Outputs and Timelines

Stage 1
Phase 1: June 05 – August 05
Phase 2: August 05 – December 05
Phase 3: January 06 – March 06
Stage 2
Phase 4: April 06 – June 06
Phase 5: June 06 – June 07

27.9 Milestones

- Target 1: Completion of natural area initial desktop assessment templates for all coastal natural areas.
- Target 2: Completion of natural area initial field assessment templates for all coastal natural areas.
- Target 3: Collation and integration of natural area initial assessment template information into database.
- Target 4: Generate summaries of ecological values and management requirements for each coastal natural area and distribute this information to the land managers and community.
- Target 5: Allocate funding to undertake management in highest priority costal natural areas.
- Target 6: Undertake management actions in highest priority coastal natural areas.

27.10 Expected Outcomes for Natural Resource Condition

The project will establish consistent information about the ecological values and management requirements of coastal natural areas. This information will contribute to a regional database of natural areas within the Swan Region. This information will be then used to engage the land managers in undertaking appropriate management actions in the highest priority coastal natural areas.

27.11 Risk Factors

Describe both “internal” risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and “external risks” (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).

- Cooperation of the coastal Local Governments: this is considered a low risk due to the relationship of the two Metropolitan Coastcare officers and Perth Biodiversity Project with the relevant Local Governments.
- Timing of survey work for identification of species.
- Inability to access land across all tenure types. Access to natural areas that exist on private land or other Government lands may not be able to be negotiated (eg Defence Department land).

27.12 Scope for Project Expansion or Contraction

Geographical scope, the number of management actions incorporated in the project, range of assets addressed, financial, human resources, period of time allowed for the project.

27.13 COST

Show the total inputs to the project (both NHT2 and Non-NHT2), and the funds sought from NHT2.

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Employment of officer (level 4 State Government)	12	$5,000 month		100	$60,000
Lease of 4 Wheel Drive vehicle	12	$1,100 month		100	$13,200
Fuel for 4 Wheel Drive vehicle	12	$400 month		100	$4,800
Training provided by Project ecologist (PBP) on use of information from Perth Region Plant Biodiversity Project	1	$1040 week	$1040 (money from PBP proposal)	0	0
Training in the use of the natural area initial assessment templates and database (PBP technical officer and Biodiversity Coordinator)	2	$1040 week	$2080 (money from PBP proposal)	0	0
GPS unit	1	$800		100	$800
GIS software	1	$2,000		100	$2,000
Aerial Photography mosaic	1	$1000		100	$1,000
Computer	1	$1500		100	$1,500
Office operating (rent, telephone, photocopying, mail etc)	1.5	$15,000 year		100	$16,000
Herbarium vouchering / Licensing					$700
Implementation of management actions*	1	20,000	20,000	50	20,000*
Total					**$120,000**

* Subject to Swan Region 125% funding of Investment Plan

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Employment of officer (level 4 State Government)	6 mths	$5,000 month		100	$30,000
Lease of 4 Wheel Drive vehicle	6 mths	$1,100 month		100	$6,600
Fuel for 4 Wheel Drive vehicle	6 mths	$400 month		100	$2,400
Office operation (rent, telephone, photocopying, mail etc)	6 mths	$15,000 per year		100	$7,500
Implementation of management actions	6 mths	33,500	33,500	50	33,500
Total					**$80000***

* Subject to Swan Region 125% funding of Investment Plan

27.14 Estimated Total Investment Influenced by the Project

Funding provided to assist with implementation of management actions would require matching funds from the agency responsible for the management of priority coastal natural areas. Additionally the in-kind support of the managers of coastal natural areas will be negotiated.

27.15 Cost Effectiveness

The project undertakes the necessary desktop and field assessments of all coastal natural areas to identify the highest priority costal natural areas and their management requirements. The project provides a strategic framework for investment in the ongoing management of priority coastal natural areas within the Swan Region.

27.16 Long Term Strategy

The project aims to utilise the Perth Biodiversity Project natural area initial assessment templates which have been developed and used successfully in more than 250 natural areas occurring within Local Government managed lands.

27.17 For how long will this kind of project be needed?

This project provides the framework for ongoing management of priority costal natural areas. Ongoing support will be required to implement the management actions identified in the threat abatement plans.

