Government of Western Australia

DEPARTMENT OF Conservation AND LAND MANAGEMENT

Conserving the nature of WA

BUSINESS PLAN

July 2002 – June 2004

Science Division

Discovering the nature of WA

http://www.naturebase.net/science/science .html

INTRODUCTION

Australia, along with other countries, is undergoing transition to a knowledge-based economy driven by scientific, engineering and technological advances. Science-based knowledge underpins Western Australia's future as a thriving, cultured and responsible community. Innovation, based on ideas, novel concepts, modern techniques and newly discovered facts, is a key factor in improving the State's economy and quality of life of its citizens, without compromising the sustainability of the environment. To be successful, public sector research must be both excellent and relevant. The operations of the Department of Conservation and Land Management (DCLM) need to be underpinned by the incorporation of up-to-date knowledge and continuous improvement based on sound science and ecological risk principles. Science Division represents DCLM's investment in generating the sound knowledge and technological advances required for successful environmental management and assessment of ecological risks.

PURPOSE OF THIS PLAN

This Business Plan sets out the role of the Science Division as a service provider to purchasers within the Department of Conservation and Land Management (DCLM) and the Forest Products Commission (FPC). It enunciates how the Division will deliver services identified in the Service Provider Agreements (SPAs) by describing the aim of the Key Science Themes (Groups) and the objectives, outcomes, adoption strategies and performance measures of the Division's Key Result Areas (Programs). The plan also presents the organizational structure and marketing strategy needed to deliver these services throughout the duration of the plan – July 2002 to June 2004.

This plan is aligned with the DCLM Corporate Plan and the Division's Strategic Plan. Information about specific Program work plans is available in the Science Operations Plan. Detail about individual science projects is available in the WA Science Project Plans (WASPP) database on the Science website. This plan also provides a basis for management of risk in the Division.

This plan deals with the conservation and land management role of the Science Division. A separate Business Plan exists for the Perth Observatory, which is administered within the Science Division, but whose activities do not directly relate to conservation and land management.

PROFILE OF PURCHASERS OF SCIENCE SERVICES

Science Division (excluding the Perth Observatory) provides services to three Output Purchasers in DCLM, and the Forest Products Commission (FPC). An overview of the Purchaser profiles is presented here.

DCLM OUTPUT 1 NATURE CONSERVATION

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

Key Result Areas and Objectives
Biodiversity inventory and conservation assessment

- an understanding of our State's natural biodiversity and biodiversity conservation needs.

Terrestrial and marine conservation reserve system

- a comprehensive, adequate and representative reserve system managed by DCLM that conserves as much as possible of our natural biodiversity.

Off-reserve biodiversity conservation and sustainable use
- a network of private conservation activities that conserve biodiversity and are complementary to the conservation reserve system.

Recovery of threatened species and ecological communities
- successful recovery of threatened species and ecological communities, while also preventing additional species or communities becoming threatened or any species becoming extinct as a result of human action/inaction.

Partnerships, public appreciation, compliance and support
- a department that works effectively with the wider community to achieve biodiversity conservation and a community that is knowledgeable about, interested in, supportive of, and involved in, biodiversity conservation.

Science and Information Services Required by Nature Conservation Output
- High level policy advice
- Understanding of the biology, conservation status and threats to the State's threatened flora and fauna taxa, and ecological communities.
- Assistance in preparation and implementation of recovery programs for threatened taxa and communities.
- Biological survey of the State to ensure a comprehensive, adequate and representative reserve system.
- Knowledge of ecological disturbances that threaten the conservation estate and important off-reserve conservation areas.
- Information about the functioning and conservation of aquatic ecosystems and their components.
- Access to data and information about plant biodiversity held at the Western Australian Herbarium.
- Provision of information to increase public awareness of nature conservation issues.

Trends:
Climate Change:
- Understanding the implications of climate change on biodiversity and disturbance ecology and developing management responses.
- Establish monitoring programs in the wheatbelt

Restoration ecology
- Ongoing development of plant-based solutions to dryland salinity
- Reconstructing degraded landscapes, especially in the wheatbelt and rangelands.

