

ENVIRONMENTAL ACTION

Government's Response to the
State of the
Environment



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December 1999

Environmental Action: Government's Response to the State of the Environment Report.

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FOREWORD

The environmental challenge for every Western Australian is to ensure that the quality and health of our diverse environment is protected for future generations.

It will take a collective effort to achieve this - one shared by every individual, every business and every level of government.

The Western Australian Government was the first in Australia to recognise the significance of long-term environmental planning and the involvement of the community in environmental management.

This coordinated approach is unique and demonstrates our collective responsibility.

When *Environment Western Australia 1998: State of the Environment Report* was released in July 1998, with more than 100 recommendations for new initiatives, the Government promised to address every recommendation it contained.

As this document demonstrates, this has now been achieved.

Environmental Action: Government's Response to the State of the Environment Report is an environmental action plan addressing every key environmental issue facing Western Australia. This response provides a clear commitment by the Government to 180 clear, targeted and funded actions addressing every recommendation in *Environment Western Australia 1998*.

Some have already resulted in action; others are in progress and a number are scheduled to commence in the near future. All have a detailed implementation plan, including clear accountability measures for relevant Government agencies.

The outcome will be an environment to which all Western Australians have contributed and one in which they can be justifiably proud.

Thanks to all who have contributed to the environmental reporting process in Western Australia. I commend this report to everyone.



A handwritten signature in black ink, which appears to read 'Cheryl Edwardes'.

HON CHERYL EDWARDES (Mrs) MLA
MINISTER FOR THE ENVIRONMENT

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ENVIRONMENTAL POLICY DIRECTIONS FOR WESTERN AUSTRALIA

Introduction

Environment Western Australia 1998: State of the Environment Report is the major statement on the quality of the environment by this Government. It is essential that environmental policy is based on the assessment of the state of the environment, the pressure it is under and the effectiveness of current policy measures. Under the framework adopted by the State Government, State of the Environment Reporting in Western Australia will ensure ongoing improvements in environmental policy and will be used to evaluate the effectiveness of policy measures. This places the Western Australian State of the Environment Reporting framework at the forefront both within Australia and internationally.

This document is the Government's response to *Environment Western Australia 1998: State of the Environment Report* and is a major policy commitment.

Background

In 1987 the United Nations called upon all jurisdictions to move to sustainable forms of development. To provide leadership, the United Nations held one of the most significant environment conferences in the twentieth century — the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. The Conference resulted in the signing by 154 nations of a number of major documents: the Convention on Biological Diversity; Framework Convention on Climate Change; Agreement on Forest Principles; the Rio Declaration and Agenda 21.

Agenda 21 is a comprehensive framework of principles for sustainable development for the coming century. Western Australia adopted the State Conservation Strategy in 1987 and responded to the call for sustainable development by endorsing the National Strategy for Ecologically Sustainable Development in 1992.

Future Directions

The Western Australian Government is committed to the 'principles of environmental policy' derived from the Rio Declaration and enunciated in the Intergovernmental Agreement on the Environment (1 May 1992) to which all Australian Governments are signatories. The Western Australian Government is considering incorporating these principles of environmental policy as objects of the *Environmental Protection Act 1986 (WA)*. These principles are:

- the precautionary principle;
- the principle of intergenerational equity; and
- the principle of the conservation of biological diversity and ecological integrity.

As well, key principles in environmental management regarding improved valuation, pricing and incentive mechanisms have been developed. In summary these are:

- environmental factors should be included in the valuation of assets and services;
- the polluter pays principle;
- full life cycle costs should be incorporated into the price of goods and services; and
- environmental goals should be pursued in the most effective and efficient way, including by way of incentive structures and market mechanisms.

In applying these principles the Western Australian Government is developing environmental policies that acknowledge several trends. Central to these trends is a recognition that effective environmental policy relies on a partnership approach between Government and the community. It is also important to recognise that the Environmental Protection Authority has a co-ordination and advisory role to the Government on environmental policy through exercising its statutory powers for environmental protection.

The main trends in environmental policy are:

- Balancing rights and responsibilities — recognition of the need to balance the rights of private ownership with the responsibilities of private owners to the common good.
- Environmental education — this central component of the State Conservation Strategy for Western Australia has led to a large growth in public awareness of environmental issues. The challenge is for this awareness to be reflected in behavioural change. A trend in environmental policy is to provide the public with the information, skills, capacity and feedback to change their behaviour.
- An ecosystem based approach to environmental management — a recognition that environmental issues interconnect and that ecosystem health and habitat diversity are fundamental to good management.
- Increased accountability and a focus on environmental performance — putting mechanisms in place to measure the effectiveness of actions in terms of environmental outcomes for investment made is an important challenge consistent with sound business practice. The condition of the environment as described in *Environment Western Australia 1998: State of Environment Report* represents a benchmark for future performance assessment.
- Diversification of the instruments used in environmental policy, including market and partnership approaches — society has now begun to recognise the impact that the current approach to economic development has had on the environment. Developments within economic policy are now leading to approaches that use economic instruments as a means to achieve environmental outcomes. Economic instruments can be powerful tools in driving environmental reform. Similarly, integrating environmental policy with economic policy will help deliver better environmental outcomes (for example, through incorporating the environmental and social costs of development into decision-making, pricing of goods and services and load-based licensing and tradeable permits).
- Recognition of environmental values in environmental policy — to protect both human and non-human values which is consistent with Intergovernmental Agreement on the Environment and the National Strategy for Ecologically Sustainable Development. For example, the actions of the Council of Australian Governments on water reforms and environmental flow provisions recognise and protect the human and non-human values of inland waters.
- Community based management — recognition that environmental management requires devolution of responsibility and decision-making through a partnership approach.
- Recognition that regulatory and administrative approaches to environmental management are useful for the more obvious and simple environmental issues but are not sufficient for more complex issues which require a range of actions but are based on co-operation of relevant parties.
- A move to undertake both top-down and bottom-up approaches to the environmental management side of the production of goods through, for example, cleaner production and waste minimisation mechanisms.

The Government in applying these principles and recognising these trends, is positioning Western Australia for the future challenges that face the State in managing the environment.

About this Report

This report follows the format and layout of *Environment Western Australia 1998: State of the Environment Report* and provides a description of actions by Government under the heading of each Suggested Response from the State of Environment Report. This approach will enable the reader to link both reports with ease.

As indicated in *Environment Western Australia 1998: State of Environment Report* the approach is based on environmental issues to facilitate clarity for the reader and to enable Government and the community to prioritise actions. It is important to recognise that environmental issues do not occur in isolation nor do programs of Government or actions of the community only relate to a single issue. In many cases multiple benefits flow from a single program of Government. For example, the Waterways Western Australia program of the Water and Rivers Commission addresses a number of issues such as salinity, riparian vegetation, eutrophication and aspects of biodiversity simultaneously. In recognising this, cross-references are made throughout the report where Suggested Responses are met by an action described previously in the report.

While this report is Government's response to the State of Environment Report it should not be read as representing the totality of Government's actions relating to these issues or to the environment generally. Indeed this report should be read in conjunction with the State of Environment Report as that report detailed a number of current responses by both Government and the community.

ENVIRONMENTAL MONITORING AND REPORTING

ENVIRONMENTAL MONITORING AND REPORTING IN WESTERN AUSTRALIA

The State of Environment Reporting Framework

The agreed framework for ongoing State of the Environment Reporting in Western Australia is outlined in *Environment Western Australia 1998: State of the Environment Report* and combines the following:

- provide for all relevant Government agencies, community-based organisations and the private sector to be part of the process (policy development, monitoring and reporting);
- ensure co-ordination and integration in monitoring, analysis and reporting and avoid omission, duplication and repetition;
- enable reporting to Government on priority environmental issues and associated indicators including recommendations for priority action and funding;
- be compatible with, and actively provide links to, the various tiers of reporting processes that have developed, that is, local, catchment, regional, state and national;
- deliver annual outcomes in line with audit requirements and incorporate appropriate indicators into existing annual reporting mechanisms where appropriate;
- provide opportunities for a number of reports to be produced according to various attributes (for example, by region, issue, theme) and report on issues as information becomes available or as an issue becomes relevant;
- provide relevant and useable information to all decision-makers;
- use information in a valid and accurate manner, recognising the limitations of the information;
- identify community response to environmental issues in terms of attitude and behaviour and barriers to behavioural change;
- allow for the State's environmental objectives to be monitored and for progress to be reported to the community; and
- be continuously updated and accessible to all members of the community.

The Department of Environmental Protection will be responsible for ongoing State of the Environment Reporting based on this framework. Current resources and mechanisms to achieve this will be reviewed annually. The collective effectiveness of society's actions will be measured by the degree to which they bring about a positive change in all environmental indicators. By linking objectives, indicators and responses in this manner, and having a framework for monitoring and reporting, the community can be confident that actions taken to manage environmental issues will be better targeted, more efficient and effective.

Environmental performance is already included in many agencies' reporting requirements, for example, in annual reports to Parliament and under the *Financial Administration and Audit Act 1985* (WA). In most cases, the existing monitoring systems of agencies will be adequate to provide Government with the information necessary for feeding into an integrated Environmental Monitoring and Reporting Program for Western Australia. There is a need for all relevant State Government agencies to develop an Environmental Monitoring and Reporting Program for Western Australia which will ensure that the State of the Environment Reporting Framework is implemented (see Action 3).

Action 1

Develop an inventory of and report on government (Local, State and Federal), industry and community environmental monitoring programs as at 31 December 1999 using recent inventories as a basis where possible. The inventory should include the identification of monitoring sites used in Western Australia where this can be practically achieved.

Implementation

Government agencies are currently preparing inventories of their monitoring and research programs. The Department of Environmental Protection will be collating these inventories. A report on the findings of the inventory will include recommendations for improvements in monitoring and reporting arrangements, including:

- the basis of a systematic and integrated environmental monitoring framework;
- identifying duplication, omission and potential for co-ordination and sharing; and
- identifying the magnitude of tasks and costs.

The responsible agency is the Department of Environmental Protection in consultation with all other relevant agencies, non-government organisations and the general public. The report is due to be completed in 2000.

Action 2

Develop and implement protocol agreements for indicators in Western Australia's State of the Environment Report.

Implementation

Develop a generic protocol and conduct pilots of protocols while the inventory in Action 1 is being completed.

Action 3

Based on the findings of the inventory report, develop monitoring programs to fill omissions in the Environmental Monitoring and Reporting Program. Implement arrangements for co-ordination and sharing of environmental data in the context of indicator frameworks and in priority order as outlined in the State of the Environment Report.

Implementation

To be determined from Action 1. The Department of Environmental Protection in consultation with other agencies will prioritise and implement monitoring and evaluation programs and protocols to establish the Environmental Monitoring and Reporting Framework for Western Australia.

FUNDAMENTAL PRESSURES

Population and the Environment

Suggested Response 1

The Western Australian Government should develop an ecologically sustainable Population and Consumption Strategy for Western Australia. This should outline plans for incorporating environmental and social costs into decision-making, and eventually into pricing mechanisms.

Action 1.1

Develop ecologically sustainable growth strategies for Western Australia consistent with the principles of the National Strategy for Ecologically Sustainable Development.

Implementation

The State Government will develop strategies to ensure that population and consumption are managed in an ecologically sustainable manner.

The State Government will not prepare a strategy which proposes to control population or consumption. The intention is to prepare strategies that examine ways of managing for change in population, immigration, demographics and patterns of consumption. The strategies will ensure that the consequential environmental and social impacts of these changes are identified and managed in an ecologically sustainable manner.

The Government will also prepare:

- a new strategic plan for Perth consistent with the principles and recommendations of the State Planning Strategy and based on a review of Metroplan; and
- landuse and planning policies for transport, employment, environment and natural resources.

Several existing initiatives of Government will contribute to ecologically sustainable growth strategies for Western Australia. These include:

- the State Planning Strategy including a Government Position Paper on Immigration through the Inter-departmental Forecasting Committee on Population;
- various energy efficiency measures developed by the Office of Energy;
- waste reduction initiatives of the Department of Environmental Protection; and
- water use reduction strategies employed by the Water and Rivers Commission and the Water Corporation.

Implementation of the strategies will be done in conjunction with implementation of the State Planning Strategy.

Some of these initiatives have started and it is anticipated that the others will begin in 1999 and will be complete by July 2002. Resources are available within existing Government budgets. The responsible agencies for the development of the ecologically sustainable growth strategies will be the Western Australian Planning Commission in association with the Environmental Protection Authority.

Suggested Response 2

At present, housing continues to be constructed in a manner that encourages high resource use patterns. A set of building standards should be implemented progressively to meet world's best environmental practice in housing design and construction.

Action 2.1

Implement the Liveable Neighbourhoods Policy.

Implementation

The Liveable Neighbourhoods Policy released by the Western Australian Planning Commission provides an extensive overview of improved suburban design, housing, energy and subdivision. Implementation of this policy is currently underway.

The Office of Energy is in the process of making more accessible the Housing Energy Rating Scheme which they administer. This will enable prospective new home owners to ensure that the design and construction of their home is energy efficient.

The National Greenhouse Strategy contains measures (Module 4 and 5) aimed at energy efficiency in building design, construction and operation (see Action 22.1).

Suggested Response 3

An analysis of the environmental and social costs of development options should be incorporated into decision-making to ensure that economic development maximises the benefits to Western Australians.

Action 3.1

Implement the State Planning Strategy project assessment framework.

Implementation

The Western Australian Planning Commission will develop a project assessment framework which incorporates criteria from the State Planning Strategy. The assessment will use these criteria so that environmental and social factors are considered in development decisions.

Environmental and appropriate social costs and benefits comprise essential components of the environmental impact assessment process for new development.

Consumption and the Environment

Suggested Response 4

Local government authorities should develop local Agenda 21s to serve as frameworks for ecologically sustainable development.

Action 4.1

Support the development of a strategy to increase the development of Local Agenda 21s in Western Australia.

Implementation

The State Government welcomes the efforts of the Local Government Local Agenda 21 Advisory Group in developing a proposal for better support and co-ordination of Local Agenda 21. Local Government, through the Western Australian Municipal Association, should be assisted to promote further improved co-ordination. A model framework for local authorities will require access to Government information, which will need to be negotiated with the relevant agencies. In an effort to assist local Government, the Department of Environmental Protection is currently assessing options for implementing Agenda 21 at the State level.

Suggested Response 5

Develop and implement a State waste management strategy and associated programs.

Action 5.1

Develop a Western Australian Waste Management Strategy.

Implementation

The Department of Environmental Protection released a draft strategy in August, 1997. Finalisation of this strategy is being coordinated with other waste management policies and will be complete in 2000. The Department of Environmental Protection has allocated \$12,000 to the Policy. Implementation of the Policy will follow.

Action 5.2

Develop and maintain a waste and recycling database.

Implementation

The Department of Environmental Protection is developing a waste and recycling database that will be used to track environmental performance with respect to waste management. The results of this database will be published yearly and will provide a mass balance of all waste in Perth that is recycled or disposed of to landfill. The Department of Environmental Protection has allocated \$25,000 per annum to develop and maintain the database.

Suggested Response 6

Develop and implement a State waste reduction and recycling strategy and associated programs.

Action 6.1

Develop a State Waste Reduction and Recycling Policy.

Implementation

The Department of Environmental Protection will complete the development of a State Waste Reduction and Recycling Policy in 2000. A draft Policy was released for public comment in August, 1997. The Department of Environmental Protection has allocated \$12,000 to the Policy. Implementation of the Policy will follow. This Policy is expected to result in improved conservation of resources.

Action 6.2

Establish and implement waste reduction and recycling programs in accordance with State Waste Reduction and Recycling Policy and the principles, guidelines and objectives of the State Waste Management and Recycling Fund.

Implementation

A State Waste Management and Recycling Fund has become accessible to groups that wish to apply for funding for the purposes of effective waste management and recycling. More than four million dollars has been received by the fund which is financed from the Waste Management Levy.

Suggested Response 7

Develop and implement a State cleaner production strategy and associated programs.

Action 7.1

Develop a State Cleaner Production Policy.

Implementation

The Department of Environmental Protection is co-ordinating the development of a draft cleaner production policy. The initial draft document entitled *Cleaner Production Strategy for Small and Medium Size Industries* is being reviewed by the Western Australian Sustainable Industries Group prior to being released for public comment. It is envisaged that the draft policy will be released in early 2000. The Department has allocated \$12,000 to this initiative.

Action 7.2

Develop a cleaner production database and baseline.

Implementation

The Department of Environmental Protection is considering options for the development and testing of baseline measurement methodologies to create a baseline for examining improvements in cleaner production.

The Department has allocated \$12,000 in 1999/2000 towards the development of a cleaner production database and baseline. This will be completed by 2001.

Suggested Response 8

Develop and implement a State resource conservation strategy and associated programs aimed at reducing consumption and the environmental impacts of necessary consumption. A public education program should be developed to encourage resource conservation.

Action 8.1

Continue current efforts towards resource conservation.

Implementation

There is substantial commitment through State Government agencies for resource conservation. These include:

- waste management strategies undertaken by the Department of Environmental Protection;
- Metropolitan Transport Strategy by the Department of Transport;
- State Planning Strategy and Liveable Neighbourhoods Policy by the Ministry for Planning;
- the planning and environmental legislation of 1996, which ensures environmental impacts of planning proposals are evaluated;
- Water Sensitive Urban Design implemented through the Ministry for Planning, Water and Rivers Commission and Water Corporation;
- programs on water demand which are currently underway through the Water Corporation; and
- the Greenhouse Strategy being developed by the Western Australian Greenhouse Council and the Department of Environmental Protection.

Suggested Response 9

Based on the ecological footprint model, develop a procedure that can be used in development planning and decision-making to compare the ecological efficiency of options. This could be used as a precursor to incorporating the environmental costs of consumption into pricing.

Action 9.1

Conduct research into models to evaluate the sustainability of projects.

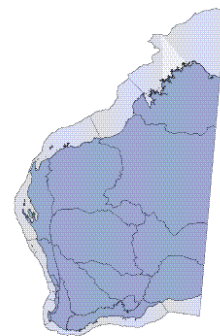
Implementation

The Western Australian Planning Commission is currently assessing methods to evaluate the sustainability of projects.

The issues of modelling as they apply to environmental impacts are under constant review and are updated by the Environmental Protection Authority and the Department of Environmental Protection in evaluating guidance and standards for environmental impact assessment and also through the implementation of environmental protection policies under the *Environmental Protection Act 1986 (WA)* and statements of planning policy under the *Western Australian Planning Commission Act 1985 (WA)*.

BIODIVERSITY

Maintaining Biodiversity



Suggested Response 10

Implement The National Strategy for the Conservation of Australia's Biological Diversity and develop and implement a complementary strategy for Western Australia.