27.18 Can the project become financially self-sustaining?

See above.

27.19 Can the project become socially self-sustaining?

Work through this project and the Coastal Targets project will aim to having on-going monitoring of the coastal vegetation asset by the land manager with the assistance of the Coastal and Marine Facilitator and the Coastcare officers of the Swan Catchment Council.

28. PROJECT CM03: MARINE FAUNA MAPPING

Long Title: ***Identifying Key Indicators: develop and implement a scientific methodology to identify key indicator species for the protection and conservation of viable populations of marine fauna.***

28.1 Summary

This project will identify sensitive or vulnerable species that are critical to, or indicators of the status of key marine ecosystem components or processes within the marine environment of the Swan Region.

A systematically review using gap analysis, workshops and conceptual modelling will be undertaken. The gap analysis is likely to indicate that information is missing and a field component is proposed to provide essential information on marine biota and physical parameters in the environment.

Following the review, selected taxa will be identified to represent the range of marine taxa within the Region. The selected taxa will take into account their sensitivity to potential effects of human activities eg species at the top of the food web and filter feeders which bio-accumulate toxins.

After the initial phase of the project sampling design, data collection methods will be developed and tested to ensure robustness of methodologies. Sampling will include a seasonal component in order to ensure an evaluation of natural variability.

A monitoring program will be developed and implemented to provide the baseline data (duration subject to funding). A further outcome of the project will be an analysis of the sampling to refine the initial methods and sampling design to provide the best possible basis for establishing a long-term indicatory program.

The project is essential to establishing the base-line data and links between the key indicator species, which will be monitored over time, and the threats to biodiversity in the marine component of the Swan Region. The initial phases of the project will identify if other decision support tools should be developed. It will be impossible to know if the on-ground actions put in place as part of the Swan Regional Strategy are effective or even appropriate to address the threats and any loss of biodiversity in the marine system without this program being put in place.

28.2 Why this is a Priority Project

- STRATEGY RCT3: Maintain and improve the condition of marine fauna in the Region, as measured at representative sites, by 2020 (with a quantified target for key indicator species set by 2005).
- STRATEGY MAT Category: CMM3.1 Determine key indicator species to protect and conserve viable populations of marine fauna by 2006.
- INVESTMENT PLAN: The project is essential to establish if other actions taken under the Swan Region Strategy and Investment Plan are having a positive impact on the marine environment. Without the ability to link environmental change with pressure threats it is difficult for resources to be directed to the appropriate areas.

The *Swan Region Strategy for Natural Resource Management: Investment Plan* recognises that

"on –ground" actions form a smaller part of the total budget than in other Programs, largely because of the pressing need to establish better management information."

In line with the Investment Plan expenditure in the first part of the project is on collating information and undertaking work on identified gaps. Stage 2 allows for the implementation of the Monitoring Plan established in Stage 1.
With knowledge gaps in the physically and biological knowledge and links been threats and these attributes, this project is required to establish a project that can clearly indicated scientific justification of the Monitoring Framework.

28.3 Incorporation of NHT Principles

Describe how this project incorporates the NHT2 Investment Principles given in the table below.

1. Generates the greatest public benefits per dollar of public investment.	The project will lead to clear accountability that future investment is directed to the appropriate threats to the marine environment. The vast majority of the WA population is concentrated in the Swan Catchment's coastal area and marine activities form a very important part of their lives. Given the number of people who stand to benefit directly from the proposed work it should generate a high level of cost: benefit.
2. Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	The project provides strategic value as it establishes the baseline and decision support tools for effective management. The project will focus on providing an understanding of species and groups likely to be affected, develop methods for tracking their status, and an overall sampling design that will allow trends to be confidently tracked into the future.
3. Investment should not exceed the public benefits that result.	Commercial and recreational marine activities in the Swan Region generate an immense level of investment, and the ecosystem services provided by this environment, ranging from recreation to waste disposal, are also considerable. The level of investment requested in this project is modest in relation to the value of the resource and to other investments in it.
4. Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	Protecting the marine environment is a high priority and there is little doubt that if the quality of this environment faced serious threat there would be strong public support for direct measures to protect this asset. However the marine environment is not an easy one to monitor since it cannot be casually observed on a day to day basis, as can many