Landscape-scale disturbance ecology
- Reconstruction and protection of arid zone fauna assemblages.
- Developing appropriate fire management for the Kimberly, Pilbara and the arid interior.
- Investigating the extent and causes of mammal decline in the Kimberley.
- Managing fire and introduced plants and animals in the rangelands conservation estate.
- Adopt landscape-scale perspective in control of environmental weeds.
- Establish monitoring sites

Species & communities conservation biology
- Ongoing taxonomic assessments of various groups
- Increasing the focus on invertebrate and fungal conservation.
- Increased activity on declared rare flora
- Increased focus on threatened communities
- Increased activity on diseases (esp. *Phytophthora*) and environmental weeds.
- Ongoing activity on introduced predator control, especially feral cats

Knowledge management
- Increase provision of user-friendly online access to biological information.
- Ongoing high level technical and scientific advice and diffusion of knowledge (internally & externally)

DCLM OUTPUT 2 SUSTAINABLE FOREST MANAGEMENT

Description
The sustainable management of State forest and timber reserves while maintaining or enhancing nature conservation, water, recreation and other values in the long term, and encouraging public awareness, understanding and support for sustainable forest management, services and policies.

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Key Result Areas and Objectives
Inventory and assessment of forest resources

- conduct inventory of forest resources.
- maintain records of disease mapping.
- provide strategic yield projections.

Maintenance and enhancement of biodiversity and other values of State forest and timber reserves

- control and manage harvesting operations and associated disturbance.
- develop and implement Montreal Criteria and indicators.
- continue implementation of departmental integrated forest monitoring system (FORESTCHECK).

Provide for harvesting, regeneration and growth of forest products from State forests and timber reserves in accordance with approved Forest Management Plans and principles of Ecologically Sustainable Forest Management (ESFM)

- provide advice in the preparation of the next Forest Management Plan (2004-2013).
- develop interactive regional logging plans jointly with the FPC and with public consultation.
- provide custodianship of SFM perspective of policies, guidelines, codes of practice and manuals.
- represent and advocate timber production on a sustained yield basis (given that one of the statutory purposes of the State forest is timber production).
- liaise and co-operate with the FPC.

Implement approved Forest Management Plans, the RFA and other government policies and programs

- implement current 1994-2003 Forest Management Plan to the satisfaction of the Conservation Commission.
- monitor and report to the EPA on compliance with Ministerial Conditions.
- provide input to the RFA.
- implement recommendations of the Karri and Tingle Advisory Group.
- complete the development and implementation of an environmental management system for SFM and achieve external certification.
- give effect to DCLM's fire review.
- manage and maintain infrastructure and delivery on Community Service Obligations.

Achieve partnerships and public support

- develop and maintain good relationships with the community and other state agencies.

Science and Information Services Required by Sustainable Forest Management Output

- Knowledge needed to develop, implement and monitor forests according to the principles of Ecologically Sustainable Forest Management (ESFM).
- Assistance in the preparation of the Forest Management Plan.
- Understanding of the response to fire and harvesting disturbance by the biota.
- Knowledge of fire and harvesting impacts on water yield and quality.
- Evaluation and development of potential indicators for sustainable forest management, regeneration success, soil disturbance and soil nutrient status.
- Development of a forest monitoring system to quantify, record, interpret and report on the status of key forest organisms, communities and processes in response to both forest management activities and natural variation.
- Provision of information on the effects of forest management on insect pests and diseases.
- Advice on the management of impacts of prescribed and wild fire on forest ecology.
- Provision of a disease detection service for *Phytophthora* and other plant diseases.

Trends

- Decline in timber production due to the planned reduction in timber harvesting from native

forests. Possible commensurate reduction in funding available for research.

- Increase in public expectation that forest management and timber production are ecologically sustainable.
- Increase in public sensitivity about the risks to biodiversity conservation and other forest values.
- Carbon cycles and forest management with respect to climate change.
- Managing forests for potable water.
- Forest health – pests and diseases.
- Forest soil conservation
- Ongoing commitment to forest monitoring (FORESTCHECK)
- Biological survey of forests
- Ongoing research into the impacts of forest management including fire and timber harvesting on threatened and sensitive species and ecosystems.

DCLM OUTPUT 3 PARKS AND VISITOR SERVICES

Description

Dealing with public involvement, visitation and appreciation of the natural environment on lands and waters managed by DCLM, including preparing and implementing management and recreation site development plans, providing, managing and maintaining appropriate access, recreation opportunities and visitor facilities, protecting natural areas, visitors and facilities from wildfire, training departmental staff and volunteers, working with local tourist bureaux and commercial tour operators; involving Aboriginal people in park management and the provision of visitor facilities and services; providing visitor information and designing and initiating educational and interpretive activity programs which enrich visitor experience and help develop greater community awareness and support for parks, natural areas, nature-based tourism and recreation services and policies.

Key Result Areas and Objectives

Planning for management

- ensure that the management of lands and waters is based on sound planning developed in partnership with key stakeholders and the community.

Acquisition and administration of protected areas

- assist in the development of a comprehensive, adequate and representative reserve system. Ensure that concessions occurring on land and water are managed sustainably.