Action 10.1

Implement the National Strategy.

Implementation

Implementation of the National Strategy is underway and will continue in an ongoing manner.

The National Strategy is a broadly-based document endorsed by the Commonwealth and all States and Territories, and addresses all aspects of the conservation of biological diversity and its integration with natural resource management. At a national level it details objectives and actions and prioritises 18 actions for completion by 2000 and a further nine for completion by 2005.

The *Wildlife Conservation Act 1950* (WA), *Conservation and Land Management Act 1984* (WA) and the *Environmental Protection Act 1986* (WA) provide the current legislative framework for implementing the National Strategy (also see Action 12.1).

The Department of Conservation and Land Management is responsible for implementing the National Strategy in consultation with all other relevant agencies.

A wide range of programs of other agencies contribute to implementation of the National Strategy in Western Australia, ranging from programs specifically directed at biodiversity conservation, to programs primarily oriented towards other issues (for example, use of natural resources and industry development) but which take biodiversity conservation into account.

The Western Australian Museum and the Perth Zoo contribute to fauna conservation and Kings Park and Botanic Garden contributes to flora conservation.

Fisheries Western Australia is implementing a Fish and Fish Habitat Protection Program and the Environmental Protection Authority and Department of Environmental Protection are contributing to biodiversity policy and biodiversity conservation through environmental protection policies and environmental impact assessment of proposals.

Agriculture Western Australia co-ordinates related programs in rural areas such as the Remnant Vegetation Protection Scheme.

The Department of Conservation and Land Management's entire Nature Conservation Program budget (approximately \$40 million in 1998/99) is directed to biodiversity conservation in Western Australia.

Action 10.2

Develop a Western Australian strategy for the conservation of biological diversity.

Implementation

A Western Australian biodiversity conservation strategy will be developed to improve the conservation of Western Australia's biodiversity and the integration of biodiversity considerations into decision-making.

The Western Australian strategy for the conservation of biological diversity will be completed in 2000. This strategy will be developed from within existing resources and will be a collaborative effort.

Action 10.3

Implement the Western Australian strategy for the conservation of biological diversity.

Implementation

The strategy will be implemented in an ongoing manner after 2000. This may also involve new funding requirements in future budgets.

Suggested Response 11

Inadequacies in the terrestrial and marine conservation reserve system need to be addressed, along with better management of conservation and biodiversity both inside and outside reserves. Important vegetation communities and habitats (land, marine and freshwater) need to be identified and protective measures put in place.

The Department of Conservation and Land Management's Nature Conservation Program has the fundamental aim of establishing a well managed, comprehensive, adequate and representative terrestrial and marine conservation reserve system. The Department also aims for the development and implementation of complementary off-reserve measures and programs. Both will be addressed in the proposed Western Australian strategy for the conservation of biological diversity (Action 10.2).

Progressing the State's environmental objectives requires ongoing biological survey and other investigations, as well as liaison with stakeholders, leading to refinement of existing conservation reserve system proposals.

Various programs of State Government agencies contribute to the establishment of the conservation reserve system and to complementary off-reserve measures, both terrestrial and marine.

The Government's commitment to establish a comprehensive statewide system of multiple-use marine conservation reserves is outlined in its 1998 *New Horizons – The way ahead in Marine Conservation and Management Policy*. The Water and Rivers Commission is developing a State River Protection Policy and the Wetlands Co-ordinating Committee is developing a Program of Action to implement the Wetlands Conservation Policy for Western Australia. (see Action 20.1).

Action 11.1

Identify inadequacies in the extent to which the existing conservation reserve system and complementary off-reserve measures are conserving Western Australia's biodiversity.

Implementation

Biological (including taxonomic) research, survey and inventory work will continue and will be used to assess the conservation status of Western Australia's biodiversity.

This will enable identification of the requirements for establishing a comprehensive, adequate and representative conservation reserve system, and for complementary off-reserve measures, sufficient to conserve Western Australia's biodiversity.

Resources for this assessment are allocated under the existing Department of Conservation and Land Management's Nature Conservation Program and the existing budgets of other relevant agencies. The responsible agency is the Department of Conservation and Land Management in consultation with all other relevant agencies.

The assessment is ongoing, however, milestones will be considered in the development of the Western Australian strategy for the conservation of biological diversity (also see Action 10.2).

Action 11.2

Establish a comprehensive, adequate and representative terrestrial conservation reserve system.

Implementation

Conservation reserve system proposals will be implemented. These will be based upon regional and park/reserve management plans of the Department of Conservation and Land Management, the Environmental Protection Authority's systems reports, biological survey findings, statutory and strategic regional plans and specific programs such as the Gascoyne-Murchison Strategy, proposed Regional Forest Agreement and Perth's Bushplan (also see Action 14.3 and Action 44.1). Implementation will be guided by the priorities of the Interim Biogeographic Regionalisation of Australia.

This will result in development of a comprehensive, adequate and representative terrestrial conservation reserve system throughout Western Australia, subject to limitations resulting from prior land use decisions and taking account of social and economic considerations.

Resources are currently allocated within the existing Nature Conservation Program of the Department of Conservation and Land Management (including \$6.8m for the Gascoyne-Murchison region over six years from 1997/98) and existing budgets of other relevant agencies.

Milestones for implementation will be considered in the development of the Western Australian strategy for the conservation of biological diversity.

Action 11.3

Establish a comprehensive, adequate and representative marine conservation reserve system.

Implementation

Implement conservation reserve system proposals, guided by the 1994 report of the Marine Parks and Reserves Selection Working Group, individual marine reserve management plans, the advice of the Marine Parks and Reserves Authority and priorities established in the Interim Marine and Coastal Regionalisation of Australia. This action will ensure the development of a comprehensive, adequate and representative marine conservation reserve system throughout Western Australia.

Resources are currently allocated within the existing Nature Conservation Program of the Department of Conservation and Land Management and existing budgets of other relevant agencies.

Milestones will be considered in the development of the Western Australian strategy for the conservation of biological diversity. Priority areas for consideration as new marine conservation reserves are Jurien Bay, Montebello/Barrow Islands, Dampier Archipelago and the Geographe Bay/Capes/Hardy Inlet area.

Action 11.4

Manage terrestrial and marine conservation reserves to conserve their biodiversity values.

Implementation

The State Government will continue to prepare and implement management plans for conservation reserves and control processes threatening the conservation of the biodiversity they contain. This will ensure the long-term viability of the biodiversity represented in Western Australia's conservation reserve system.

Required resources are currently allocated within the existing Nature Conservation Program of the Department of Conservation and Land Management and existing budgets of other relevant agencies.

Action 11.5

Improve conservation of biodiversity outside conservation reserves, both terrestrial and marine.

Implementation

Improved integration of biodiversity conservation into other land and marine uses and decision-making is essential for the conservation of biodiversity, particularly in areas that are outside of the conservation estate.

This action is being pursued within existing agency budgets including:

- the Department of Conservation and Land Management (for example, Land for Wildlife; proposed nature conservation covenanting scheme; and the Roadside Conservation Committee);
- Agriculture Western Australia (Remnant Vegetation Protection Scheme and conservation covenants where permission to clear has been refused);
- Fisheries Western Australia (Fish and Fish Habitat Protection Program);
- the Environmental Protection Authority and the Department of Environmental Protection (through Environmental Protection Policies and environmental impact assessment); and
- partnerships between the Commonwealth Government, State Government and the community under the Natural Heritage Trust.

Suggested Response 12

The *Wildlife Conservation Act 1950* (WA) should be replaced by new legislation incorporating modern biodiversity conservation principles.

Action 12.1

Develop new legislation for the conservation of biodiversity in Western Australia, in consultation with stakeholders, for introduction to Parliament in 2000.

Implementation

There is a need for a new legislative basis for biodiversity conservation in Western Australia. This will be developed by the Department of Conservation and Land Management. The new replacement legislation will provide the primary basis for biodiversity conservation in Western Australia in the future.

Currently, the *Wildlife Conservation Act 1950* (WA) is the primary piece of State legislation for the conservation and management of biodiversity in Western Australia.

Resources required to develop the legislation are available from within the existing Nature Conservation Program of the Department of Conservation and Land Management.

Suggested Response 13

Ensure that land clearing in Western Australia is in line with Australia's commitment to the Kyoto Protocol on greenhouse gas emissions and climate change.

Action 13.1

Develop (in collaboration with State and Commonwealth Governments) guidelines and policies to give effect to National principles to reverse long-term decline in the quality and extent of native vegetation cover, taking into account greenhouse issues as well as biodiversity, land capability and agricultural sustainability and other sustainability issues.

Implementation

Implementing this action will rely upon revising current state-based clearing guidelines and policies to ensure that they are consistent with national principles to reverse the long-term decline in the quality and extent of native vegetation.

It is expected that this action will improve native vegetation retention and will contribute to reduced greenhouse gas emissions from clearing and the associated emissions from soil disturbance and decaying vegetation.

Required resources will be identified and allocated in the development of the Western Australian Greenhouse Response Strategy.

This suggested response is also addressed in the section on the Enhanced Greenhouse Effect.

The responsible agency for this action is the Department of Environmental Protection as the State's co-ordinating agency for greenhouse matters. With respect to clearing controls through the Memorandum of Understanding for the protection of remnant vegetation on private land in the agricultural region of Western Australia (see Action 15.1), the responsible agencies are Agriculture Western Australia, the Department of Environmental Protection, the Environmental Protection Authority, the Department of Conservation and Land Management and the Water and Rivers Commission.

Suggested Response 14

Development and planning should minimise the clearing of native vegetation and encourage the development of corridors of native vegetation.

Minimising the clearing of native vegetation involves the integration of planning (State and local) and environmental protection processes. Application of rigorous environmental assessment processes is required to ensure that clearing proposals which will cause environmental harm do not proceed. This has been demonstrated by application of the interagency memorandum of understanding on the protection of remnant vegetation on private land in the agricultural region of Western Australia, which incorporates biodiversity impact evaluation criteria. Further minimisation of clearing requires application of similar criteria to other land uses.

Reducing the effects of habitat fragmentation on biodiversity goes beyond the development of vegetation corridors. Significant work is underway to improve the protection and management of revegetation generally and to ensure that revegetation works include local provenance species and key species for habitat restoration.

The retention, management and development of corridors and networks of native vegetation is encouraged and promoted by various means including conservation reserve system design, the work of the Roadside Conservation Committee (which covers utility corridors as well as roadsides), and a range of off-reserve conservation initiatives such as Land for Wildlife, the Remnant Vegetation Protection Scheme, Salinity Action Plan actions, the State Revegetation Scheme and Natural Heritage Trust programs (particularly Bushcare, Landcare and Rivercare).

Action 14.1

Develop and ensure the application of environmental and planning policies and procedures governing the clearing of native vegetation which specifically require comprehensive consideration of biodiversity implications and minimise the clearing of native vegetation.

Implementation

Development and planning policies and procedures will be progressively developed to minimise the clearing of native vegetation.

This is expected to result in the retention of native vegetation, particularly areas of significance for biodiversity conservation.

Resources for this action are within existing agency budgets.

The responsible agencies for this action are the Environmental Protection Authority, Department of Environmental Protection, the Ministry for Planning, Agriculture Western Australia, the Department of Conservation and Land Management and the Water and Rivers Commission.

Action 14.2

Encourage the protection and effective management of remnants along with broader revegetation and development of corridors and networks of native vegetation.

Implementation

Retention and sustainable management of existing remnants, along with the establishment of revegetated areas and corridors using local provenance species is essential for the long-term protection of biodiversity.

This action will involve the establishment and maintenance of linkages between areas of remnant vegetation to improve the long-term survival of their biota.

Resources are currently allocated within existing agency budgets including the Department of Conservation and Land Management (Roadside Conservation Committee; Land for Wildlife); Agriculture Western Australia (Remnant Vegetation Protection Scheme and the State Revegetation Strategy). Other resources are provided through partnerships between the Commonwealth Government, State Government and the community under the Natural Heritage Trust.

Action 14.3

Implement Perth's Bushplan.

Implementation

The State Government released Perth's Bushplan for four months public comment in November 1998. Bushplan will be finalised by December 1999 and released in early 2000.

The Plan will be progressively implemented on a case-by-case basis in full consultation with affected landowners through a suite of implementation mechanisms suited to individual circumstances. Mechanisms include reservation in the conservation estate, and complementary mechanisms for conservation on private lands, such as statutory covenants, management agreements, and incentive mechanisms. Where sites are significantly constrained by existing zoning and or development approvals negotiated outcomes may be sought based on solutions available through planning legislation. Bushplan sites will be further recognised in the metropolitan planning framework through development of a Statement of Planning Policy.

Suggested Response 15

The interagency Memorandum of Understanding on vegetation clearing should be progressively revised so that, by the year 2000, all proposals to clear native vegetation other than those rejected on existing criteria are assessed on biodiversity criteria.

Action 15.1

Revise and extend the interagency Memorandum of Understanding on clearing controls to apply statewide, based on common principles applied with geographically appropriate biodiversity criteria.

Implementation

The existing interagency Memorandum of Understanding on vegetation clearing applies to remnant vegetation on private land in the agricultural region of Western Australia and incorporates biodiversity impact evaluation criteria. It is being reviewed both in respect of its current area of application and possible application elsewhere in Western Australia.

The responsible agencies for this action are the Environmental Protection Authority and Department of Environmental Protection, Agriculture Western Australia, the Department for Conservation and Land Management, the Water and Rivers Commission and the Ministry for Planning.

Resources for this action are within existing agency budgets. The revised and extended memorandum of understanding will be developed in 2000.

Suggested Response 16

Local conservation strategies need to be developed and should be based on The National Strategy for the Conservation of Australia's Biological Diversity and on the Western Australian strategy when developed.

Action 16.1

Fully incorporate biodiversity conservation in statutory and strategic regional planning and in evolving regional strategies for natural resource management in Western Australia.

Implementation

Statutory and strategic regional plans, and regional strategies for natural resource management, in Western Australia will be developed so that they incorporate biodiversity conservation.

Conservation strategies are being advocated at various levels below the State level, including local, for example Local Government authority areas, bioregional (based on the Interim Biogeographic Regionalisation of Australia) and other regionalisations.

The most cost-effective approach for Western Australia will be to ensure that biodiversity conservation is fully incorporated in statutory and strategic regional planning and in evolving regional strategies for natural resource management. In addition, more localised conservation strategies should be supported where the need and demand exist.

The responsible agencies for this action are the Department of Conservation and Land Management, the Environmental Protection Authority, the Department of Environmental Protection and the Ministry for Planning in consultation with other relevant agencies. Resources are available from within the existing budgets of relevant agencies.

Action 16.2

Support localised conservation strategies (for example, Local Government Authorities) where the need and demand exist.

Implementation

Local conservation strategies will be developed where they are needed. These strategies will help improve integration of biodiversity considerations in local planning and decision-making. The development of local conservation strategies will be supported by relevant State Government agencies.

Suggested Response 17

Build on existing partnerships between Aborigines and other land-users in biodiversity conservation.

Action 17.1

Implement partnerships with Aboriginal groups as determined through management plans, Native Title negotiations, Indigenous Protected Areas Program projects and other forms of management agreements.

Implementation

Mechanisms for Aboriginal involvement in land management decisions on conservation reserves, for example, via Park Councils, and outside conservation reserves will be established. In addition, Government will implement the Indigenous Protected Areas Program of the Natural Heritage Trust.

The achievement of biodiversity conservation objectives requires sympathetic actions by owners, managers and users of land outside the conservation reserve system, as well as partnerships where appropriate, on conservation reserves.

Significant areas of Western Australia are managed by Aboriginal people and as well, the management of other Crown lands and waters, including conservation reserves, is of cultural and spiritual importance to Aboriginal peoples.

The responsible agency for these partnerships is the Department of Conservation and Land Management in consultation with all other relevant agencies. Action will be taken within the existing budget of the Department of Conservation and Land Management.

Suggested Response 18

Develop a package of measures to encourage and facilitate conservation on private lands to complement the conservation reserve system and remove disincentives to conserving biodiversity.

Action 18.1

Expand the implementation of existing off-reserve conservation measures.

Implementation

The State Government will expand implementation of existing off-reserve conservation measures that are currently part of a range of programs and measures, including:

- the Department of Conservation and Land Management (Land for Wildlife; proposed nature conservation covenanting scheme; management agreements; advisory services; proposed independent fund-raising foundation);
- Agriculture Western Australia (covenants and Remnant Vegetation Protection Scheme);
- the Environmental Protection Authority and the Department of Environmental Protection (Environmental Protection Policies, environmental impact assessment and Ecoplan);
- Lotteries Commission (Gordon Reid Foundation for Conservation grants); and
- partnerships between the Commonwealth Government, State Government and the community under the Natural Heritage Trust.

Perth's Bushplan, a cross-government initiative, also features approaches to conservation on private lands.

Further developmental work is needed and is being undertaken, particularly in respect to economic incentives and the removal of disincentives.

Various private (landholder, community groups and industry) initiatives operate in this area and complement Government agency efforts.

The development and implementation of complementary off-reserve conservation measures and programs will be further addressed in the proposed Western Australian strategy for the conservation of biological diversity (see Action 10.2).

The responsible agency for this action is the Department of Conservation and Land Management in consultation with all other relevant agencies and stakeholders. Resources for this initiative are allocated within existing budgets.

Action 18.2

Develop additional off-reserve conservation measures including voluntary nature conservation covenants and where appropriate, link them to environmental and planning mechanisms and approvals.

Implementation

Implementation of new off-reserve conservation measures will provide additional improvement to conservation of biodiversity outside the reserve system.

This is an ongoing initiative that will be funded from within existing agency budgets. The responsible agency is the Department of Conservation and Land Management in consultation with other relevant State agencies.

Action 18.3

Review incentives and identify and seek to remove disincentives to the conservation of biodiversity.

Implementation

Government, through the work of the Department of Conservation and Land Management, will develop appropriately targeted incentives for conservation of biodiversity and will address existing disincentives. This will provide additional improvements for the conservation of biodiversity outside the reserve system.

Resources for this action are within existing agency budgets.

Suggested Response 19

Implement the National Weeds Strategy and develop and implement a complementary strategy for Western Australia which targets control of weeds according to their environmental threat.

Action 19.1

Implement the National Weeds Strategy.

Implementation

Implementation of the specific actions from the National Weeds Strategy in Western Australia will lead to improved weed control throughout Western Australia.

The National Weeds Strategy is endorsed by the Commonwealth and all States and Territories and presents a strategic approach to weed problems of national significance.

Weeds are a major threatening process affecting native flora, fauna and habitats, as well as agricultural production.

Control of weeds is one of the most important tools in the recovery of threatened native flora and ecological communities and the maintenance of them at sustainable levels.