	terrestrial environments. Consequently management of the marine environment requires specific, targeted methodologies in order to quantify and understand environmental trends. This project will supply these methodologies and begin systematic implementation.
5. Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	N/A
6. Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Targeting the resource requested by the project in the marine area will redress a potential imbalance within the region between terrestrial and marine investments.
7. The processes required for setting priorities will involve ongoing learning and need constant feedback.	The project will set initial priorities through scientific, academic and consultative processes. The ongoing project will provide data and direct observations that will enable ongoing learning and feedback into the decision making process in the future. Decision support tools such as key indicator species will need to continue to be refined as more information on the marine ecosystem is gain and use of the Monitoring Plan highlights the need for modifications.
8. Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	Research priorities in the project will be set based on the best available knowledge and inference. While this knowledge is not perfect the precautionary principle will be applied to the areas with greatest perceived risk.

28.4 Work Program

Phase 1

Component A

1. **Review of information** for the Swan Region to address:
condition/values
pressures
(a desktop collation of information to inform the process and build on SCC Coastal & Marine research database (Westera 2004) and existing maps (Swan Region Coastal & Marine Wildlife Mapping Report, CALM 2004) or census lists.

Output 1: Briefing document on the above work to inform stage 2 and 3 – workshops

2. **Workshop # 1 Researchers and scientists to produce definition/detail of conditions/values** (Secondary information either in the form of statements/maps)

Output 2 – Report Workshop # 1

3. **Workshop # 2 Researchers and scientists to identify pressures (in space and time)**

Output 3 - Report Workshop # 2

4. **Proposed approach – how to develop indicator species**

Output 4 – Indicator Assessment Report (assessment of previously used approaches/ models relevant to the Swan Region based on the above identified characteristics).

5. **Identification of Parameters** (eg at levels of species, population, gene pools) to represent a range of intrinsic ecosystem/species values that may be sensitive to the Pressures (using review of local and overseas literature)

Output 5 – Methodology Report on the identity and measurement protocols for the key parameters, taking account of natural dynamics and sensitivity to pressures, etc.

6. **Feasibility Analysis -** what can be realistically achieved for the region? Using likely resources available, and collaboration with agency and research partners, prepare a detailed design – including level of effort allocated to each parameter – for ongoing monitoring. Identify any specific enabling research project that may be required.

Output 6 – Monitoring Design and Implementation Plan

Phase 2 – Implementation of outcomes from Phase 1, Point 6

Component B

Establish Researcher/Scientist Project Subgroup to assist with point 2.
Gap analysis to identify groups of taxa for which limited information

- Develop survey program to research information gap
- Employ researcher team to conduct surveys

1. **Research project to identify and refine appropriate tools and techniques for monitoring indicator species** identified in Phase 1, particularly assessing capacity to detect ecologically meaningful change and management sensitivity in each parameter.
2. **Commence monitoring program.**

This work should:

- be adaptive requiring ongoing evaluation of selected indicators
- determine natural variability of indicator status
- incorporate outcomes of other initiatives eg

  - The 'Users' Guide for Estuarine, Coastal and Marine Indicators for Regional NRM Monitoring' provides a comprehensive set of indicators related to estuarine, coastal and marine issues. This report is the product of a project undertaken for the national Monitoring and Evaluation Working Group (established by the Natural Resource Management Ministerial Council in 2001) and Intergovernmental Coastal Advisory Group through the Australian Government Department of Environment and Heritage.

  - Monitoring and Evaluation Framework for Swan – Canning (DoE) (which is to include identifying resource condition indicators and information gaps (plus address marine pests) for coastal and marine environs and to establish whether the M& E proposed will address those pressures/changes to natural resources which are a direct influence of human activities).
- include consideration of work to monitor pressures conducted by the Swan River Trust, Dept. of Fisheries, Dept. for Planning and Infrastructure and Dept. or Environment)
- be conducted in conjunction with other related projects submitted through other funding rounds or proposed for the region namely: NHT Regional Competitive Component Proposal "*Cross-regional subtidal marine biodiversity and habitats: linking baseline data collection with habitat mapping in a hierarchical spatial framework."*

28.5 How the project has been designed and developed

This project has been developed in collaboration with and technical expertise from the following people:

Erica Higginson – Coastal & Marine Coordinator SCC
Suzanne Gattrell – State Strategic Marine Facilitator, WWF - Australia
Dr Russ Babcock – CSIRO, Marine Research
Dr Jane Fromont - Curator of Marine Invertebrates, Western Australian Museum
Dr Jessica Meeuwig – Oceans Liaison Officer, National Oceans Office
Dr Trevor Ward - Greenward Consulting, Marine Ecosystems and Biodiversity
Dr Helen Astill – Aquatic Sciences Branch, DOE
Dr Malcolm Robb - Aquatic Sciences Branch, DOE
Karen Wheeler – Marine Conservation Officer, CALM
Harriet Davie – Senior Environmental Officer, Rottnest Island Authority
Dr Mark Westera – Marine Ecologist, affiliated with Edith Cowan University; Dept of Environment, CSIRO and University of WA.
Paul Gamblin – Oceans & Coasts Program, WWF - Australia

The following points were raised with regard to the development and implementation of this project:

- This project directly addresses CMR - RCT3 and MAT CMM 3.1 however effort should be made wherever possible to address aspects of other MATs under RCT 3 and also CMR - RCT 2 (habitat and fauna issues should not be seen in isolation but rather a broader ecosystem based approach considered).
- Project design should be as tightly developed as possible and guided by a technical steering committee of independent experts.
- Selection of project proponents requires careful assessment in terms of ability to deliver on outcomes and meet milestones/deadlines.

References:

Trevor J. Ward (2002) **Indicators for assessing the sustainability of Australia's marine ecosystems** CSIRO Marine Research, PO Box 20, North Beach, WA6020, Australia.

Parrish, J. D., D. Braun, and R. Unnasch. *In press*. **Are we conserving what we say we are? Measuring ecological integrity in evaluations of protected area management effectiveness.** Bioscience.

Royal Commission on Environmental Pollution (2004) **Turning the Tide - Addressing the Impact Of Fisheries On The Marine Environment TSO Shops – Twenty fifth Report** 123 Kingsway, London, WC2B 6PQ http://www.rcep.org.uk/fishreport.htm

28.6 Partners

List all partners who contribute in cash or kind. What other activities are *directly* linked to this project in an operational sense?

Stakeholders

- Department of Conservation and Land Management
- Department for Planning and Infrastructure
- Department of Fisheries
- Department of Environment
- Rottnest Island Authority
- Community

- Museum of Western Australia
- Industry

28.7 Management Structure

- A project coordinator
- Technical steering/advisory committee to guide and advise project (comprised of suitably technically capable members who are independent of the work programs, supported by an allocation of budget to fund membership and operations).
- Survey work to be conducted by research organisations such as Universities, CSIRO, Museum WA, and Australian Institute of Marine Science.
- Facilitators to assist capture expert knowledge and guide community involvement.

28.8 Outputs and Timelines

Phase 1: Component A - Review of information on the Swan Region considering condition/values and pressures. Gap analysis and survey program to address identified gaps.

Output 1: Briefing document on the condition/values and pressures to inform stages 2 & 3 of the project.
Output 2: Report from Workshop 1
Output 3: Report from workshop 2.
Output 4: Indicator Assessment Report
Output 5: Methodology Report
Output 6: Monitoring Report

Phase 1: Component B – Survey Program

Output 1: Research program brief
Output 2: Employment of research team
Output 3: Research results published and distributed

Timelines

1. Phase 1: Component A 3-4 months: milestones as above
2. Phase 1: Component B
3. Phase 2: 8-24 months (3 year subject to funding): milestones to be determined in Phase 1.

28.9 Expected Outcomes for Natural Resource Condition

Defendable process based on national and international best practice, for choosing marine assessment indicators.
Tracking of change in specific ecological parameters of relevance to the persistence and resilience of a small representative suite of faunal species in the region.
Conceptual linage of ecological changes to the better management practices of natural resources in the region.

28.10 Risk Factors

Describe both “internal” risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and “external risks” (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).
Staff need to be recruited: there could be a short time delay while quality proponent and their staff are selected/recruited.
Agencies capacity to participate may limit the scope of Phase 2.