The responsible agencies for this action are the Department of Conservation and Land Management and Agriculture Western Australia (including the Agriculture Protection Board) in consultation with all other relevant agencies (including the Department of Land Administration on Crown lands under its control).

Resources are currently allocated within the Department of Conservation and Land Management's Nature Conservation Program, Agriculture Western Australia's Industry Resource Protection Program and the Department of Land Administration which allocates \$667,000 per annum for weed and vermin control on Crown lands.

Action 19.2

Develop a Western Australian weeds strategy in consultation with relevant government, industry and community interests.

Implementation

An environmental weeds strategy for Western Australia was completed in 1999. A Western Australian State Weeds Plan addressing environmental and agricultural weeds will be completed by 2000. Together these strategies will improve weed control throughout Western Australia. Resources are currently allocated within the existing budget of the Department of Conservation and Land Management's Nature Conservation Program and Agriculture Western Australia's Industry Resource Protection Program.

Action 19.3

Implement the Western Australian State Weeds Plan.

Implementation

Details concerning the implementation of the Western Australian State Weeds Plan will be determined in its development. This will also identify the resources required to implement the plan. Implementation will be ongoing after 2000.

Suggested Response 20

Implement the Wetlands Conservation Policy for Western Australia.

Action 20.1

Implement the Wetlands Conservation Policy for Western Australia.

Implementation

The 1997 Wetlands Conservation Policy for Western Australia is a whole-of-government policy which outlines five principal objectives and a strategy for implementation listing 62 actions.

A Wetlands Co-ordinating Committee has been established to co-ordinate implementation of the Policy and the activities of relevant agencies with respect to wetlands.

The Policy commits agencies involved in its implementation to develop a Program of Action through the Wetlands Co-ordinating Committee, and also commits to a review of progress in implementation three years after the Committee's formation.

The responsible agencies are the Department of Conservation and Land Management, the Water and Rivers Commission and the Department of Environmental Protection in consultation with all other relevant agencies.

Resources for implementation have been allocated within the existing budgets of the Department of Conservation and Land Management's Nature Conservation Program, the Water and Rivers Commission, the Department of Environmental Protection and other agency budgets. New budget allocations may be required in accordance with the Program of Action.

The Program of Action will be completed in 2000 and a review of progress in implementing the Policy will be conducted in 2001.

Suggested Response 21

Expand feral animal control programs including the successful Western Shield program to enable larger coverage of the State with community involvement. Continue to develop and refine assessment of the translocation of live aquatic non-endemic species into or within Western Australia and ensure adherence to the Ministerial Guidance on aquaculture and recreation fish stock enhancement.

Action 21.1

Expand the Western Shield program.

Implementation

Control of feral animals is one of the most important tools in the recovery of threatened native species and ecological communities and the maintenance of them at sustainable levels.

There has been an extension of feral predator (fox and cat) control from 3.2 million hectares of Department of Conservation and Land Management managed lands in mid-1997 to more than 3.5 million hectares in mid-1999, with further expansion to 5 million hectares as resources permit and particularly into arid regions when cost-effective cat control is feasible. Extension of community involvement will occur through landholder-based baiting programs.

This action will increase the distribution and abundance of a wide range of native fauna, and will provide for the recovery of threatened fauna and their removal from State and national lists for threatened species.

The responsible agency for this program is the Department of Conservation and Land Management who will continue to allocate approximately \$2.5 million annually to the program.

Action 21.2

Maintain and where necessary expand control programs for feral animals other than foxes and cats, including rabbits, goats, rats, pigs, camels, donkeys and starlings.

Implementation

Control of feral animals will continue in order of priority to improve the conservation status of native flora, fauna and habitats, and to improve agricultural production.

Resources are currently allocated within the existing budget of the Department of Conservation and Land Management's Nature Conservation Program, Agriculture Western Australia's Industry Resource Protection Program (Animal Pest Management) and the Department of Land Administration.

Action 21.3

Maintain and refine the aquatic species translocation assessment process currently managed by Fisheries Western Australia under a memorandum of understanding with the Environmental Protection Authority.

Implementation

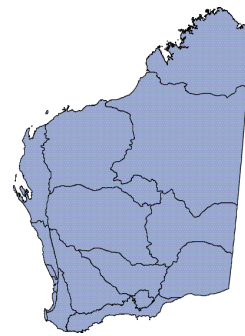
Currently this issue is managed by means of a Memorandum of Understanding between the Environmental Protection Authority and Fisheries Western Australia, which provides for the environmental assessment of translocation of live, aquatic, non-endemic species into or within Western Australia.

This program will be continued in order to prevent damage to endemic aquatic species and the aquatic environment from introduced exotic species.

Resources have been allocated within the existing Fisheries Western Australia (Fish and Fish Habitat Protection Program) budget to continue this program, which receives significant support from Commonwealth funds through the Natural Heritage Trust and the Australian Quarantine Inspection Service.

ATMOSPHERE

Enhanced Greenhouse Effect



Suggested Response 22

The Western Australian Government should develop a Western Australian Greenhouse Strategy which is based on the National Greenhouse Strategy but takes into account regional differences and imperatives. As such, the Strategy should reflect the measures included in the Prime Minister's Statement, *Safeguarding the Future: Australia's Response to Climate Change* and include agreed outcomes of the Kyoto Protocol.

Action 22.1

Develop a Western Australian Greenhouse Strategy based on the National Greenhouse Strategy but which takes into account regional differences and imperatives.

Implementation

The Western Australian Greenhouse Strategy is currently being developed by the Western Australian Greenhouse Council, through six Technical Panels. The program has been funded by Government as part of a \$1.075 million package over five years. Measures in the National Greenhouse Strategy will be prioritised and costed by the Western Australian Greenhouse Council, on the basis of Western Australia's particular circumstances. An implementation plan will then be produced which will include outputs and timelines. The implementation plan and the National Greenhouse Strategy will form the basis of the Western Australian Greenhouse Strategy.

Suggested Response 23

The Western Australian Government should also initiate a Western Australian Greenhouse Council to advise on:

- a) achieving the objectives and targets of the National Greenhouse Strategy and Framework Convention on Climate Change;
- b) co-ordinating Western Australia's contribution to the national greenhouse gas inventory;
- c) providing advice to the Western Australian Government on climate change matters;
- d) developing strategies for monitoring and reporting on the implementation of the National Greenhouse Strategy and the Western Australian Greenhouse Strategy;
- e) climate change policies and programs in other jurisdictions; and
- f) methods of informing and raising awareness about climate change and greenhouse response in the community.

Action 23.1

Establish a Western Australian Greenhouse Council.

Implementation

A Western Australian Greenhouse Council has been formed with terms of reference consistent with the suggested response. The Department of Environmental Protection is the responsible agency for co-ordinating the Western Australian Greenhouse Council.

Suggested Response 24

Develop as part of the State Greenhouse Strategy, a Sustainable Energy Policy that specifically addresses the use of natural gas, energy conservation and renewable energy.

Action 24.1

Develop a draft policy that is consistent with the Western Australian and National Greenhouse Strategies and the Energy Policy Framework being developed by the Australian and New Zealand Minerals and Energy Council.

Implementation

The Office of Energy will develop the draft policy from within its current budget. Input will be sought from the Western Australian Greenhouse Council.

Development of a national draft policy framework began through the Australian and New Zealand Minerals and Energy Council (ANZMEC) in 1997 and was completed following circulation within ANZMEC of a final draft at the end of 1998 and consideration of that final draft by ANZMEC Ministers. A draft policy for Western Australia is currently being completed to follow on from the release of the national framework.

Suggested Response 25

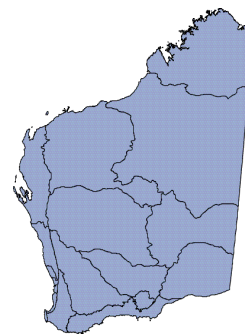
Local Government authorities should take energy efficiency issues into account in planning decisions, conduct energy audits of city facilities and educate householders and businesses to reduce greenhouse gas emissions.

This suggested response is aimed at Local Government.

Action 25.1

Several Local Government Authorities have conducted energy audits and some are beginning to incorporate such activities into Local Agenda 21s and other environmental policies (see Action 4.1). The State Government will continue to assist Local Government through its existing programs (see Actions in the section on page 80).

Stratospheric Ozone Depletion



Suggested Response 26

Continue to implement the 1994 Australian and New Zealand Environment and Conservation Council National Strategy for Protection of Ozone by reviewing Western Australia's Environmental Protection (Ozone Protection) Policy 1993.

Action 26.1

Design a generic framework for the statutory review of Environmental Protection Policies.

Implementation

The Department of Environmental Protection developed a generic framework for the statutory review of Environmental Protection Policies in June 1999 for consideration by the Environmental Protection Authority.

Action 26.2

Review the Environmental Protection (Ozone Protection) Policy 1993.

Implementation

The generic framework outlined in Action 26.1 will be used by the Department of Environmental Protection to review the performance of Environmental Protection Policies in order to improve their effectiveness. The Environmental Protection (Ozone Protection) Policy 1993 will be reviewed by the year 2000.

Suggested Response 27

Current education campaigns are focused on industry. There is a need for the Department of Environmental Protection to expand current education campaigns to target the wider community.

Action 27.1

Develop a draft Environmental Education Policy for Western Australia.

Implementation

A draft Environmental Education Discussion Paper has been developed as a precursor to the final policy. The Environmental Education Discussion Paper contains strategies for improving environmental education across the community, education, government and industry sectors.

The Department of Environmental Protection is the responsible agency for developing the Environmental Education Discussion paper, which is expected to be released for public comment in late 1999.

Photochemical Smog



Suggested Response 28

Develop and implement an Air Quality Management Plan for Perth.

Ensure new vehicles have appropriate emission levels, and that these are maintained over the life of the vehicle.

Ensure the reporting, inspection and repair of defective motor vehicles.

Better manage car parking in the City of Perth to improve air quality.

Promote higher car occupancy.

Promote travel alternatives, including public transport, cycling and walking.

Ensure industrial emissions are as low as possible, given ongoing technological improvements.

Ensure urban development patterns and densities promote short trips and public transport, walking and cycling.

Improve public transport service levels in Perth and regional centres.

Promote gas conversion of car fleets. Compared with cars running on unleaded petrol, natural gas vehicles produce 80% less hydro-carbons, 50% less nitrogen oxides, 53% less carbon monoxide and 20% less carbon dioxide.

Adequately fund existing alternative travel and education programs.

Action 28.1

Develop an Air Quality Management Plan for Perth.

Implementation

Targets for reductions in emissions of photochemical smog precursors will be set within the Plan to ensure achievement of the National Environmental Protection Measure objectives for ozone (photochemical smog). The Plan will incorporate:

- an updated emissions inventory which identifies key sources and relative contributions from them;
- a better targeted air monitoring network which measures ambient levels to which people are exposed;
- a Central Perth Parking Policy to selectively reduce parking allowances for a range of building developments and provide funding from parking licence fees to support improving non-car modes of access to central Perth;
- community education and information on the health effects of smog;
- elements of the *Better Public Transport: Ten Year Plan for Transperth*, to introduce significant enhancements and extensions to the rail and bus systems;
- current and continued implementation of behavioural change programs such as TravelSmart, that encourage public transport, walking and cycling as alternatives to the car;
- development of a strategy to increase use of existing vehicles and where appropriate, provide priority on the road system for high occupancy vehicles, particularly buses; and
- improvements in energy conservation of dwellings and vehicles.

The Department of Environmental Protection is the responsible agency for developing the Plan and \$2.6 million has been allocated for its development over four years. Development of the Plan began in 1997 and it is expected to be implemented by June, 2001.

Action 28.2

Implement the Perth Air Quality Management Plan.

Implementation

Perth Air Quality Management Plan will determine the actions required to ensure reductions in emissions of photochemical smog precursors, of haze particulates and of other pollutants of concern.

Required resources and timelines for implementation will be determined by the outcomes of Action 28.1.



Haze from Particulates

Suggested Response 29

Determine appropriate legal standards for particulate haze.

Implement a comprehensive community awareness campaign based on the findings of the 'Halt the Haze' trial.

The *Environmental Protection Act 1986 (WA)* was amended (May 1998) to enable a ban on the sale of appliances, for example, wood stoves and heaters, that do not comply with Australian Standard 4013. The Department of Environmental Protection is developing regulations preventing the retail sale of wood with more than 25% moisture content.

Studies are required to determine the health impacts of current haze levels.

Develop and implement an Air Quality Management Plan for Perth.

Action 29.1

Develop appropriate health-based guidelines for haze particles.

Implementation

The State Government has established an expert health issues group to advise on and develop projects on health related issues.

This action will set health-based guidelines for haze particles (PM_{2.5}) and provide data for an indicator which measures air quality related to haze. A PM_{2.5} standard will be developed as part of the National Environmental Protection Measure for Air Quality.

The action incorporates elements of the Government Response to recommendations of the Select Committee on Perth's Air Quality and overlaps with suggested responses to related issues of photochemical smog, carbon monoxide, sulfur dioxide, lead and dust.

Action 29.2

Develop and implement appropriate management programs to minimise emissions of haze particles.

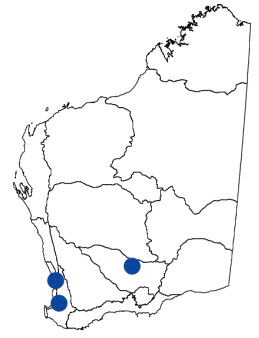
Implementation

This action will:

- enforce the *Environmental Protection (Firewood Supply) Regulations 1998* (effective as of 24 November 1998) which limit the sale of green firewood, that is, wood with a moisture content of greater than 20%;
- enforce the *Environmental Protection (Firewood Supply) Amendment Regulations 1998* (effective from 24 January 1998) which require all woodheaters sold to comply with Australian Standard 4013:1992;
- implement a community education and awareness campaign which encourages the use of dry firewood and the correct operation of woodheaters to reduce emissions from these sources;
- implement new diesel vehicle emission design rules (Australian Design Rule 70/01); and
- implement education and incentive programs encouraging the conversion of solid fuel heaters to electricity or gas.

The responsible agency for Action 29.1 and 29.2 is the Department of Environmental Protection in collaboration with Departments of Health, Transport, Local Government, Resources Development, Conservation and Land Management, Main Roads Western Australia, Office of Energy and Ministry for Planning. Resources for this action are incorporated into those provided for the development of an Air Quality Management Plan for Perth.

Sulfur Dioxide



Suggested Response 30

Due to the high level of sulfur dioxide emitted around Kalgoorlie, public education about sulfur dioxide emissions and environmental and health effects is needed in this region.

There is concern that the Kalgoorlie Environmental Protection Policy standard is greater than the National Health and Medical Research Council goal. The Kalgoorlie Environmental Protection Policy should be reviewed before its scheduled review in 2000.

The proposed National Environmental Protection Measure and complementary State Air Environmental Protection Policy should provide for regional differences in Western Australia.

Action 30.1

Develop a Statewide Air Environmental Protection Policy including standards and attainment programs for sulfur dioxide.

Implementation

This action will implement the National Environmental Protection Measure ambient air quality standards, including those for sulfur dioxide. The action will also include programs for achieving these standards.

The responsible agency is the Department of Environmental Protection.

Action 30.2

Review the Environmental Protection (Kwinana) (Atmospheric Wastes) Policy and the Environmental Protection (Goldfield Residential (Sulfur Dioxide)) Policy 1992.

Implementation

The review of the Environmental Protection Policies for Kwinana and the Goldfields will set ambient limits for sulfur dioxide and will set or confirm required buffer distances.

The responsible agency is the Department of Environmental Protection. The Environmental Protection (Kwinana) (Atmospheric Wastes) Policy 1992 was reviewed in 1999 and the Environmental Protection (Goldfield Residential (Sulfur Dioxide)) Policy 1992 will be reviewed by 2000.

Carbon Monoxide



Suggested Response 31

Responses to reduce carbon monoxide should focus on reducing the reliance on motor vehicles for personal travel and improving technology to reduce vehicle emissions and wood heater and combustion stove emissions. These responses should be developed through the Air Quality Management Plan for Perth and include:

- adequate funding of existing alternative travel and education programs;
- promoting higher car occupancy;
- promoting travel alternatives, including public transport, cycling and walking;
- ensuring new vehicles have minimum emission levels, and that these are maintained over the life of the vehicle;
- ensuring urban development patterns and densities which promote short trips and public transport, walking and cycling; and
- ensuring emissions from wood heaters and combustion stoves are as low as possible given ongoing technological improvements.

The responsible agencies are the Environmental Protection Authority and the Department of Environmental Protection in collaboration with Departments of Health, Transport, Local Government, Resources Development, Conservation and Land Management, Main Roads Western Australia, Office of Energy and Ministry for Planning.

The Air Quality Management Plan for Perth (see Action 28.1 and 28.2) will also address the Suggested Responses for Carbon Monoxide.

Action 31.1

Develop and implement a Statewide Environmental Protection (Air) Policy adopting the National Environmental Protection Measure standards for carbon monoxide.

Implementation

A Statewide Environmental Protection (Air) Policy constitutes the key initiative for achieving the objectives for ambient carbon monoxide and for providing data for the indicators which measure air quality. It incorporates the relevant parts of the Government Response to the recommendations of the Select Committee on Perth's Air Quality.

Lead



Suggested Response 32

Monitoring of ambient atmospheric lead levels should continue.

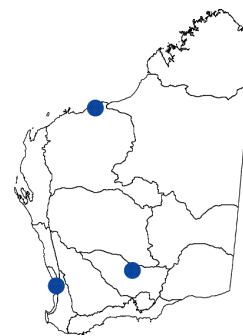
Action 32.1

Maintain ambient lead monitoring at peak sites.

Implementation

The Department of Environmental Protection will continue its monitoring program. Data from this monitoring program should continue to verify compliance with the National Environmental Protection Measure standards. Beyond compliance with the National Environmental Protection Measure, monitoring should verify a continuing decline in ambient lead levels.

Dust



Suggested Response 33

Future development should consider dust management as an integral component of environmental management strategies.

Standards concerning dust levels should be developed and enforced.

Studies are needed regarding the health effects of ambient dust.

The responsible agencies are the Environmental Protection Authority and the Department of Environmental Protection in collaboration with Departments of Health, Transport, Local Government, Resources Development, Conservation and Land Management, Main Roads Western Australia, Office of Energy and Ministry for Planning.

Action 33.1

Develop and implement a statewide Environmental Protection (Air) Policy adopting the National Environmental Protection Measure standards for ambient air quality and include an additional guideline for Total Suspended Particulates.