28.11 Scope for Project Expansion or Contraction

Geographical scope, the number of management actions incorporated in the project, range of assets addressed, financial, human resources, period of time allowed for the project.
Expansion / Contraction – level of research undertaken on identified gaps.
Phase 1 of this project will have broad applicability to all the other WA NRM regions, and could be used as a precursor for critical components of their marine investment strategies. Phase 2 will be directly relevant to the temperate regions, and there may be important ecological reasons for these regions to implement compatible projects (such as if indicators range across serval regions). In order for it to be useful the life of Phase 2 needs to be extended into the future. Indicators need to be checked and measured regularly and consistently in order to fulfil their intended role.

28.12 Cost

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Research/Scientific Project Subgroup		5,000	400	50	5,000
Workshops/Reports		5,000		100	5,000
Consultant to assist with the: • Desktop collation of information and preparation of briefing papers • Gap analysis • Indicator assessment report	40 days	1000 per day			40,000
Researcher Team (PhD level scientist and research assistant)	8 months	25,000 per month	Time of C& M Facilitator Swan Region	100	200,000
Field work expense	8 months	5,000 per month		100	40,000
TOTAL					**$290,000**

Carry-over $30,000 carried over to year 2

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Field expenses	3 months	4,000 per month		100	12,000
Research team (Scientist and qualified assistant)	3 months	25,000 per month		100	75,000
Research/Scientific Project Subgroup		3000	3000	50	3000
					90,000
Subject to further funding					
Research team (scientists and qualified assistant)	8.5 months	20,000 per month			170,000
Field expenses	8.5 months	4000 per month			34,000
TOTAL					**$204,000**

28.13 Estimated Total Investment Influenced by the Project

Provides the baseline for future investment in monitoring of marine fauna as indicators of environment change in the marine environment.

28.14 Cost Effectiveness

Why is the project a cost-effective way of addressing the threat to asset value?
Without this project there is no practical way of knowing how the marine ecological assets are changing, and whether they are responding to management interventions, such as controls on coastal water quality, management of recreational fishing, or compliance with marine park regulations, etc are conserving viable populations of marine fauna. This project expects to take a defendable and achievable approach to identifying surrogates for ecosystem condition in the Swan Region, and put in place a monitoring program that will provide reliable ecological data and information to inform relevant agency programs of monitoring and evaluation.

28.15 Long term Strategy

The project can be broadened to be more specific for the other regions, particularly as a model for Phase 2 activities, which are the specifics of identifying parameters that are meaningful and measurable for assessing resource management implications in marine systems. However this would require a further allocation of resources (although not necessarily major, depending on which WA regions were involved).

28.16 For how long will this kind of project be needed?

The project described here is 2-year project (part of year subject to funding and a third year of monitoring should be undertaken to provide the baseline data). However it will establish the parameters for ongoing monitoring, which will need to be maintained indefinitely. Part of this project will involve working with the agencies to collaborate with their activities, and it is

desirable that, once established and proven through this project, the ongoing aspect of monitoring will be absorbed into the core business of the relevant agencies. As part of the Swan Region Strategy, funds from NHT will be needed to compliment the agencies funds to ensure that adequate resources for this aspect are made available.

28.17 Can the project become financially self-sustaining?

E.g. what plans are there to diversify funding sources?
Agencies might contribute resources collaboratively, but the core funds will not be able to be replaced from elsewhere. There is also only limited scope for agencies to undertake new responsibilities for on-going monitoring without financial support.

28.18 Can the project become socially self-sustaining?

Community and science engagement is expected to play an important role; including involvement of NGOs and possibly local government activities for public communication about the project and its on-ground activities. There is some capacity to contribute to raising community appreciation of the vulnerability of the marine environment and to raise awareness of the need to actively monitor marine resources in order to maintain them. This awareness and appreciation would be translated into support for agencies to be adequately resourced to implement necessary monitoring.
The need to establish the links with government agencies, scientific bodies and the community to undertake long-term monitoring. The Monitoring Framework will require fine-tuning over time as more information on the marine habitats and species are gain. Threats may also change thus requiring adaptation of the framework.