Implementation

The statewide Environmental Protection (Air) Policy constitutes the key action for achieving the objectives for ambient dust. Collection and reporting of data for the indicator, Total Suspended Particulates, which measures air quality relative to dust will also occur. This will be reported against the National Health and Medical Research Council or other appropriate goals for Total Suspended Particulates.

The Pilbara Air Quality Study, which is being undertaken as a co-operative effort between the Department of Environmental Protection and Pilbara industries, started in 1997 and is due to be completed in late 2000. The study will provide data and management tools applicable to a broad range of air quality issues, including dust management. The relationship between total suspended particulates and finer fractions of particulates, which are of concern in relation to health effects, will be determined via monitoring. The study will cost \$1.3 million over four years.

LAND

Land Salinisation



Suggested Response 34

Re-establish large areas of deep-rooted perennial vegetation and continue to improve high water-use farming systems throughout the agricultural landscape to address the hydrological imbalance.

Action 34.1

Research, develop and extend high water-use farming systems.

Implementation

It is expected that this action will result in reduced recharge, runoff and erosion as well as reduced rates of soil acidification. Work began in 1997 and will continue until 2001 as part of the Western Australian Salinity Action Plan and the National Dryland Salinity Program Phase 2.

The responsible agencies for this action are the Department of Conservation and Land Management and Agriculture Western Australia.

Action 34.2

Maritime Pine Program.

Implementation

This program aims to develop maritime pine as a major tree crop in the medium rainfall zone (400 to 600 mm). Initial planting of 4,500 ha has been undertaken in 1997 and 1998 in the Perth region (extending from the West Midlands to West Dale districts) and in the Mt Barker region. Operations started in the Esperance region in 1999. Planting is financed by the Department of Conservation and Land Management under 'crop share' contracts with farmers where revenue is shared in proportion to costs of land and operational inputs. The Department of Conservation and Land Management plans to expand operations across the medium rainfall zone over the next several years to reach a planting rate of 15,000 ha/year and a target total area of 150,000 ha (see Actions for the section on page 84).

Action 34.3

Oil Mallee Program.

Implementation

The Department of Conservation and Land Management initiated development of a eucalyptus oil industry in 1992. By 1998 some 400 growers had planted 7,000 ha. Total expenditure has been \$4 million by farmers, \$3 million by the Department of Conservation and Land Management and \$1 million from other State and Commonwealth Government programs (see Actions for the section on Forestry).

Action 34.4

Natural Heritage Trust State Agency Contribution to Land Conservation/Biodiversity Revegetation Project ('Meta-Project').

Implementation

The Natural Heritage Trust Meta-Project will improve the capacity of the Government agencies to deliver revegetation advice, will develop best practice designs for integrating nature conservation and sustainable agriculture and will support the Rural Towns Program and Salinity Action Plan Water Supply and Natural Diversity Recovery Catchments.

The project began in 1998 and will end in 2001. State agencies will fund \$13 million over this period and an additional \$4.9 million will be contributed from the Natural Heritage Trust.

The responsible agencies for this action are the Department of Conservation and Land Management and Agriculture Western Australia.

Suggested Response 35

Implement the *WA Salinity Action Plan* in consultation with the community.

Action 35.1

Implement the Western Australian Salinity Action Plan.

Implementation

Implementation of this action includes Actions 34–38, 53, 55 and 57. Implementation of the Western Australian Salinity Action Plan should result in:

- 500,000 ha of commercial tree crops in the medium rainfall zone;
- land conservation and biodiversity plantings and remnant vegetation protection in priority catchments;
- new high water-use crops and pastures in agricultural systems;
- revised drainage regulation and development of 'Best Practice' for drainage;
- hydrogeological information suitable for salinity management;
- new communication technologies and services;
- landholders in Focus Catchments implementing co-ordinated plans;
- implementation of plans for Recovery Catchments to protect water resources and biodiversity;
- implementation of plans to manage salinity in rural towns;
- measurement of the impact of the salinity problem and the effectiveness of the Western Australian Salinity Action Plan; and
- augmented clearing controls.

This action began in 1996 and will continue until 2026 and beyond.

Resources have been allocated in existing agency budgets. Detailed information on budget allocations are included in the Western Australian Salinity Action Plan (November 1996 and draft update 1998). The State Government has allocated funding peaking at \$44.2 million annually to the Salinity Action Plan.

Action 35.2

Revise authorisation and assessment procedures and provide statements of best practice for rural drainage.

Implementation

This review will result in new Government policy on rural drainage for salinity management and land reclamation from waterlogging and inundation in high rainfall areas. Findings from a study commissioned by the Minister for Primary Industries will be incorporated into this work.

Resources for implementation of this action are included in the Western Australian Salinity Action Plan.

Action 35.3

Review the Western Australian Salinity Action Plan.

Implementation

A project to review and update the Salinity Action Plan is underway, and community participation is a key element. The updated strategy will incorporate the latest thinking with concepts from the original plan. The strategy is likely to be available in early 2000. It is expected that the revised Plan will have greater acceptance of salinity management needs by a broad range of stakeholders.

Resources for implementation of new actions will be included in the updated action plan.

The State Salinity Council is working with the community and agencies to review the strategy and will seek endorsement from the State Government.

Action 35.4

Develop methods to accurately map soil salinity caused by irrigation and work with farmer groups to identify remedial measures. Develop land and water management plans which include the provision of best practice management advice.

Implementation

Methods will be developed to effectively map salinity associated with irrigation. This will provide information on a range of management options, including land drainage and will enable the assessment of possible environmental impacts from drainage for salinity control.

Resources for implementation of this action are included in agency budgets.

Agriculture Western Australia is the responsible agency for this action.

Suggested Response 36

Protect existing remnant vegetation on public and private lands, especially where they are at risk of the effects of rising saline groundwater.

Refer also to Actions 11.1–11.5 for information on activities to protect existing remnant vegetation.

Action 36.1

Remnant Vegetation Protection Scheme and State Revegetation Scheme.

Implementation

These schemes have been used to provide details on location of remnant vegetation requiring protection and have raised awareness in the community of the value of remnant vegetation.

High value remnants have been protected by conservation covenants. By mid-1998 42,581 ha were protected.

Revegetation is being designed strategically to support existing remnant vegetation.

Each year \$900,000 is allocated to the Remnant Vegetation Protection Scheme and \$500,000 is allocated to the State Revegetation Scheme (also see Action 18.1).

These programs began in 1997 and will cease in 2001. Both programs are administered by Agriculture Western Australia.

Action 36.2

Protection of remnant vegetation in Water Supply Recovery Catchments.

Implementation

The action has resulted in maps of remnant vegetation in Recovery Catchments and many landholders within Recovery Catchments are erecting fences to protect priority remnant vegetation. It is expected that all significant areas of remnant vegetation within Water Supply Recovery Catchments will be fenced by 2010.

The program began in 1996 and is due to be complete by 2010. Resources for implementation of this action are included in the Western Australian Salinity Action Plan.

The Water and Rivers Commission is the responsible agency for this action.

Suggested Response 37

A comprehensive education campaign should be implemented to ensure that people in urban areas are informed of the salinity threat in rural areas and its impact upon them.

Action 37.1

Salinity Communications Office.

Implementation

A Salinity Communications Office at CSIRO is funded by the National Dryland Salinity Program and the Western Australian Salinity Action Plan. This action involves identification of information users and their information needs regarding dryland salinity management, retrieval of dryland salinity management information from all sources and presentation and dissemination of information in ways that are readily accessible. It is expected that this will increase awareness of salinity, its impacts and its solutions by both urban and rural people.

Action 37.2

Raise awareness of urban communities about salinity issues through information and community group networking.

Implementation

Several existing programs are being used to implement this action:

- information about salinity is available on the Internet, in written format, by direct contact and by promotion co-ordinated through the Swan Catchment Centre and the Avon Catchment Network;
- an annual field day is held at 'Avondale' near Beverley with a major focus upon salinity issues;
- the 'Avon Ascent' self-drive information tour;
- the Landcare Pavillion at the annual Royal Show;
- displays at popular field venues that are attended by urban audiences, for example, Dowerin Machinery Field Day;
- the Swan-Avon Landcare Education Program; and
- inclusion of salinity management in broad tourism programs, such as the 'Avon Arc' initiative.

Agriculture Western Australia has provided general funding for these activities since the 1980's and this is expected to continue.

Action 37.3

Rural Liaison Officer with Conservation Council of Western Australia.

Implementation

A Rural Liaison Officer is funded by the State Government and the Commonwealth through the Natural Heritage Trust within the Conservation Council of Western Australia. This position is responsible for co-ordinating:

- the Rural Living and Landcare Education Experience program for Year 10 students;
- promotion of landcare to urban communities;
- developing exchange opportunities for broad landcare experience; and
- providing linkage of landcare initiatives with agriculture.

Suggested Response 38

Progressively implement the recommendations of the Farm Forestry Taskforce (1995).

Action 38.1

Farm Forestry Program.

Implementation

The Farm Forestry Task Force recommended the establishment of a Farm Forestry Development Group to provide a forum to improve planning and promotion of farm forestry in the high rainfall zone. It also recommended that a Farm Forestry Advisory Service be established. These bodies commenced in 1996. Funds are provided by the Department of Conservation and Land Management and Agriculture Western Australia with allocations of \$120,000 and \$300,000 in 1998/99 respectively. Additional funds are provided by the Commonwealth Department of Agriculture, Fisheries and Forestry's Farm Forestry Program, including \$300,000 in 1998/99. The program is due for completion at the end of 1999 (also see Actions 34.2 and 34.3).

Suggested Response 39

The Western Australian Government should develop economic instruments and tax reform as part of the pending national review of tax arrangements to complement the Western Australian Salinity Action Plan and initiatives addressing other environmental issues.

Taxation arrangements and opportunities to provide economic instruments for environmental policy are mostly within the jurisdiction of the Commonwealth Government. The State Government has regularly advocated an approach for better environmental outcomes during the recent reform of taxation arrangements. The State Government will continue in its efforts to improve national taxation arrangements and encourage the use of economic instruments for generating environmental benefits.

Action 39.1

Continue to develop economic instruments as part of the Salinity Action Plan and other Government policies which provide incentives and remove disincentives to the protection of the environment. Continue to encourage the Commonwealth Government to initiate similar reforms.

Implementation

The State Salinity Council will be considering various economic instruments to increase available resources for salinity management and improve land management. The detail of these actions are yet to be finalised and will be made available with the release of the revised Salinity Action Plan early in 2000 (see Actions 35.1 to 35.3).

The State Government is also pursuing economic instruments for the purposes of environmental protection through various other policies. For example, implementation of the National Strategy for the Conservation of Australia's Biological Diversity (Action 10.1) includes measures to provide financial incentives, cost reimbursements and rate rebates. In developing a Western Australian biodiversity strategy (Action 10.2) the State Government will also be considering economic instruments for biodiversity conservation.

Suggested Response 40

Fines for illegal land clearing should be significantly increased.

Action 40.1

Change legislation to allow for increased fines, and increased effectiveness of clearing controls.

Implementation

The remnant vegetation remaining in the wheatbelt has a vital role in preventing further deterioration in hydrological conditions, and its retention is far more cost effective than equivalent revegetation.

The importance of protecting remnant vegetation in agricultural areas is recognised in the Salinity Action Plan, and is also of vital importance for biodiversity protection.

Legal clearing has been minimised through the application of a cross-agency memorandum of understanding. Monitoring of the extent of vegetation change (which will highlight illegal clearing) is being achieved through the Land Monitor program.

Changes to the *Soil and Land Conservation Act 1945* (WA) and the *Environmental Protection Act 1986* (WA) are currently being used to increase fines which should result in a reduction in illegal clearing. Beginning in 1998, \$100,000 has been allocated to Agriculture Western Australia and the Department of Environmental Protection to complete the task.

Agriculture Western Australia, through the Commissioner for Soil and Land Conservation, has a key statutory role in preventing clearing in rural areas where it will lead to land degradation, such as salinity, and in co-ordinating the input of other agencies, particularly the Department of Environmental Protection, Department of Conservation and Land Management and the Water and Rivers Commission.

Action 40.2

Improved detection and prosecution of illegal clearing.

Implementation

The extent of illegal clearing is currently unknown. The Commonwealth Land Cover Change project will provide data to audit illegal clearing of native vegetation between 1990 and 1996. Ongoing monitoring through the Land Monitor project will ensure that those landholders that clear native vegetation illegally are prosecuted. The amount of resources required to implement this action will be determined once the extent of illegal clearing is known.

Suggested Response 41

Incorporate nature conservation and restoration into property management plans.

See Actions to Suggested Response 36 and Actions in the Biodiversity section of this report which highlight a range of measures for the protection of remnant vegetation on both private and public lands.

Action 41.1

Provide nature conservation advice to landholders for incorporation into their property management plans.

Implementation

As well as being incorporated into regional and catchment scale planning, nature conservation and restoration needs to be incorporated into management planning at the property level. The State Government is providing nature conservation advice to landholders through such means as the Natural Heritage Trust funded Bushcare program, Land for Wildlife Scheme, participation in regional and catchment planning processes, and through revegetation and other advisory services.

Land Contamination



Suggested Response 42

Remediation and prevention measures for land contamination should meet best practice management. A land contamination prevention strategy should be developed as part of the integrated contaminated sites management framework.

Action 42.1

Promote best environmental management of industry through the three-tiered environmental licensing system.

Implementation

The three-tiered licensing system offers a choice of licence type from regulatory licence, a monitored licence where industry monitor all waste discharged to the environment, to a best practice environmental licence which offers significant benefits to those industries where good performance is demonstrated, best practice environmental management systems are used and continual improvement is implemented. This system establishes clear management arrangements and regulatory conditions for industrial activities that encourage and require existing operations to modify those practices or activities that cause contamination.

The Department of Environmental Protection is the responsible agency for this action and \$587,000 is allocated per annum. The action began in mid-1996.

Action 42.2

Implementation of the national ban on the use of organochlorine chemicals.

Implementation

Another national collection of organochlorine chemicals is scheduled for 2000/2001 following a national ban on the use of organochlorine and national collection program for these chemicals in 1987.

The responsible agencies for this action are Agriculture Western Australia, the Department of Environmental Protection and Health Department of Western Australia.

It is expected that in 1999/2000, \$400,000 will be allocated to this action followed by \$800,000 in 2000/2001.

Action 42.3

Development of legislation complementary to proposed contaminated sites legislation for the protection of community health.

Implementation

A Public Health Bill will be developed for the protection of community health from hazardous land. This Bill will complement proposed amendments to the *Environmental Protection Act 1986* (WA). These amendments provide for the identification, registration, management and remediation of contaminated sites. These amendments are currently being drafted. They also provide additional powers to cover decommissioning to ensure that future closures do not leave contamination.

The combined legislative package should provide for better management of hazardous land and the prevention of land becoming hazardous.

Development of the Public Health Bill will take 18 months from mid-1999 and funding is within current resources.

Action 42.4

Assessment of current and historical land uses for the protection of water resources.

Implementation

This action is ongoing and allows for the development of policies, guidelines and codes of practice. These will ensure that best practice management is applied to different landuses for the protection of water resources.

The responsible agency is the Water and Rivers Commission. The action began in mid-1997 and is being funded within the current budget.

Action 42.5

Promote best practice management for remediation of contaminated land.

Implementation

This action is resulting in the development of State and national policies, guidelines, standards and codes of practice for best practice management in different land uses to protect public health and the environment.

The overall result should be the:

- establishment of clear legislative and administrative arrangements for the effective management/ remediation of existing contaminated sites;
- development of a National Environmental Protection Measure for the assessment of contaminated sites which facilitates appropriate decision-making on the remediation of contaminated sites; and
- cost effective and equitable protection of human health and the environment from land contamination.

The responsible agencies are the Department of Environmental Protection and Health Department of Western Australia. The Department of Environmental Protection receives \$50,000 per annum and Health Department of Western Australia receives \$70,000 per annum to implement this action.

Suggested Response 43

Establish an inventory of contaminated sites.

Action 43.1

Develop a register of contaminated sites.

Implementation

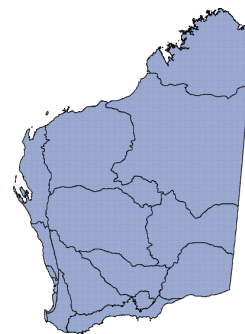
This action will create:

- legislative provisions for identifying contaminated sites;
- integrated planning and environmental assessment procedures to facilitate site identification;
- memoranda of understanding between key Government agencies for the provision of contaminated sites information;
- database on contaminated sites managed by the Department of Environmental Protection;
- database on contaminated groundwater managed by Water and Rivers Commission; and
- access arrangements for both databases.

The responsible agencies for implementing this action are the Department of Environmental Protection and the Water and Rivers Commission through the contaminated sites amendment to the *Environmental Protection Act 1986* (WA).

The Water and Rivers Commission is funded \$114,000 per annum and the Department of Environmental Protection is funded \$20,000 per annum to implement this action.

Erosion



Suggested Response 44

Implement the State Government policy *Managing the Rangelands*.

Action 44.1

Develop an Implementation Strategy for the *Managing the Rangelands* Policy.

Implementation

The implementation strategy for the *Managing the Rangelands* Policy will provide for the development of management plans, the training of leaders and development of management options.

The responsible agencies for this action are Agriculture Western Australia and the Department of Conservation and Land Management.

Development of the Strategy began in 1995 and is ongoing.

Action 44.2

The Rangeways Project.

Implementation

Regional landuse plans are being developed and are defining regional conservation objectives. The Rangeways Project should result in empowered local communities, defined multiple landuse options, and maximised regional incomes within the constraints of Ecologically Sustainable Development.

The responsible agency for the Rangeways Project is Agriculture Western Australia. Funding is provided by the Land and Water Resources Research and Development Corporation (\$750,000), the Commonwealth Department of Transport and Regional Development (\$250,000) and Agriculture Western Australia (\$550,000).

The Rangeways Project began in 1996 and will end in 2001.

Action 44.3

Implement the *Managing the Rangelands* Policy.

Implementation

Implementation of the *Managing the Rangelands* Policy will result in legislation to support sustainable rangeland enterprises and the encouragement of alternative landuses and strategic planning at the business enterprise level. In addition, regional monitoring of the pastoral resource will continue and will be used to produce regular reports on resource condition at the property level. Importantly, regional resource surveys will be conducted to establish a benchmark for the condition of rangeland areas.

The Policy will also result in management of severely degraded and eroded lands, management of species which pose a threat to rangeland resources, regional landuse planning strategies and the development of a comprehensive, adequate and representative conservation reserve system.