29. PROJECT CM10: COAST AND MARINE IMPLEMENTATION FRAMEWORK

29.1 Summary

This project provides the framework for coordination and delivery of the Coast and Marine Regional Delivery Program. The broad outcomes of the project are:

- Support implementation of the projects within the Coast and Marine Program
- Develop partnerships with key stakeholders to develop and implement Coast and Marine projects
- Coordinate activities within the Coast and Marine Program to maximise efficiency and outcomes
- Implement monitoring and evaluation programs

The framework consists of a:

- Coast and Marine Program Manager: The role of this position is to ensure that the MAT's within the Coast and Marine Delivery Program are being met within given timeframes, to coordinate the delivery of the program across the Swan Region, to provide support and training to sub-regional staff within their program, to form partnerships at a strategic level to implement projects and to coordinate the monitoring and evaluation of the program.
- Part-time Communications Officer: The Communications Officer will assist with organising of events related to the program, coordinate a communications plan for the program and produce displays and information required within the program
- Part-time Local Government Officer: This position will ensure Local Government involvement in Coast and Marine projects, assist them to reach Coast and Marine goals for their area and assist them to partner with other stakeholders such as State Government and community
- Indigenous Officer: The Indigenous Officer will ensure that indigenous issues are considered within the delivery program, that indigenous people are involved in the decision making processes and engaged where possible in the delivery of projects.
- Sub-regional Officers: There are 2 Sub-regional Coast and Marine Officers, 1 in the north and 1 in the south. The role of these officers is to support the delivery of Coast and Marine Projects in their region, develop partnerships with Local Government, community and other stakeholders to develop and implement Coast and Marine projects and to carry out monitoring and evaluation of projects within their region

29.2 Why this is a Priority Project

The Swan Region has a population of over 1.4 million people, and it is the pressures which they place on environmental assets which is the major threat to NRM. Behaviour change at at a State Government, Local Government, industry and community level is essential if we are to protect our natural resources. The Coast and Marine Program encompasses both coastal dune systems and marine issues 3km from the shore as well as many offshore islands. Partnership development is also essential to effective NRM in this region, and coordination of the large number of stakeholders involved in working with the environment in some way.

The investment in the Coast and Marine Framework reflects this requirement for initiating behaviour change, coordinating effort and developing partnerships.
The project meets the MAT's in the Swan Region Strategy in the following way:

29.3 Relationship to Implementation of Strategy

Assets addressed: Coastal and marine Biodiversity, Water quality
Threats addressed: Chemical and pesticide contamination, development and/or change in land use, groundwater and surface contamination, stormwater discharge, recreation, native vegetation clearing, exotic plants, feral animals, plant diseases, animal diseases, fragmentation of natural resources, erosion/sedimentation, introduced aquatic pests, habitat loss

Matter for Target	RCT	Primary MAT's	Secondary MAT's
Estuarine, coastal and marine habitats integrity	CMR1 maintain and improve the condition of terrestrial coastal habitats in the Region, as measured at representative sites by 2020	CMM1.1 CMM1.2 CMM1.3 CMM1.4 CMM1.5	
	CMR2 maintain and improve the condition of marine habitats in the Region, as measured at representative sites, by 2020	CMM2.1 CMM2.2 CMM2.3 CMM2.4 CMM2.5 CMM2.6	
	CMR3 maintain and improve the condition of marine fauna in the region, as measured at representative sites by 2020	CMM3.1 CMM3.2 CMM3.3 CMM3.4	

29.4 Budget

$284,000 per year for three years

29.5 Past Achievements

N/A – a new project

29.6 Incorporation of NHT Principles

1. Generates the greatest public benefits per dollar of public investment.	Most assets in the Region are public assets, and this project aims to achieve large-scale behaviour change to protect assets
2. Investment in actions should be strategic and should be focused on priority areas with high value and high probability of success.	Prioritisation of strategic actions will be assisted through this project
3. Investment should not exceed the public benefits that result.	Investment in this project is to protect public assets
4. Where the priority is high and net public benefits are sufficient, strong action should be taken to ensure protection of the asset.	The prioritisation process will be assisted by this project
5. Where the public priority is low but there are extensive private assets at risk, public investment should be aimed at industry development.	Assets are all public
6. Targeted investment in NRM will be likely to result in an unequal distribution of investment across the region.	Investment in the Sub-regions has been unequal and prioritised according to urgency
7. The processes required for setting priorities will involve ongoing learning and need constant feedback.	Monitoring and evaluation of program delivery is a key component of this project
8. Priorities need to be set even when there is only limited or imperfect information on prevailing environmental, social and economic circumstances.	The prioritisation process will be undertaken on an annual basis, and adaptive management used to incorporate new information and learnings