A new Pastoral Lands Board has been established under the *Land Administration Act 1997* (WA), with responsibilities to manage the rangelands in keeping with the principles of Ecologically Sustainable Development. The Department of Land Administration's budget includes an amount of \$270,000 per annum to support the Board's activities. Agriculture Western Australia provides a further \$683,000 in inspection and monitoring. Agriculture Western Australia has been allocated approximately \$3.5 million to implement the Policy and the Department of Conservation and Land Management has been allocated \$6.8 million over six years to acquire land for conservation reserves. Funds are also provided under the Gascoyne-Murchison Strategy.

Suggested Response 45

Further develop better management practices for erosion and communicate these to land managers. Preventative measures such as revegetation with natural vegetation and farming systems that conserve soil need to be developed and applied widely.

Action 45.1

Research, development and extension on minimum and zero tillage techniques.

Implementation

To minimise the extent and severity of erosion it is usually best to address the whole soil profile (for example, through reduced tillage and better vegetative cover) than to use distributed methods such as earthworks to control runoff and windbreaks to reduce wind velocities. This action involves research on minimum tillage, zero tillage and conservation farming systems and more importantly, field days and seminars to promote the results of this research to farmers.

The responsible agency for this action is Agriculture Western Australia in association with the West Australian No-Till Farmers Association. This action began in 1998 and will continue until 2001. Funding is shared equally between industry and government with a total of \$1.125m allocated per annum.

Action 45.2

Improving crop production in windbreak and alley farming systems.

Implementation

The uptake of windbreak and alley farming systems has been restricted by a perception and some evidence that these systems result in reductions in crop yields. This action will quantify the extent and magnitude of crop yield reductions in competition zone of trees. The impact of different strategies to reduce competition on crops and trees will be assessed and cost-benefit analyses of strategies will be carried out. In addition, the effects of competition management on water use and crop yield will be modelled to help design alleys.

It is expected that this action will result in greater yields by crops and trees in alley layouts and greater adoption of agroforestry for wind erosion and salinity control.

The responsible agency is Agriculture Western Australia and \$250,000 has been allocated per annum beginning in 1998 and concluding in 2002.

Suggested Response 46

Integrate the need to rehabilitate eroded lands with current and proposed revegetation strategies.

Action 46.1

Extension and demonstration of methods of stabilising soils.

Implementation

To minimise the extent and severity of soil erosion it is necessary to link the need with current revegetation strategies. The National Windbreaks Program of the Land and Water Resources Research and Development Corporation is a key initiative to achieve this. (See Action 45.2; some resources are also included in Actions 34.1 and 35.1)

Extension and demonstration of methods for stabilising soils will result in improved revegetation advice and will provide landholders with the skills to stabilise eroding soils.

The responsible agency for this action is Agriculture Western Australia which has been allocated \$150,000 per annum beginning in 1998 and ending in 2001.

Action 46.2

Continue efforts in the Ord River Regeneration Reserve.

Implementation

This action has been undertaken since the 1960s and is ongoing. It will result in the minimisation of sediment loss from Ord River Catchment and the long term sustainable yield of irrigation water from Lake Argyle.

Agriculture Western Australia is the responsible agency for this action and \$106,000 is allocated per annum.

Suggested Response 47

Develop more effective indicators of erosion for agricultural lands. There is an urgent need for a quantitative assessment and estimates of current annual sediment transport in key river basins including its current level of deposition along stream courses, in pools, in estuaries and out to sea.

Action 47.1

Measure sediment transport rates in selected streams and sedimentation in estuaries.

Implementation

Erosion research, development and extension can be better targeted if susceptible farming systems, climatic zones and soil-landforms are identified. This action is also an important component of implementing the Water and Rivers Commission's 'Waterways Western Australia' program (see Actions 60.1 and 60.2).

Total Suspended Solids are being measured at 50 sites throughout Western Australia and it is proposed to collect continuous turbidity and Total Suspended Solids at five additional sites in 1999.

This action should provide the ability to correlate turbidity measures with Total Suspended Solids and will enable relative measures of sediment load in waterways to be established.

The responsible agencies are the Water and Rivers Commission and Agriculture Western Australia.

Action 47.2

Estimate long term soil loss rates using the radioactive fallout tracer Cs-137.

Implementation

The Cs-137 technique will provide a statewide survey of long-term erosion rates for Western Australia. This will be published and used for educating land managers on soil erosion. The outcome should be better targeted erosion research, development and extension.

Agriculture Western Australia and the University of Newcastle have collaborated on the project. Agriculture Western Australia has allocated \$25,000 per annum. The work began in 1992 and is due to be completed in 2000.

Suggested Response 48

Develop an 'early warning system' which can trigger land managers to take steps to prevent or ameliorate land degradation events such as wind erosion.

Action 48.1

Implement the Vegewatch program.

Implementation

Historic erosion has been mapped using Landsat MSS and TM to identify erosion-prone areas and to identify poorly managed land.

Twice-monthly images of vegetation condition (NDVI) from NOAA AVHRR are being collected which provide a statewide overview of vegetation cover 24 times per year and erosion risk is interpreted from this overview. Remote sensing information is provided by the Department of Land Administration.

The responsible agency for implementation of Vegewatch is Agriculture Western Australia who have been allocated \$100,000 for the task. Vegewatch began in 1996 and is an ongoing commitment.

Soil Acidification



Suggested Response 49

Further monitoring of the extent of soil acidification.

Action 49.1

Regular soil surveys of abundant, high risk soils, representative of the range of important environments in agricultural areas.

Implementation

To alleviate the effects of agricultural soil acidification it is necessary to have a good measure of how quickly different soils are acidifying under current land uses.

The survey involves a frequency distribution of the pH of topsoil and subsoil of each soil type/environment which will be sampled every five years.

This will enable an ongoing assessment of the adequacy of soil acidification management in agricultural areas.

The responsible agency for this action is Agriculture Western Australia which will consider this as part of an overall review of its commitment to monitoring the condition of the agricultural resource base.

Suggested Response 50

Further research into less acidifying agricultural systems (crops, fertilisers and management).

Action 50.1

Evaluate the importance of the imbalance of cation-anion uptake by plants in the development of sub-soil acidification.

Implementation

Farming systems which reduce the rate of nitrate leaching through deeper-rooted and longer-active systems will also reduce recharge to saline groundwaters.

The pattern of nutrient uptake and hydrogen ion excretion is being examined in a number of split-root experiments which started in February, 1999.

The responsible agencies for this action are Agriculture Western Australia, University of Western Australia, CSIRO, and the Centre for Legumes in Mediterranean Agriculture. The work is being funded by the Grain Research and Development Corporation costing \$60,000 per year. This action began in July 1998 and will end in June 2001.

Action 50.2

Determine the effect of annual and perennial species on drainage, the input, turnover and fate of legume-fixed nitrogen, anion and cation leaching, and soil acidification, for a soil in the 400 mm rainfall zone.

Implementation

This action is established to facilitate multi-disciplinary research on nutrient and soil water movement and acidification, in the context of rotation treatments.

It is expected that the action will provide an understanding of the factors affecting acidification.

The responsible agency for this action is Agriculture Western Australia who has provided funding jointly with CSIRO, the Grain Research and Development Corporation and the Centre for Legumes in Mediterranean Agriculture. The action began in July 1998 and is expected to be completed by June 2002. \$260,000 has been allocated per annum.

Action 50.3

Test agricultural systems that are predicted to minimise soil acidification.

Implementation

This action should provide an understanding of the practicality of reducing the rates of acidification under farming systems. It will do this by:

- measuring the rates of acidification at sites in the medium to high rainfall areas of the south west of Western Australia;
- defining and categorising the mechanisms of acidification under a number of agriculture systems; and
- measuring acidification over ten years under agriculture systems that are predicted to minimise soil acidification.

The responsible agency for this action is Agriculture Western Australia who will fund the work jointly with the Land and Water Resources Research and Development Corporation costing \$150,000 per annum for five years then \$50,000 per annum for a further five years. The final five years of this action will be funded by Agriculture Western Australia. The action began in 1993 and is due for completion in 2002.

Suggested Response 51

Further education about the costs of managing soil acidification and benefits of applying lime.

Action 51.1

Conduct research to ensure adequate understanding of biophysical aspects of management of soil acidification.

Implementation

Currently farmers are not applying enough lime to counteract the acidifying effects of agricultural practices.

Field experiments will be conducted to monitor the opportunities and threats associated with soil acidification management.

The responsible agency for this action is Agriculture Western Australia who have provided \$180,000 per annum jointly with the Grain Research and Development Corporation (this allocation is also for Action 52.2 below). The research began in 1997 and will be complete by 2002.

Action 51.2

Undertake a comprehensive extension program.

Implementation

The objectives of this action are to increase the proportion of landholders who are applying lime and increase the understanding of soil acidification and its management amongst landholders and their advisors.

Information resources will be provided for key groups (landholders and providers of information for landholders). This will culminate in a report on level of adoption of liming by landholders and level knowledge of landholders and their advisors.

The responsible agency for this action is Agriculture Western Australia. The action began in July 1997 and is due to be completed in June 2002.

Suggested Response 52

A State Lime Strategy should be developed to secure lime sources and protect areas of conservation value.

The timeframe, human and financial resources required to implement the strategy will be determined by Action 52.1 above. A draft strategy is expected to be available for Cabinet consideration in 2000.

Action 52.1

Prepare a project brief to develop a State Lime Supply Strategy and submit to State Cabinet.

Implementation

Liming is an important method of alleviating soil acidity. In mining lime it is important to minimise the impact on nature conservation and other land uses.

It is expected that this action will lead to the development of a State Lime Supply Strategy to provide lime resources throughout Western Australia for the next 50 years.

The responsible agencies are the Department of Resource Development (lead agency) with Department of Minerals and Energy, Department of Environmental Protection, Department of Conservation and Land Management, Ministry for Planning and Agriculture Western Australia.

Development of the Strategy is being met from within current operating budgets.

Action 52.2

Implement a project to develop State Lime Supply Strategy.

Implementation

The strategy will include reports on:

- predicted demand for lime over the next 50 years;
- location, quality and size (where the information is available) of potential strategic lime resources;
- environmental, urban development, industrial development and heritage issues associated with the extraction of lime resources;
- recommendations of lime deposits to be reserved for lime extraction and legislation changes required to effect security of resource availability; and
- costed recommendations for a phased program of action to implement the strategy.

The strategy is expected to resolve security of supply for industries requiring lime over the next 50 years and will provide confidence that potentially competing interests (for example, conservation, urban development and heritage issues) have been satisfied.

Waterlogging



Suggested Response 53

Implement the WA Salinity Action Plan including surface water control measures.

Action 53.1

Water management plans implemented in Focus Catchments.

Implementation

Comprehensive water management plans will be developed which address waterlogging, water erosion, on-farm water supplies and recharge. These plans will be developed by hydrologists and landcare technicians.

It is expected that this action will reduce waterlogging, water erosion, inundation, water shortages and recharge on catchments which have gone through the Focus Catchment process.

The responsible agency is Agriculture Western Australia. \$450,000 has been allocated to the work which began in 1997 and is due for completion in 2005.

Suggested Response 54

Develop improved soil and surface water management practices.

Action 54.1

Improved farming systems for waterlogged soils – bedding drainage for cropped soils and farming systems for waterlogging-prone sandplain soils.

Implementation

Improved practices will reduce the extent and damage caused by waterlogging and inundation. Reduced tillage improves soil structure and infiltration while drainage removes excess water before it causes plant damage, becomes recharge or causes erosion and eutrophication.

This action involves:

- production of reports to the Grain Research and Development Corporation on raised beds and farming systems for waterlogging-prone sandplain soils;
- a newsletter for farmers interested in bedding drainage; and
- investment analyses and improved availability of bed formers and seeders from commercial machinery companies.

The expected result is decreased waterlogging and increased crop yields, improved water conservation, reduced disposal of excess water and improved knowledge on nutrient flows in drains and catchments.

The responsible agency is Agriculture Western Australia who have allocated \$500,000 per annum beginning in 1998 and ending in 2000.

Suggested Response 55

Develop and evaluate new enterprises requiring water harvesting and use, for example, aquaculture. These should be developed within strict environmental guidelines.

Action 55.1

Integrated research, development and extension on engineering methods of controlling water that are linked with aquaculture opportunities.

Implementation

This action involves the development of growth path plans for inland saline aquaculture. These will be supported by market analyses and economic decision support tools, environmental management standards for aquaculture using inland saline water and demonstration sites for aquaculture facilities which are linked to water management solutions.

It is expected that this action will lead to increased investment in inland aquaculture as viable environmentally sustainable on-farm diversification. It should also reduce costs for engineering solutions to waterlogging.

The responsible agencies are Fisheries Western Australia and Agriculture Western Australia. Over \$100,000 has been allocated to the task. Work began in 1997 and will conclude by mid-2004. Fisheries Western Australia provides principal funding for aquaculture development. Substantial contributions have also been made by the Sea Water Inland Fin Fish Association, the Great Southern and Wheatbelt Development Commissions and Edith Cowan University. The work is also supported by Aquaculture Development Fund, the Rural Adjustment and Finance Corporation and the Fisheries Research and Development Corporation.

Suggested Response 56

Use appropriate technology, for example, satellite imagery, to monitor waterlogged and saline areas to assist in providing information for improved practices.

Action 56.1

Continue to implement the AgImage program.

Implementation

Knowing the extent of waterlogging will increase the likelihood of correct diagnosis of poor crop growth and a response by farmers. At present the losses caused by waterlogging go largely unrecognised.

Maps of crop and pasture yield variability are being produced from satellite images which are also being used for farm and catchment planning. This action should contribute to an increased response from farmers to waterlogging damage in crops and pastures. It is also assisting in the development of precision farming methods that decrease the need for chemical input and increase crop yields.

The responsible agencies are the Department of Land Administration and Agriculture Western Australia. \$300,000 has been allocated per annum. Mapping for the AgImage program began in 1995 and was completed in 1998. Implementation of the results of the Program are ongoing.

Action 56.2

Implement the Land Monitor Project.

Implementation

High resolution digital elevation models are being produced that are suitable for two metre contours. These are being used to generate maps of the spread of salinity and change in perennial vegetation condition since 1987/88, and ortho-photographs and predictions of the area that may be affected by salinity in the year 2020.

This action is expected to result in: better farm and catchment plans (including plans to address salinity affecting towns, roads, wetlands, water resources and native vegetation); increased awareness of the size and rate of spread of salinity by farmers and agencies; and increased awareness of the rate of degradation of perennial vegetation and extent of plantations and revegetation.

The responsible agency for this project is the Agriculture Western Australia. Government agencies and the CSIRO have allocated \$1.46 million per annum to the project which began in 1998 and will be complete in 2001.

INLAND WATERS

Salinisation of Inland Waters



Suggested Response 57

Implement the Western Australian Salinity Action Plan by expanding programs to recover and protect catchments, which have high wetland, biodiversity, and potable water supply values, and to protect important infrastructure under threat from salinity. Support community and farmer groups in the development and implementation of catchment management plans to achieve their defined salinity targets.

Action 57.1

Implement the Western Australian Salinity Action Plan.

Implementation

Implementation of the Salinity Action Plan began in 1996. Recovery Plans and Implementation Strategies have been developed for the Warren River Catchment, Wellington Catchment, Kent River Catchment, Denmark River Catchment and Mundaring Weir Catchment.

Other actions in this document outline specific components of the Western Australian Salinity Action Plan (see Actions 34–38, 53 and 55).

Resources have been allocated in existing agency budgets. Detailed information on budget allocations are included in the Western Australian Salinity Action Plan. The State Government has allocated funding peaking at \$44.2 million annually to the Salinity Action Plan.

Loss of Fringing Vegetation



Suggested Response 58

Large scale fencing and restoration of fringing vegetation is necessary to achieve the State's environmental objective for fringing vegetation. Establish vegetated waterway protection corridors on at least 50% of substantial streamlines by 2010. Corridors should be of adequate width to meet ecological functions. Guidelines should be flexible to meet the needs of the river environment and the local community. A research program is required to determine specific widths for protection corridors and buffer functions.

Action 58.1

Fencing and restoration of fringing vegetation.

Implementation

Several initiatives are contributing to the fencing and restoration of fringing vegetation. The South West Wetlands Environmental Protection Policy provides for best management practices in managing wetlands. Agriculture Western Australia provides farmers with demonstrations and advice on Streamlining techniques and is co-ordinating fencing activities through the Ellenbrook Natural Heritage Trust project.

The Water and Rivers Commission's Waterways Western Australia and Rivercare Programs are ensuring ongoing fencing and restoration of fringing vegetation on a priority basis across the State.

Agriculture Western Australia provide support and planning for community fencing of fringing vegetation. This is an ongoing program of Government.

Action 58.2

Establish vegetation waterway protection corridors on at least 50% of substantial streamlines by 2010.

Implementation

Agriculture Western Australia provides planning and technical support for vegetation establishment on strategic streamlines through Integrated Catchment Management groups, 50 Landcare groups and 14 Land Conservation District Committees within the southwest Agriculture Western Australia Sustainable Rural Development region.

The Water and Rivers Commission, through Waterways Western Australia and River Restoration programs, is providing support and technical advice to community groups and Local Government.

Agriculture Western Australia allocates \$150,000 to planning and technical support for the establishment of vegetation on strategically important streamlines by community groups.

This action is ongoing and is part of the Salinity Action Plan (see Action 57.1).

Action 58.3

Research program to determine specific widths for protection corridors.

Implementation

Government is currently conducting research into the widths required for riparian protection corridors. Research in the Albany hinterland under the National Riparian Zone Program is working on trapping efficiency (sediment and nutrients) of restored fringing vegetation.

Trials on the Blackwood River will provide information on vegetation densities and widths for protection corridors.

Agriculture Western Australia has allocated \$316,000 to this action with support from the Water and Rivers Commission. This work began in 1996 and is due for completion in 2001.

Suggested Response 59

Research into fringing vegetation zone restoration technologies is needed.

Action 59.1

Conduct research into fringing vegetation zone restoration technologies.

Implementation

Research is currently being conducted under the National Riparian Zone Program to examine trapping efficiency (sediment and nutrients) of restored fringing vegetation.

Trials on the Blackwood River will provide information on vegetation densities and widths for protection corridors.

Knowledge is also being gained from the various landowner and community group projects that are being conducted in Western Australia.

Knowledge and understanding of fringing zone restoration technologies can be transferred and used by Local Government and community groups across the State.

Suggested Response 60

Waterway and wetland restoration programs are necessary, as part of state strategies, regional strategies and catchment plans, linked strongly to catchment based revegetation programs.

Action 60.1

Waterways Western Australia – technical support and co-ordination for community groups.

Implementation

Community groups are leading the way in preparing restoration programs for waterways and wetland restoration. The Waterways Western Australia project will support these community-based activities through the provision of technical support and the co-ordination of the many community groups involved.

Agriculture Western Australia is developing a number of sub-catchment plans which will eventually be expanded to cover all key catchments in the Salinity Action Plan.

Technical support and tools are being made available to all community groups and Local Government authorities. Agriculture Western Australia allocates \$5,000 per annum to provide this support.

Action 60.2

Waterways Western Australia – river and wetland restoration program, training and technical support.

Implementation

The Waterways Western Australia program involves river and wetland restoration and the provision of training and technical support. This should result in improvements in the training of people involved in river and wetland restoration.

The Water and Rivers Commission have allocated \$586,000 to this program which began in 1998 and will be ongoing.

Suggested Response 61

A long-term program based on the initial work of the Wild Rivers Project should be developed for mapping and assessing the northern rivers of Western Australia in a co-operative approach with community groups. This should be designed to complement the Monitoring River Health Initiative.

Action 61.1

Protect rivers identified in the Wild Rivers Program.

Implementation

The State Government has contributed to the Commonwealth's Wild Rivers program. Agriculture Western Australia's Rangeland Resource Inventory and Condition Surveys have provided data for this program and for the State of the Northern Rivers Report. It is hoped that this information will lead to improved land management for the protection of Wild Rivers.

Agriculture Western Australia allocated \$246,000 to this project which began in 1994 and will end in 1999.

The Water and Rivers Commission will include the protection of wild rivers in the Waterways Western Australia Program.

Suggested Response 62

Specific clearing controls on fringing vegetation and measures to facilitate restoration should be introduced. Formal planning mechanisms should be used to protect existing areas of fringing vegetation to ensure that development prevents any further losses.

Action 62.1

Introduce clearing controls.

Implementation

The existing system of augmented clearing controls provides for the control on clearing of fringing vegetation. The South West Wetlands Environmental Protection Policy contains a provision for control in relation to registered wetlands.

Agriculture Western Australia allocates \$870,000 per annum to administer clearing and other regulatory controls which are continuing to be refined. This action is also included in the section on Biodiversity, Action 15.1.

Action 62.2

Formal planning mechanisms.

Implementation

Streams and rivers are protected through planning mechanisms as normal practice, especially by Local Government. The State Government is developing a Foreshore Policy to guide development along foreshore areas. A Water Sensitive Design Manual has been developed to provide guidance for developers which can assist in the protection of remnant vegetation.

The Water and Rivers Commission have allocated \$4,000 to this action and the Ministry for Planning have allocated \$7,000.

Eutrophication



Suggested Response 63

Develop a framework for determining environmental values and solutions to eutrophication in Western Australia, based on the National Water Quality Management Strategy by 1998. Determine environmental values by 2000.

Action 63.1

As a part of Waterways Western Australia, develop a statewide River Protection Policy.

Implementation

As part of the Waterways Western Australia program, statewide river protection policies will be developed to ensure that a comprehensive, adequate and representative system of river environments are protected and that rivers are managed according to set environmental quality criteria.

The program will also provide advice and tools for river protection, restoration and reduction of nutrients. Priorities will be established across the State for the management of nutrients.

Local Government, community groups and landowners are co-operatively managing catchments and waterways to minimise the impacts of nutrients.

The Water and Rivers Commission has allocated \$425,000. Development of policies began in 1996.

Action 63.2

Develop environmental targets for nutrients and associated parameters. Continue to evaluate techniques to reduce nitrogen and phosphorus in surface waters and estuaries.

Implementation

Environmental targets will be established for the catchment and estuarine water quality of systems under stress.

Further, nutrient reduction techniques will be developed that are applicable to Western Australian conditions.

The eutrophication action plan for Swan-Canning is being implemented with specific nutrient targets.

A reduction in the inputs and stores of nutrients available to fuel algal blooms is expected to result from this action for all affected waterways.

Agriculture Western Australia has currently allocated \$175,000 for this initiative and the Water and Rivers Commission has allocated \$200,000. Work began in 1999 and will be complete by 2004. An additional \$14 million has been allocated to the Swan-Canning between 1999 and 2004.

Action 63.3

State Groundwater Environmental Protection Policy.

Implementation

A State Groundwater Environmental Protection Policy is in development. This policy will provide a framework for the protection of the environmental values of groundwater in Western Australia.

Development of the Policy began in 1997 and will be complete in 2000 when it is expected the necessary *Environmental Protection Act 1986* (WA) amendments may be proclaimed. The Department of Environmental Protection has allocated approximately \$15,000 to the Policy's development.

Suggested Response 64

Eutrophication Action Plans should be developed including restoration programs for all affected waterways. These should provide support for integrated catchment management initiatives and incorporate a community education program.

Action 64.1

Develop and implement an Integrated Natural Resources Management Policy.

Implementation

The State Government is developing a new Natural Resources Management Policy for Western Australia. This will provide a structural framework for integrated natural resource management in Western Australia.

This policy will ensure that natural resources, including waterways and nutrients, are managed so as to meet agreed targets across the State.

Integrated Natural Resources Management Plans are being developed in several regions. The responsible agencies for this action are the Water and Rivers Commission, Agriculture Western Australia, the Department of Conservation and Land Management and the Department of Environmental Protection.

Agriculture Western Australia has allocated \$873,000 to the development of Integrated Natural Resources Management Plans in Western Australia.

Development of the Integrated Natural Resources Management Policy began in 1997.

Action 64.2

Develop and implement a Wilson Inlet Action Plan.

Implementation

The Water and Rivers Commission will ensure development of a Wilson Inlet Action Plan including catchment management measures to conserve and restore the Inlet and prevent any future increases in nutrient inputs.

The Plan will require community participation in the management of Wilson Inlet. A research program conducted under the National Eutrophication Management Program and due to be completed in 1999 forms the basis of the Plan.

The Plan begins development in 2000 and it is expected to be complete in 2001. The Water and Rivers Commission has allocated \$177,000 to develop and implement the Plan.

Action 64.3

Continue the Infill Sewerage Program.

Implementation

Under the Infill Sewerage Program all unsewered areas will be seweraged to prevent future inputs of nutrients into groundwater. The program will also ensure that wastewater treatment plants do not pollute waterways.

The Infill Sewerage Program began in 1995 and once fully implemented in 2005 nutrient inputs from sewerage and wastewater will have been reduced to required standards in all areas.

The responsible agency for this action is the Water Corporation which has allocated \$800 million dollars to its completion.

Action 64.4

Develop a project to facilitate the development of Wetland Management Plans for Western Australia.

Implementation

The Water and Rivers Commission will support the development and implementation of community-based wetland management plans in Western Australia. This will be consistent with national and international policy in this area and will ensure that management plans and structures are established, especially for high value wetlands.

Under the plan the community will be informed of the importance of the State's wetlands and encouraged to manage them so as to protect their ecosystem and social values.

The Water and River Commission has allocated \$81,000 to develop the project which is due to be completed in 2000.

Suggested Response 65

A process for establishing and reviewing best land management practices should be developed. Best land management practices (including water sensitive urban design principles) should be implemented for priority waterways, by 50% of land-users by 2010 and 100% by 2020.

Action 65.1

Develop best land management practices for rural areas.

Implementation

Agriculture Western Australia will assist in meeting the environmental objectives of Western Australia through improved practices and expects to reduce nutrient inputs to rivers and estuaries from agricultural activities.

This program will ensure that catchment plans are developed and implemented on a priority basis throughout rural Western Australia.

Research will be conducted on vegetation indicators and this will include monitoring and reporting on condition and trends for the range of environmental indicators and indicators of ecological sustainability.

Agriculture Western Australia will develop standards for land management with industry and provide the means to successfully meet targets for adoption.

Regulatory controls primarily come under the *Soil and Land Conservation Act 1945* (WA) and the *Environmental Protection Act 1986* (WA).

Action 65.2

Develop and implement best land management practices for urban areas.

Implementation

Water Sensitive Design principles will be adhered to by all State agencies. A Stormwater Practitioner Manual provides ongoing advice and support for best practice management.

This will assist in improving stormwater management and is expected to reduce pollution of waterways. The Water and Rivers Commission has allocated \$15,000 to promote the use of the "Manual for Managing Urban Stormwater Quality in WA" which was released in August, 1998.

Sedimentation



Suggested Response 66

There is an urgent need to establish realistic long-term targets to achieve the objective for sedimentation of waterways. The targets should be based on research findings and an agreed approach to sediment monitoring by the end of 1999. Investigations to determine the source of sedimentation will take time and should be targeted at priority waterways where sedimentation is causing significant problems.

Action 66.1

Establish long-term targets to reduce sedimentation in waterways (also see Actions for the issue of Soil Erosion on page 44).

Implementation

Agreement on long term targets to reduce sedimentation will rely on an understanding of sources and causes of sediment transport. Research is being undertaken in priority river systems. Management measures and tools will be established and made available to help meet these targets. Targets will be set to meet the State's environmental objective for sedimentation and this will ensure a reduction in erosion and sediment transport to acceptable levels in affected areas and reduced sedimentation in waterways.

The agencies that are responsible for setting targets in collaboration are the Water and Rivers Commission, Agriculture Western Australia and the Department of Environmental Protection.

Funding is integrated into Agriculture Western Australia's Sustainable Rural Development Program, and the Water and Rivers Commission's Waterways Western Australia Program. This work will be ongoing but directed to priority rivers and estuaries.

Suggested Response 67

Establish vegetated waterway protection corridors (see Loss of Fringing Vegetation).

Action 67.1

Establish vegetated waterway protection corridors.

Implementation

See Action 58.2.

Suggested Response 68

Restore river pools in the most affected rivers (where pools have been completely filled) by 2010. It may not be possible to restore all river pools and restoration programs should be developed to reflect the new dynamic equilibrium of river systems.

Action 68.1

Restore river pools in the most affected areas by 2010.

Implementation

The most affected rivers will have river pools restored by 2010. This will also involve research on causes of degradation of river pools so as to prevent ongoing sedimentation and may require implementation of management and action plans for restoration.

Work on river pool restoration has begun in priority waterways like the Avon, Blackwood, King and Kalgan Rivers. This is a key part of the Waterways Western Australia Program and priorities are established in partnership with local governments and communities. Funding is shared between State and local government with some industry sponsorship.

Suggested Response 69

Minimise the discharge of sediment from rural and urban drains to be at ecologically sustainable levels by 2020.

Action 69.1

Minimise discharge of sediment from rural and urban drains to ecologically sustainable levels by 2020.

Implementation

Best management practices including water sensitive design will be implemented for all rural and urban drains on a priority basis. Best Management Practices Guidelines will be made available including Design Manuals. This action is part of Action 65.1 and 65.2.

Local governments will be encouraged to incorporate water sensitive design considerations into development approvals processes. Landowners and community groups will be encouraged to implement best management practices to ensure that environmental objectives are met.

Support and advice for the prevention of sediment discharge is currently available from the Water and Rivers Commission for Local Government, landowners and community groups.

Suggested Response 70

In consultation with the community, ensure best land management practices to reduce erosion and sedimentation are adopted, particularly in priority catchments by 50% of land-users by 2010 and 100% by 2020.

Action 70.1

Ensure best land management practices are adopted by 50% of land-users by 2010 and 100% by 2020 (also see in the section on Soil Erosion on page 44).

Implementation

See Actions 65.1 and 65.2 and 69.1. In addition, training and design manuals and support and advice will be available to Local Government, landowners and community groups.

The overall outcome will be better managed land on farms and developments as well as roads so that erosion is minimised. Also the program is expected to create an increased awareness of sedimentation and soil erosion. The incorporation of best management practices into landuse and land development will become a normal component in decision-making.

Agriculture Western Australia has currently allocated \$50,000 to participate in this action within rural areas.

Suggested Response 71

As part of the long-term program for mapping and assessing the northern rivers of Western Australia, major sediment sources should be identified and rehabilitation plans implemented. Responses apply to rural and urban areas and should be developed as a component of the State's integrated catchment management policy.

Action 71.1

Mapping of major sediment sources and implementation of rehabilitation plans (also see Action 61.1).

Implementation

Major sediment sources will be mapped and used in the development of rehabilitation plans. Also see Actions 68.1 and 60.1.

Work on river pool restoration has begun in priority waterways like the Avon, Blackwood, King and Kalgan Rivers. This is a key part of the Waterways Western Australia Program and priorities are established in partnership with local governments and communities. Funding is shared between State and local government with some industry sponsorship.

Contamination of Inland Waters



Suggested Response 72

The effectiveness of responses to ban or restrict some pesticides has not been assessed and could be linked to the Monitoring River Health initiative.

Action 72.1

Assess effectiveness of responses to ban or restrict some pesticides.

Implementation

The Water and Rivers Commission will assess the required level of monitoring for pesticides and will estimate the costs involved for the consideration of potential funding bodies. This assessment will be completed by December 1999.

Codes of practice and licensing of pesticide operators continues and monitoring is in place in some areas to test water quality against water quality criteria.

With increased monitoring, the effectiveness of banning and restricting selected pesticides on contamination of waterways can be evaluated.

Suggested Response 73

Environmental guidelines are not available for acceptable levels of contaminants in stream and wetland sediment. The Environmental Protection Authority should review the guidelines for soil contamination and develop a suitable set of guidelines for assessing contamination in sediments.

Action 73.1

Develop suitable guidelines for assessing contamination in sediments.

Implementation

Guidelines will be developed by the Department of Environmental Protection for consideration by the Environmental Protection Authority in order to provide a uniform approach to the assessment of contaminated sediments and to provide targets for management measures that are in place across the State.

Suggested Response 74

All significant point sources of contaminants should be identified by 1998 and be fully regulated by the year 2000 as part of a statewide contamination strategy. As part of this strategy, site specific management plans should be implemented for contaminated groundwater plumes.

Action 74.1

Maintain accurate, up-to-date information on contaminated sites in Western Australia.

Implementation

Reports on levels of contamination in specific water bodies are produced by the Water and Rivers Commission. These reports will continue and will be guided by the environmental indicators for the contamination of inland waters. Management strategies will be implemented to address problem areas as they are identified. Also refer to Action 43.1.

A database of the locations of point sources of pollution will be maintained by the Department of Environmental Protection as part of the National Pollutant Inventory. The inventory will be fully implemented and available to the public by early 2000.

The Water and Rivers Commission has developed a groundwater contaminated sites database, called LEGACI. The annual cost of this database is \$114,000 (see Action 43.1).

Suggested Response 75

A strategic system of monitoring contaminant loads into major waterbodies subject to significant human pressure to be in place by the year 2000. Again, this will need increased funding and resources in the future.

Action 75.1

Develop a strategic system of monitoring contaminant loads into major waterbodies subject to human pressure by 2000.

Implementation

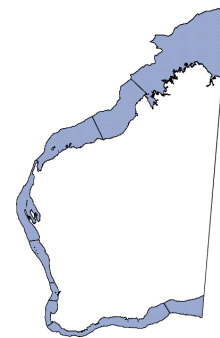
Protocols for environmental indicators and the methods of collecting, analysing and reporting contamination of inland waters will be established by the Water and Rivers Commission and the Department of Environmental Protection. This is a part of Action 72.

Targets will be established for priority waterways in Western Australia and this will provide a clear comparison of water quality criteria with targets.

This will be another important component of the Waterways Western Australia Program (see Actions 60.1 and 60.2).

MARINE

Degradation of Marine Habitats



Suggested Response 76

Establish a representative system of marine conservation reserves in line with the Government's New Horizons policy.

Action 76.1

Implement the State Government's marine conservation and management policy as outlined in New Horizons - the way ahead in marine conservation and management (also see Action 11.3).

Implementation

This action is expected to result in comprehensive and adequate preservation of representative as well as special ecosystems in the marine environment. Also a formal management framework will ensure the various uses of marine conservation reserves are managed in an equitable, integrated and sustainable manner.

The principal thrust of the Government's marine conservation effort will be to have one comprehensive reserve system under the *Conservation and Land Management Act 1984* (WA).

The responsible agency for this action is the Department of Conservation and Land Management which has allocated \$2.6 million per annum to implement the policy. Work will be ongoing.

Action 76.2

Establish a system of Fish and Fish Habitat Protection Areas.

Implementation

A statewide system of fish habitat protection areas is being developed.

This should result in more effective management of fish and the protection of habitats that are important to fish populations.

Fisheries Western Australia is the responsible agency for this action and have an allocation of \$700,000 per annum for the program.

Suggested Response 77

Identify areas of increasing pressure, damage or threat and implement regional strategic action plans for their protection and rehabilitation (such as Pilbara and Perth Metropolitan marine regions).

Action 77.3

Complete regional fisheries management strategies.

Implementation

Fisheries Western Australia has been developing regional recreational fisheries management strategies. These strategies will continue with development of complementary regional fisheries environmental management strategies.

The outcome from these strategies should be more effective management of fish resources and consequent lowering of pressure on the marine environment and the conservation of fish stocks.

Fisheries Western Australia will expend \$20,000 in 1999/2000 to continue this program.

Action 77.4

Develop a State Marine Planning Strategy for Western Australia.

Implementation

The Ministry for Planning will lead the development of a State Marine Planning Strategy for Western Australia in close liaison with the Department of Conservation and Land Management and Fisheries Western Australia. The Strategy will have the objective of developing a co-ordinated approach to planning in the marine environment. Additional works and the need for local area plans will also be identified in the Strategy.

The Strategy will begin to be developed in 2000 and will be complete in 2002.

Suggested Response 78

Improve our knowledge of important marine habitats and resources through a co-ordinated research and monitoring program. Identify, map and establish baseline conditions of habitats.

Action 78.1

Expand the role of the Western Australian Land Information System Marine Working Group to co-ordinate marine habitat mapping and environmental research and monitoring.

Implementation

This initiative provides much of the information required to meet the State's environmental objectives for marine habitats and will provide data for the indicators in the State of the Environment report.

There are several agencies currently collecting information on the marine environment and its resources. This action will provide for systematic, co-ordinated mapping of the State's marine habitats at the broad scale (1:100,000) for the entire State and the fine scale (< 1:10,000) for areas under significant pressure. A Statewide database of human usage is being developed at the broad scale (1:100,000) for the entire State and at the fine scale (< 1:10,000) for areas under significant pressure.

The responsible agency for this action is the Department of Conservation and Land Management through the Western Australian Land Information System Marine Working Group.

Suggested Response 79

Develop a public information program to ensure users of the marine environment act responsibly and do not damage important habitat.

Action 79.1

Develop mechanisms to co-ordinate existing agency education programs and identify gaps.

Implementation

Current education programs address the management of all human-induced pressures on the marine environment.

A co-ordinated approach will enable more focused public information programs and will result in more care being taken of the marine environment. It will have a positive impact on the health of the marine environment through changes in community behaviour and may reduce the number and extent of threatening processes.