29.7

29.8 Work Program

Milestone	Timeline
Sub-regional planning completed to June 06	March 05
Implementation of projects, partnership development	March 05-June 06
Monitoring and evaluation of projects	Ongoing
Evaluation of Coast and Marine Program	April-Jun 06

29.9 How the project has been designed and developed

The Program Delivery Structure is an outcome of the development of the Swan Region NRM Strategy. The Sub-regional structure for implementation of the Strategy has been developed through a community consultative process of mapping the catchments of the Swan Region over the last two years

29.10 Partners

List all partners who contribute in cash or kind. What other activities are *directly* linked to this project in an operational sense?
Key partners in this project include State and Local Government and Industry. The coast and marine officers sit within local Government, and operating costs are supported through contributions from Local Governments, State Government and industry (eg Tiwest and Chevron Texaco).
This project also leverages investment into Coast and Marine in many ways, for example, coastcare funds and Swan Alcoa Landcare program funds have allowed substantial dune restoration

29.11 Management Structure

The Coast and Marine Program Manager is responsible for the overall coordination of this project. Sub-regional investments are managed through community committees, with a Sub-regional Coordinator and Coast and Marine Officers..

29.12 Outputs and Timelines

Outputs achieved through this project may be reported through other projects which have been supported through the framework. Specific outputs reported through this project will cover a wide range of outputs and cannot be finalised until Sub-regional planning is complete.

29.13 Milestones

See above

29.14 Expected Outcomes for Natural Resource Condition

Be as specific as you can.
The Coast and Marine projects implemented through the Coast and Marine Program will be successful and will have strong partnerships in place. Monitoring and evaluation will be used as the basis for adaptive management to further enhance the outcomes of Coast and Marine projects

29.15 Risk Factors

Describe both "internal" risks to the project (e.g. key staff, agreements yet to be finalised, collaborative funding yet to be committed), and "external risks" (e.g. extraneous factors that could detract from the expected beneficial impacts of the project).
The employment of suitable staff is a potential risk. The short-term nature of contracts for positions makes it difficult to employ suitably experienced staff.
Another risk to the project is the considerable coordination required across multiple stakeholders. Success of the project depends on obtaining the trust and goodwill of a large range of players.

29.16 Scope for Project Expansion or Contraction

Geographical scope, the number of management actions incorporated in the project, range of assets addressed, financial, human resources, period of time allowed for the project.
The project does not need to be expanded, as the scope of the project has been set through extensive consultation. Conversely, if the project were to contract the Coast and Marine Program Delivery could not be fully implemented.

29.17 Cost

Show the total inputs to the project (both NHT2 and Non-NHT2), and the funds sought from NHT2.
Financial Year 2004-05

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	3.75		$329,000	91%	$284,,000

Financial Year 2005-06

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	3.75		$329,000	91%	$284,000

Financial Year 2006-07

Item	Units	Rate ($/Unit)	Total Input ($)	% NHT2	Total NHT2 Funds Sought ($)
Project staff	3.75		$329,000	91%	$284,000

29.18 Estimated Total Investment Influenced by the Project

$250,000 in grant funds and Local Government contributions

29.19 Cost Effectiveness

Why is the project a cost-effective way of addressing the threat to asset value?
The staff within the project will leverage NRM investment from partnerships, as well ensuring that all NHT funded projects are successful in implementing MAT's

29.20 Long Term Strategy

Adaptive management will be used to develop the aims and objectives of the project on a regular basis

29.21 For how long will this kind of project be needed?

This project will be ongoing for the duration of implementation of the strategy, however the total project cost may change over time as aims and objectives are refined.

29.22 Can the project become financially self-sustaining?

E.g. what plans are there to diversify funding sources?
It is unlikely that the project can become self-sustaining in the short term, however local government and community are expected to assist the project to become self-sustaining long term

29.23 Can the project become socially self-sustaining?

E.g. what actions are in place to extend active partnerships involved with the project?
As partnerships are established, there will be less requirement for partnership inititaion, and over time less need for partnership support. The aim is to build the capacity of partners so that best management practice becomes self-sustaining