All departments with responsibilities within the marine environment carry out public information programs, including:

- Fisheries Western Australia's Voluntary Fisheries Liaison Officer program, website publications and Community Awareness Division;
- the Department of Conservation and Land Management; and
- the Department of Transport which circulates information when approving boating licences.

The responsible agencies for this action are the Department of Conservation and Land Management, Fisheries Western Australia and the Department of Transport. Resources are available from within current agencies' budgets.

Suggested Response 80

Based on the precautionary principle and the objectives in this report, the Environmental Protection Authority should complete the development of a consistent set of guidelines for environmental impact assessment for the protection of the State's marine benthic primary producer habitats.

Action 80.1

Complete the guidelines for environmental impact assessment - Marine Benthic Primary Producer Habitat Protection.

Implementation

The development of a consistent set of guidelines for environmental impact assessment will improve the maintenance, protection and enhancement of marine ecosystems. It will limit the loss of various habitat types and will reduce the number and extent of threatening processes.

The Environmental Protection Authority currently assesses the environmental impacts of development proposals and has the objective of minimising cumulative impact on marine benthic communities.

Fisheries Western Australia assesses and monitors aquaculture proposals to ensure that their impacts on benthic communities are minimised. The preparation of trawl bycatch reduction plans by Fisheries Western Australia will contribute to the protection of marine benthic communities.

The responsible agencies for developing the guidelines are the Environmental Protection Authority and the Department of Environmental Protection.

The development of these guidelines began in 1997 and will be completed in 2000.

Action 80.2

Produce guidance documents for specific benthic primary producer habitats.

Implementation

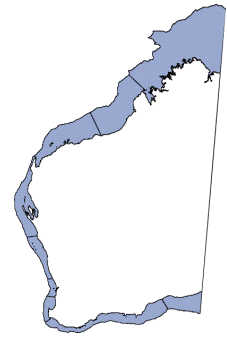
Guidance documents will be prepared for specific habitats. These include a:

- statewide Seagrass Habitat Protection guideline;
- statewide Mangrove Habitat Protection guideline;
- statewide Coral Habitat Protection guideline; and
- local guidelines for specific habitats in regions or sub-regions on a priority basis.

It is expected that these documents will provide protection for marine habitats, improve proposal design and enable better consideration of alternatives by proponents.

The responsible agencies for developing the guidelines are the Environmental Protection Authority and the Department of Environmental Protection. Funds are currently allocated within the budget of the Department of Environmental Protection.

The development of these guidelines began in 1997 and will be completed in 2000.



Contamination of the Marine Environment

Suggested Response 81

Implement the recommendations of the Southern Metropolitan Coastal Waters Study.

Action 81.1

Implement the recommendations of the Southern Metropolitan Coastal Waters Study.

Implementation

Implementing the recommendations of the Southern Metropolitan Coastal Waters Study will better maintain, protect and enhance the environmental values of Perth coastal waters. Discharges of contaminants to Perth coastal waters will be reduced.

This initiative also addresses each objective for degradation of marine habitats (Suggested Responses 76 to 80) in this area.

A number of actions are also being pursued:

- a Draft State Marine Waters Environmental Protection Policy has been developed; and
- Tributyltin (TBT) and heavy metal surveys are being conducted by the Department of Environmental Protection.

The Environmental Health Service of the Health Department of Western Australia will provide policy advice as required and set standards as required in relation to this initiative.

The Southern Metropolitan Coastal Waters Study incorporates a number of the other Suggested Responses in the State of the Environment Report. These include:

- developing a strategy on discharges to the marine environment with interim targets to progress the long-term goal of zero discharge from industrial sources and the appropriate and sustainable management of ocean outfalls;

- environmental surveys should be undertaken in areas of known contamination to quantify any effects and to provide a baseline from which to monitor the effectiveness of remedial action. Health implications of current tributyltin levels in shellfish need to be further investigated;
- the Environmental Protection Authority should formally designate environmental values and objectives for the Perth metropolitan marine region by 1999. Environmental quality criteria to support these objectives should be developed by 2000. Designation of environmental values and objectives for other high priority areas of the State should occur by 2001;
- the State Government should become much more proactive towards eliminating tributyltin paints from ships, and should seek a review of the Australian and New Zealand Environment and Conservation Council recommendations on anti-fouling paints for vessels over 25m; and

Waste inputs reduction strategies will include a review of licensing conditions and a review of catchment management plans (in relation to reducing diffuse nitrogen sources).

Resources of approximately \$20,000 per annum are currently allocated within the Department of Environmental Protection's budget for implementation of the recommendations of the Southern Metropolitan Coastal Waters Study which has been ongoing since 1996.

Action 81.2

Develop a Perth Coastal Waters Management and Consultative Process.

Implementation

The Management and Consultative Process will produce a series of Environmental Protection Authority discussion papers and reports on:

- the environmental values and environmental quality objectives of Perth coastal waters (a discussion paper has been released and public comments received);
- environmental quality criteria that should be applied to Perth coastal waters; and
- the appropriate management responses that should be adopted by Government for Perth's coastal waters.

The process will generate a more co-ordinated framework for managing water quality which incorporates Government agencies, industry and the community. Marine environmental monitoring will be reviewed for management and reporting purposes. Clear environmental quality goals will be set as will marine-related objectives for catchment management.

Currently joint funding arrangements between the Department of Environmental Protection, the Commonwealth and major users of the Perth coastal waters have contributed approximately \$200,000 to the process which began in 1997 and will be completed in 2000.

Action 81.3

Upgrade of Woodman Point Waste Water Treatment Plant.

Implementation

The waste water treatment plant will be upgraded to ensure lower levels of nutrients, heavy metals and bacteria in the Sepia Depression west of Garden Island.

The Water Corporation has allocated \$130 million to the upgrade which began in 1998 and will be completed in 2002.

Action 81.4

Apply the water quality management framework developed in the Perth Coastal Waters Study to other priority areas.

Implementation

Once the State Marine Waters Environmental Protection Policy is finalised, regulations will be used to apply the water quality management framework to other priority areas.

Funding arrangements and timeframes have not yet been established, however, it is expected to involve joint funding from the State (Department of Environmental Protection) and Commonwealth.

Suggested Response 82

A statewide inventory of contaminant sources should be developed and maintained by the Department of Environmental Protection as part of the National Pollutant Inventory.

Action 82.1

On a statewide basis, develop and maintain inventories of contaminant sources and loads for priority areas.

Implementation

The development of a statewide inventory of contaminant sources and loads will provide data for environmental reporting as well as providing important information to enable the objective of maintaining, protecting and enhancing the marine environment. The inventory will be updated annually for Perth Coastal Waters, Albany Harbours and is being developed for the North West Shelf region.

The National Pollutant Inventory provides a framework to incorporate data from the more detailed statewide inventory which looks at historical, current and projected future loads of contaminants to the marine environment from all sources. Various clean-up programs being conducted by the Water and Rivers Commission in areas like the Peel Harvey, the Swan, Geographe Bay and Albany Harbours will also involve the development of an inventory of contaminant sources and loads.

This action will provide:

- a better understanding of the relationships between contaminant discharge and the health and quality of marine ecosystems;
- a basis for setting licence conditions; and
- a basis for a more strategic approach to the management of outputs.

The Department of Environmental Protection is responsible for implementing the inventory in conjunction with relevant management agencies. Inventory work started in 1997.

Suggested Response 83

The State Government should establish a formal framework to co-ordinate environmental management within Perth's metropolitan marine region and between these waters and their land catchments. This should be used as a pilot program for expansion to other areas under pressure from domestic and rural discharges.

Among other actions, the Perth Coastal Waters Management and Consultative Process (Action 81.2) is contributing to the development of a formal framework for co-ordinated management. Other actions, such as development of a statewide Marine Environmental Protection Policy are establishing management frameworks for marine areas outside of Perth Coastal Waters that are under threat or pressure.

Action 83.1

Complete North West Shelf Marine Environmental Management Study.

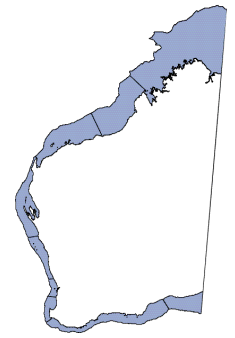
Implementation

Environmental Protection Authority discussion papers will be produced to seek public and stakeholder views on the environmental values and objectives for North West Shelf. The Environmental Protection Authority will then use this input to set the environmental values and objectives. Environmental quality criteria will be developed to support these objectives. The Environmental Protection Authority will report to Government on the management responses that are required for the North West Shelf.

This action is expected to provide for more co-ordinated and effective management of marine environmental systems and a more effective partnership between Government agencies, the community and industry for the management of multiple uses of the North West Shelf.

Currently, joint funding arrangements between the Department of Environmental Protection, the Commonwealth and major users of the North West Shelf have contributed over \$5 million to the Study which began in 1998 and will be completed in 2002.

Introduction of Exotic Marine Species



Suggested Response 84

Once final, implement the Australian Ballast Water Management Strategy, and assist in reviewing and updating that strategy.

Action 84.1

Contribute to the implementation of the Australian Ballast Water Management Strategy.

Implementation

The Australian Ballast Water Management Strategy is a Commonwealth initiative to control the spread of exotic marine organisms through ballast water and hull fouling. Its implementation will contribute to reducing the risk of introductions of exotic marine species to Western Australian waters. It is expected that the tonnage of foreign ballast water discharged at major ports will be reduced.

The Australian Quarantine Inspection Service conducts inspections of vessels from foreign ports to check on adherence to voluntary ballast water guidelines.

The recommendations in *Maritime accidents and pollution: Impacts on the marine environment from shipping operations* closely parallel those in the Australian Ballast Water Management Strategy. This action incorporates recommendations in both documents.

The Environmental Health Service of the Health Department of Western Australia will provide policy advice as required and set standards as required in relation to this initiative.

The Department of Transport is responsible for convening and co-ordinating the Western Australian Ballast Water Working Group.

Suggested Response 85

Conduct research into the control and eradication of exotic marine species.

Action 85.1

Complete baseline studies especially in areas of greatest pressure to determine the distribution and abundance of existing exotic species in order to put in place, if necessary, management strategies to eliminate them or control their spread.

Implementation

Baseline surveys on the presence of introduced exotic marine species have been completed at the ports of Bunbury, Albany, Port Hedland and Fremantle.

A three year study to determine the importance of biofouling for the transport of marine pests to and within Australian waters is being conducted by the Centre for Research on Introduced Marine Pests. Biofouling is now suspected to be an important contributor to the introduction of marine pests.

The data that is collected will be used in a risk assessment-based decision support system which is currently being developed by the Australian Ballast Water Management Advisory Council.

Following on from Action 84.1 the Western Australian Ballast Water Working Group will provide advice to the Australian Ballast Water Management Advisory Council during the development of a risk assessment-based Decision Support System in order to facilitate its implementation in Western Australia.

The Department of Transport is the agency that is responsible for co-ordinating this action through the Western Australian Ballast Water Working Group. \$400,000 has been required for this initiative which began in 1998 and will be completed in 2000. Funds have been allocated by the Fremantle Port Authority and Port Hedland Port Authority. The Department of Transport has contributed \$41,000 to the Fremantle Port Authority in 1999/2000 for a baseline study in Fremantle and Cockburn Sound waters.

Action 85.2

Conduct further surveys and install early warning systems in marinas, boat harbours and ports in a order to minimise the introduction and spread of marine pests.

Implementation

Baseline surveys will be conducted and early warning systems installed in marinas, ports and harbours in Western Australia.

This will help ensure that Western Australia can resist the impact of introduced organisms on endemic species including valuable fishing and aquaculture species and the marine environment.

A project team lead by Fisheries Western Australia and including the Department of Environmental Protection, Department of Conservation and Land Management, Western Australian Museum and Department of Transport are currently examining this matter.

Action 85.3

Utilise the risk assessment-based Decision Support System in Western Australia to minimise the risk of the introduction of exotic species into Western Australian waters.

Implementation

This action will significantly lower the risk of exotic species being introduced into Western Australian waters. Implementation of this action is contingent on completion of Action 85.1 and will require joint Commonwealth and State funding.

PROGRESS TOWARDS ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Agriculture

Natural Resource Use Sectors

Suggested Responses

In the past, agricultural research has looked to increase farm profit through increased crop yields, animal weight gains and short-term profit margins. The research did not put as much emphasis on the long term effects on the land or the waterways. New ways of farming are required which consider these onsite and offsite effects and allow farmers to make a living.

No single approach will work. In agricultural areas, improvements in sustainability will come from combinations of best management practices such as minimum tillage, and landuse changes like integrated farm forestry. The strategic development of new industries and markets, such as for canola, durum and noodle wheats and live cattle will improve economic sustainability.

Implementation of the *WA Salinity Action Plan* (Government of Western Australia, 1996) coupled with research and development by Agriculture Western Australia, evolution of farming systems and provisions of technical and catchment support services will be vital. Much of the focus for the Sustainable Rural Development Program within Agriculture Western Australia is on Integrated Catchment Management. This approach explicitly recognises that farms cannot be managed sustainably in isolation and that all stakeholders, including many off-farm, have a role to play.

In the rangelands of Western Australia flexible and innovative approaches to landuse options are required which tap the wilderness, conservation and heritage values of these lands. One major initiative, the Gascoyne–Murchison Rangeland Strategy (Government of Western Australia, 1997c), will over the next five years:

- broker lease adjustments;
- provide better access to business planning;
- assist in the implementation of total grazing management infrastructure and practices;

- foster pastoral industry self-management;
- raise awareness of rangeland issues;
- facilitate the research, development and adoption of industry diversification;
- work towards a regional approach to rangeland environmental objectives; and
- co-ordinate the assistance of a number of government agencies and funding bodies.

Regulatory activities, mostly undertaken under the *Soil and Land Conservation Act 1945* (WA), will continue to be important. The success of the inter-agency Memorandum of Understanding for land clearing has led to the initiation of a similar approach for drainage in agricultural areas. Regular pastoral lease reports are conducted for the Pastoral Board on an ongoing basis.

Refer to sections on Land, Biodiversity and Inland Waters for additional information on Actions for Sustainable Agriculture.

Actions

Agriculture Western Australia's Sustainable Rural Development Program has eight strategic activities underway which are intended to progress achievement of the suggested responses above.

Implementation

- Salinity Action Plan implementation

The Salinity Action Plan is, in effect, a natural resources or catchment management plan for the agricultural zone (excluding the high rainfall/coastal catchments). It includes regional initiatives in the Blackwood, Swan-Avon and South Coast, the Remnant Vegetation Protection Scheme and the State Revegetation Scheme.

- Farm Business Development

This includes the Rural Adjustment and Finance Corporation, the Rural Adjustment Scheme, FarmBIS and the Better Business initiative funded by the National Landcare Program component of the Natural Heritage Trust. The ability of farmers to physically implement environmental remediation measures is very much dependant on the financial health of their businesses.

- Rangeland Management

This area includes the Gascoyne-Murchison Strategy.

- Rural Community Development

This component of the Sustainable Rural Development Program includes the Ministerial initiatives of “Doing More With Agriculture” and the “Western Australian Rural Leadership Program.” Strong, vibrant communities are another pre-requisite for the implementation of environmental remediation measures.

- Regulation under the *Soil and Land Conservation Act 1945* (WA)

This Act includes clearing and drainage controls and the Memorandum of Understanding for pastoral lease reporting with the Pastoral Lands Board.

- Regional Strategic Planning

This area includes preparation of regional strategies, development of regional situation statements, management of the Regional Assessment Panel process and brokering large funding initiatives, as well as marketing the sustainability of agriculture.

- Monitoring of Natural Resource Condition

Rangeland monitoring, the new Land Monitor project, agency commitments to State of the Environment Reporting, as well as acquisition of basic natural resource management data (for example, soil maps) are all components of Agriculture Western Australia’s monitoring program.

- High Rainfall Catchments

In this area the agency contributes to landuse planning as an input to the statutory planning system and encourages high rainfall farm forestry.

Energy

Natural Resource Use Sectors

Suggested Responses

Develop as part of the State Greenhouse Response Strategy, a policy that addresses the more efficient use of energy and the increased use of renewable energy. This will include the Government's response to the Commonwealth's intention to increase by 2% the amount of electricity sourced from renewables and to introduce efficiency standards for electricity generating equipment.

Refer to Actions in the sections on Atmosphere and Fundamental Pressures for additional information. For information on additional Government activities that address more efficient use of energy and the development of renewable energy, see the 1997/8 Annual Report of the Office of Energy.

Action

Develop a Green Power Policy for Western Australia.

Implementation

The Office of Energy is preparing a Green Power Policy for Western Australia that addresses the use of renewable energy and energy efficiency.

The Office of Energy continues to provide policy advice and briefings to Government on a range of energy related issues including the Commonwealth's intention to increase by 2% the amount of electricity sourced from renewables and to introduce efficiency standards for electricity generating equipment.

Fisheries

Natural Resource Use Sectors

Suggested Responses

Fisheries WA will continue to assess the status of targeted fish stocks as indicators of sustainable fishing. This is achievable by using a combination of directed research and appropriate management to ensure that all fisheries sectors (commercial, recreational and aquaculture) operate at sustainable levels with minimal impact on the aquatic environment.

Refer to Actions in the section on the Marine environment for additional information on Fisheries.

Action 1

Continue existing research programs into the sustainability of all commercial fisheries.

Implementation

Fisheries Western Australia will continue to prepare Fishery Status Reports for each fishery and maintain an up to date database for each fishery to enable the status of fish stocks to be assessed annually.

Currently, \$3.7 million is allocated per annum to research programs on the sustainability of commercial fisheries within Fisheries Western Australia.

Action 2

Continue existing research programs monitoring major recreational fishing target species.

Implementation

Status reports for the main target species including rock lobster, marron, trout, abalone, Australian salmon, herring, pink snapper and others will continue to be produced. Up-to-date databases for main target species are maintained to enable the status of fish stocks to be assessed annually.

Suggested Responses

Fisheries WA is further developing its capacity for managing the State's fish resources at sustainable levels by incorporating ecologically sustainable development principles. As a result, Fisheries WA intends to assess the environmental effects of activities associated with fishing activities by reviewing all fisheries on a regional basis. Environmental management measures being investigated include bycatch reduction techniques and reduction of commercial fishing effort through a variety of mechanisms including licence buy-back schemes. Fisheries WA has identified growing recreational fishing effort as an important issue that will be taken into account in the overall management of fish stocks.

Currently, \$1 million per annum is invested in research programs to monitor major recreational fishing target species.

Action 1

Identify environmental issues associated with fish, fish habitats and fishing activities and prepare regional management strategies to address these issues. A series of Regional Fisheries Environmental Management Programs will be prepared over a three year duration for five regional areas, namely the Gascoyne, Mid-West, Southern, Pilbara and Kimberley regions.

Implementation

By June 2000 it is expected that the following actions will be completed:

- completion of Draft Gascoyne Regional Fisheries Environmental Management Program;
- compilation of Geographical Information System of commercial fishing licence areas and principal fishing areas; and
- initiation of Draft Pilbara Regional Fisheries Environmental Management Program.

Fisheries Western Australia is working towards the following by June 2000:

- completion of Final Gascoyne Regional Fisheries Environmental Management Program;
- completion of the Draft Pilbara Regional Fisheries Environmental Management Program; and
- initiation of Draft Mid-West Regional Fisheries Environmental Management Program.

Currently Fisheries Western Australia have allocated \$35,000 per annum to these initiatives.

Action 2

Implement the relevant recommendations of the National Bycatch Action Policy including the development of bycatch action plans for individual fisheries.

Implementation

Implementation of the recommendations of the National Bycatch Action Policy began in 1997. Fisheries Western Australia expects to have completed implementation of the Action Policy by 2000. A Draft State Effects of Fishing and Aquaculture Policy will be released for public comment in 2000.

This action also involves a three year research program on the effects of the west coast purse seine fishery and sea bird populations, a bycatch action plan for the Shark Bay Prawn Trawl and Scallop Trawl fisheries and research into the environmental effects of rock lobster fishing operations in the waters of the Abrolhos Islands.

Implementation of the Policy will improve understanding of the environmental effects of fishing and aquaculture and should reduce these effects within Western Australia.

Fisheries Western Australia has allocated \$130,000 per annum to this action.

Action 3

Conduct creel surveys to improve knowledge of recreational fishing effort.

Implementation

Carry out regular creel surveys on a rotating region by region basis (each region surveyed every five years) to improve knowledge of recreational fishing effort. Currently, Fisheries Western Australia is undertaking a creel survey of the Gascoyne Region.

A survey of the Pilbara region is due to start in 1999/2000. This will be followed by the Kimberley

region in 2000/01, the South Coast in the following year and South West Western Australian estuarine fisheries in 2002/03.

Findings from these surveys will be made available to the public. The surveys will be used to provide catch and effort information for the management of the State's recreational fisheries. It is also expected that there will be a general improvement in compliance with fishing regulations.

Fisheries Western Australia has allocated \$400,000 per annum to this survey program.

Action 4

Continue to remove surplus commercial fishing effort through buy-backs of commercial fishing licences under the General Fisheries Adjustment Scheme and the Resource Sharing Initiative.

Implementation

A total of 187 licences have been surrendered as at 30 June 1999 through the General Fisheries Adjustment Scheme and eight of these occurred during the 1998/99 financial year.

In addition, a total of 48 licences (worth \$3,404,265) have been surrendered through the Resource Sharing Initiative, 12 of which occurred during the 1998/99 financial year.

These initiatives have reduced surplus fishing effort from the commercial fishing sector and have facilitated resource use re-allocation between sectors.

Eight million dollars is allocated over four years for the Resource Sharing Initiative. The General Fisheries Adjustment Scheme has been in operation since 1987 and ended on 30 June 1999 while the Resource Sharing Initiative began in 1996. A review of the General Fisheries Adjustment Scheme is being conducted to assess whether the scheme is to be

Suggested Response

The challenge of assessing the ecological effects of fishing and working toward enlarging the body of information available for the environmental assessment of fishing is being addressed. Fisheries WA is also involved in the process of developing environmental indicators for fishing on a national level.

reestablished.

Action

Fisheries Western Australia, with assistance from the Department of Transport, is producing Geographical Information System (GIS) data on commercial and recreational fisheries, aquaculture, fish, and fish habitat protection areas. This information will be used in the management of the State's fisheries and fish habitats and will be incorporated into the Australian Coastal Atlas.

Implementation

In 1999 it is expected that geospatial information such as Commercial Fisheries Licence Areas (State and Commonwealth), Aquaculture Licence Areas and Pearling Lease areas, will become available. During 1999/2000 Fisheries Western Australia will be developing further GIS data for Principal Fishing Areas, Species Distribution, and Recreational Fishing Areas.

Suggested Response

Sustaining fish habitat is considered an integral part of sustaining fisheries. One of the management tools made available by the *Fish Resources Management Act 1994* (WA) is the establishment of Fish Habitat Protection Areas which provide special protection and management for fish and their habitats. This will complement provisions in the *Conservation and Land Management Act 1984* (WA) for the establishment and management of a marine reserves system.

Fisheries Western Australia has allocated \$64 000 for GIS development and support for the 1999/2000 financial year.

Action

Continue to establish a statewide system of Fish and Fish Habitat Protection Areas.

Implementation

It is expected that several fish habitat protection areas will be established by June 2000. This will include management plans for threatened or significant areas of the marine environment of relevance to fisheries management.

A system of fish and fish habitat protection areas will lead to more effective management of fish and the protection of habitats important to fish populations.

Fisheries Western Australia has allocated \$70,000 per annum to this program.

Forestry

Natural Resource Use Sectors

Suggested Response

Fundamental elements of sustainable development are a secure and managed reserve system and management regimes off-reserve which maintain the ecological processes sustaining the forest. The foundations of these elements exist in Western Australia. Following the current comprehensive regional assessment of the level of reservation of biodiversity, old growth and wilderness values; forest management practices; and social and economic values in the South West, the State and Commonwealth governments will develop and sign a Regional Forest Agreement which will provide the basis for sustainable development over the next 20 years.

Action

Implement the Regional Forest Agreement (signed in May 1999) and modify harvesting practices in old growth karri and tingle forest.

Implementation

Under the RFA, a comprehensive, adequate and representative (CAR) reserve system will be established. The area of formal conservation reserves was increased by 150,000 hectares bringing the total area protected in CAR reserves in the south-west forest region to 1,047,000 hectares, which represents more than 25% of the region. The governments' have agreed that Western Australia's forest management systems, as amended by the Agreement, provide for ecologically sustainable forest management. Subsequently work of a Ministerial Advisory Group will provide a basis for modified sustainable timber yield for karri and modified harvesting practices in old growth karri and tingle forest. Improvements to forest management systems include the establishment of an environmental management system, a new Forest Management Plan to implement commitments, reporting on indicators of sustainability, improvements to consultation and planning processes, fauna data management and assessment, and improvements to the structure and function of CALM and its controlling bodies.

Suggested Response

Both the public and private sector are contributing to additional plantations on agricultural land which will supply increased timber volumes in the future as well as assisting in redressing water balances in cleared agricultural landscapes. Nationally, the Plantations 2020 vision sets a goal of trebling the nation's plantations by 2020.

Action

Development of additional plantations on agricultural land (also see Actions in the section on Land).

Implementation

The Department of Conservation and Land Management's Tree Crops on Farms Program was originally developed in the 1980s to provide a commercial way to rehabilitate degraded agricultural land, particularly areas affected by salinity. The program is based on the development of joint ventures with owners of previously cleared farmland to plant a range of tree crops having both commercial and biodiversity attributes.

It is estimated that in Western Australia, 800,000 hectares of tree crops on farms will be established by the year 2020.

Plantations 2020 is a national program aimed at increasing Australia's plantation estate to 3.3 million hectares by 2020.

As part of the Western Australian Salinity Action Plan it is proposed to plant 150,000 hectares of maritime pine plantations in areas of the State having 400-600 mm of annual rainfall.

Suggested Response

Research needs to continue into the interactions between different pressures on the forest and their impacts, leading to refinements in management over time.

Action

Continue research and refine management over time.

Implementation

Results from research into interactions and impacts of pressures on the forest should ensure continuous improvement in forest practice in order to enhance ecologically sustainable forest management.

Mining and Petroleum Production

Natural Resource Use Sectors

Suggested Responses

Increased scientific knowledge and changing environmental, social and economic conditions lead to the development of new practices and procedures which define and redefine management practices. Because of the wide range of activities associated with exploration and production and the diverse environments encountered in the State, environmental management responses must be specifically tailored to the activity proposed.

Further effort towards ecologically sustainable practices is required in many key areas of mining and petroleum production including management and rehabilitation of mined out voids, tailings management, management of potentially acid forming materials, toxicological studies and defining ecological risk. These issues are being addressed through research initiated under the auspices of the Minerals Environmental Liaison Committee (MELC), which is a government chaired committee representing government and conservation organisations; and the Minerals and Energy Research Institute of Western Australia (MERIWA) which is a government funded statutory authority.

A review of the environmental performance of the gold mining industry and the heavy mineral sands industry was undertaken by MELC in 1994 and 1995 respectively with recommendations made to the Minister for Mines in 1996 final reports. These recommendations identified that tailings management was the most important issue for continued study in these industries.

The research projects of MERIWA relate to geoscience, mineral processing, hydrocarbons, engineering and environmental rehabilitation. Most research is undertaken by universities and consultants with sponsorship from both the mineral and petroleum sectors. Results of the research are utilised by the industry to improve its performance. Examples of recent MERIWA projects include

smoke enhanced germination of native species for minesite rehabilitation and research into the control of dieback disease using phosphite fungicide.

Results from monitoring and annual environmental audits provide additional information on the extent of the pressures on the environment, how industry is responding to these pressures and what further action is required by both industry and government.

Action

Current activities include the review of new mining and petroleum proposals and annual auditing of environmental performance of mining and petroleum operations in Western Australia. The latter involves reporting on areas disturbed and rehabilitated during the financial year and rating the environmental performance of mining and petroleum activities in terms of meeting environmental commitments and conditions applied to those operations.

New regulations and guidelines under the *Petroleum (Submerged Lands) Act 1967* (WA) are expected to be introduced early next year. It is anticipated that auditing requirements will increase as a result of their introduction.

An agreed program for the Mineral Environment Liaison Committee was developed during 1998/99. Financial and other resources would be provided by all Mineral Environment Liaison Committee members. Timeframes will be determined when programs are determined.

Tourism

Natural Resource Use Sectors

Suggested Response

Government agencies involved in the management and promotion of the natural environments used by the tourism industry must further develop methods of measuring the impact tourism is having on the environment. Existing strategies must be refined and new approaches developed to ensure the areas being utilised by tourists are adequately protected from damage.

Action

Implementation of the Nature Based Tourism Strategy and the Western Australian Tourism Development Strategy.

Implementation

The Western Australian Tourism Commission in conjunction with the Department of Conservation and Land Management have developed a Nature Based Tourism Strategy which will be used to ensure that tourism development is carried out in a sustainable manner.

The Western Australian Tourism Development Strategy outlines the direction and time scales for tourism development throughout the State. The strategy emphasises the need for sustainable development and sensitive use of the State's natural resources.

Tourism Destination Strategies are being developed for all of the Priority Destination Areas identified in the Western Australian Tourism Development Strategy. These will be developed in conjunction with Regional Tourism Associations and Regional Development Commissions to ensure that sustainable tourism development is achieved.

Water Supply

Natural Resource Use Sectors

Suggested Response

Continue to manage ongoing pressures for water source development to keep allocations within ecologically sustainable limits. Provide additional attention to the management of surface water allocation particularly the determination of environmental water provisions and flows.

In the semi-arid Pilbara and Kimberley regions, identify high value water dependent environmental features, improve the determination of environmental water provisions from existing or proposed sources and increase the management of mine dewatering arrangements.

Implement the WA Salinity Action Plan and the recommendations of the Select Committee on Metropolitan Development and Groundwater Supplies (Legislative Assembly, 1994).

Investigate potential climate change effects on water resources and reach agreement on possible yield reductions of existing and proposed sources for a nominated period. This will need to make provision for environmental water needs.

Encourage the investigation and trialing of greywater reuse and, if successful, prepare guidelines with Health WA and local authorities.

Encourage the capping of uncapped artesian bores.

Provide information on the benefits, costs and risks of the use of rainwater tanks.

Establish the principle of restoration of degraded riverine systems to compensate for impacts on natural water resource values.

Encourage the reuse of treated sewage and industrial effluent for irrigation purposes where appropriate.

Also refer to the section on Inland Waters for additional Actions in this area.

Action 1

Water Law Reform.

Implementation

The Water and Rivers Commission has carried out wide consultation as part of Western Australia's response to the Council of Australian Governments' Agreement for reform of water use and management. Amendments to the *Rights in Water and Irrigation Act 1914 (WA)* are proposed to provide for trading of water licenses and involvement of the community and industry in decision making about use of water and environmental allocations. This will result in a statutory obligation to manage water resources in a sustainable way with clear definition of rights and responsibilities of managers and users. It is proposed to establish Local Area groups for key areas over 10 years.

\$148,000 has been allocated to consultation, development and implementation of new water legislation in 1999/2000.

Action 2

Environmental Water Requirements.

Implementation

Environmental water provisions and requirements are being developed progressively for important water supply areas in Western Australia. Planning is well advanced for the Harvey River Basin. A draft plan has been prepared for the Ord Stage 1 and 2. Work has started on the Warren and Murray River Basins and Canning-Wungong. Further work is planned for the Ord as studies for Stage 2 progress, and as part of the comprehensive Land and Water Management Plan. Funding is built into Water Allocation and Water Quality Protection Plans.

Action 3

Regional and Local Allocation Plans.

Implementation

The Water and Rivers Commission is developing Regional Allocation Plans for surface and groundwater for Perth to Bunbury, Busselton to Walpole and the Kimberley Region. These plans identify key social, environmental and economic values and allocate water resources to meet these values and likely demands, for example setting aside a river reach for recreation. The plans also identify sustainable yields for water supply.

Virtually all groundwater areas have “local” management plans with withdrawals limited to sustainable yields. Less work has been done on surface water allocation plans, but these are now a high priority for the Water and Rivers Commission. The Harvey Basin was the first of these because of the priority of this source for Perth’s water supply. Other priorities are the Murray River Basin, Canning-Wungong and the Lefroy as well as the Ord irrigation area and West Kimberley systems. \$428,000 has been allocated to develop these plans.

Action 4

Water Use Efficiency and Reuse.

Implementation

Advice is provided by the Water and Rivers Commission to the community and industry on water use efficiency programs, including the use of rainwater tanks. This is emphasised with the Water Auditor Training program that aims to promote Best Practice Environmental Management.

The Water and Rivers Commission is currently assessing the feasibility of utilising recycled wastewater in a Perth groundwater area. A similar viability evaluation study is being conducted examining wastewater reuse for irrigation in the Swan Valley. Reuse of treated wastewater results in a reduced contaminant load to waterways and reduced demand for treated potable water.

The federally funded Clean Seas program includes \$1.25M dedicated to wastewater reuse demonstration programs including Greywater trials, Horrie Miller Drive landscaping, Kwinana Industrial reuse, Subiaco irrigation conversion and treelot nutrient stripping of effluent at Bullsbrook.

The Water and Rivers Commission has allocated \$14,000 to water use efficiency advice and \$12,000 for water auditor training.

Action 5

Water Quality Protection Plans.

Implementation

The Water and Rivers Commission has a program to prepare Water Source Protection Plans for all town water supplies within Western Australia. These Plans identify sources of contamination that should be investigated and set out programs for management of the resource. Water Source Protection Plans usually recommend the proclamation of a Public Drinking Water Source Area and establish the level of protection required within the Area. The Water and Rivers Commission has started a project to formally proclaim these protection areas. \$20,000 has been allocated to proclaim public drinking water source areas and \$140,000 has been allocated to developing water source protection plans for public drinking water source areas.

Action 6

Contaminated Sites and Groundwater Contamination.

Implementation

To enable effective management and protection of the State’s water resources, technical advice is provided to government agencies and the community on contamination issues. Extensive investigations of contaminated sites and assessment of the impact of specific landuses on water quality have been carried out. A site remediation program in Bellevue has been undertaken. This site posed a threat to the groundwater supply for Perth. Similarly, investigations have been carried out at former gaswork sites in Spearwood, Fremantle and Geraldton.

Information obtained from investigations is maintained in a groundwater contamination database. The Water and Rivers Commission has allocated \$569,000 to contaminated site investigations.

Action 7

Appraisal of Water Resources.

Implementation

Surface Water

The Water and Rivers Commission has conducted surface water resource investigations for the Pilbara, Gascoyne and Murchison regions and has started similar assessments in the Kimberley region of Western Australia. These appraisals assist in the development of management and protection policies and strategies that ensure Western Australia's surface water resources are developed in a sustainable and environmentally sound manner.

Studies are in progress for the Ord River irrigation area to model rising groundwater levels associated with irrigation practices.

Water management studies are also in progress at Moore River and Millstream (Pilbara).

The Water and Rivers Commission has allocated \$17,000 for hydrology studies for water allocation and \$72,000 for water management studies.

Climate Variability

Climate variations are of great economic significance in Australia and the ability to understand or forecast the likely nature of such variations is potentially of major economic benefit. In October 1997 the Government of Western Australia formed an Indian Ocean Climate Initiative to develop more effective seasonal forecasting and an improved understanding of climate variability. This initiative had an initial focus on the South West of Western Australia. However, the linkages to other parts of the Indian Ocean are also being explored.

In addition the Commission is investigating the impact of climate variability on the surface water resources of South West Western Australia.

The State Government has allocated \$340,000 to the Indian Ocean Climate Initiative and the Water and Rivers Commission has allocated \$23,000 to studies of the impact of climate variability on water resources.

Groundwater

The Water and Rivers Commission has conducted groundwater resource appraisal investigations for the Pilbara, Gascoyne and Murchison regions and has started similar assessments in the West Kimberley, East Kimberley and Collie regions of Western Australia. These appraisals assist in the development of management and protection policies and strategies that ensure Western Australia's groundwater resources are developed in a sustainable and environmentally sound manner.

The Water and Rivers Commission, in conjunction with the Department of Resource Development, is studying the regional groundwater of the Northern Goldfields region. Additional studies are in progress for the Ord River irrigation area into rising groundwater levels associated with irrigation practices.

The Carnarvon Artesian Basin Rehabilitation and Reticulation Project is one component of the Gascoyne-Murchison strategy regional initiative. This project provides grants to landholders in the Carnarvon Artesian Basin to undertake approved bore capping, re-drilling and reticulation works.

The Farm Water Grants Scheme has been extensively used by dryland farmers to provide for livestock and domestic water supplies on farms for the last three years. By encouraging farms to become more self-sufficient, the probability of regional water supply shortages is diminished. Agriculture Western Australia provides advice to farmers and technical service providers. The Office of Water Regulation manages the Grants Scheme. Farmers receive grants for approved plans that average 33% of capital costs. The total Government expenditure on grants over the last three years is approximately \$11.4 million for 1,600 approved plans. About \$2 million is now spent each year on the Scheme.

The Water and Rivers Commission will expend \$243,000 on groundwater exploration and resource appraisal and \$740,000 on bore capping in the Carnarvon Artesian Basin.