Park presentation and resource protection

- achieve high quality visitor services and facilities, which are sustainably managed.

Visitor communication and management

- improve the quality of experience of visitors and the understanding and appreciation of wildlife conservation, parks, forests and reserves.

Community involvement

- promote and encourage community involvement in all areas of DCLM activity.

Liaising and working with Aboriginal people

- develop effective partnerships with Aboriginal people in the management, protection and interpretation of protected areas.

Business management

- ensure activities are planned and implemented within a business management framework.

Legislation and Policy for parks and visitor services

- achieve an efficient and effective legislative and policy framework ensuring sustainable use of protected areas.

Resourcing

- improve the level of resourcing available for provision of visitor services and management of

protected areas.

Science and Information Services Required by Parks and Visitor Services Output

- Input to the preparation of area management plans.
- Knowledge about natural features, animals, plants and other biota in National Parks, Nature Reserves and Conservation Parks.
- Provision of information for nature-based tourism operations.

Trends for Science Services

- Increase the provision of research information that is relevant to interpretive services.
- Develop a capacity to research the impact of visitation on biodiversity values.
- Develop a capacity to research interactions between people and the natural environment.

FOREST PRODUCTS COMMISSION

Description

The Forest Products Commission is the Western Australian trading enterprise responsible for the allocation and sale of forest products from the State's native forests, and from State-owned and State-managed plantations. The vision for the Forest Products Commission is to support an environmentally sustainable and commercially viable forest products industry providing economic and social benefits to the people of Western Australia. The Mission of the Forest Products Commission is to contribute to Western Australia's economic and regional growth by developing the sustainable use of the State's native and plantation timber resources, promoting local value adding for these resources and achieving appropriate returns to the State for the use of publicly-owned and FPC-managed timber resources.

Key Result Areas and objectives

Production and promotion of the timber Industry in WA

- provide forest products from native forests to industry consistent with management plans.
- provide forest products from publicly owned and managed plantations.
- increase the area of hardwood and softwood plantations to meet regional development opportunities and environmental objectives.
- promote increased level of economic return to WA from the use of forest products.

Business performance

- meet the financial targets agreed with the WA government.
- optimise the price of forest products.
- employ suitably qualified, experienced staff to deliver the objectives of the Commission.
- high levels of performance by staff, aligned with the Commission's vision and mission.

Community support

- improve community knowledge and support of the Commission's activities
- establish and maintain good relationships with neighbouring landholders.

Community service obligations

- identify and meet the Commission's community service obligations.

Science and Information Services Required by Forests Product Commission

- Knowledge for the long-term sustainable utilization of native forests.
- Understanding of forest ecology so that harvesting and regeneration operations are in accordance with ESFM principles.
- Provision of information about appropriate species, genotypes, soils, and silvicultural prescriptions to maximize production from existing plantations.
- Assistance in the development of new tree crops for carbon credits and possible salinity credits.
- Assistance in training of FPC staff in the management of native forests and plantations.

Trends

- Increase in production of wood from plantations to compensate for the reduced harvesting of native forests.

- Focus on lower rainfall areas for increased biomass production.
- Increase in tree plantings to produce fibre products and environmental benefits.

OTHER POTENTIAL PURCHASERS

Services are also provided to other purchasers, including Alcoa of Australia, Biogene, community groups, Co-operative Research Centre (CRC) for Greenhouse Accounting, CRC for Tropical Savannas, CRC for Pest Animal Control, CRC for Marsupial Management, CRC for Plant Based Management of Dryland Salinity, CRC for Bushfires, CRC for Desert Knowledge, environmental consultants, Forest and Wood Products Research and Development Corporation, Land and Water Australia, Natural Heritage Trust, privately operated sanctuaries, Rural Industries Research and Development Corporation, and Western Australian Police Service.

SCIENCE DIVISION

Science Division will deliver services to the DCLM Nature Conservation, Sustainable Forest Management, and Parks and Visitor Services Divisions, and the Forest Products Commission through the mechanism of Service Provider Agreements and the implementation of this Business Plan.

VISION

We envisage a society where scientific enquiry is highly respected and forms an objective basis for environmental decision making and policy development. We strive to provide excellence in science and technology based on internationally recognized best practice. We operate research centres that foster, promote and reward creativity and innovation.

FOCUS AND PURPOSE

Provision of up-to-date and scientifically sound information to uphold effective conservation of biodiversity and sustainable natural resource management in Western Australia.

ROLE

To achieve its Mission, Science Division has the following broad objectives:

- To provide a scientifically objective and independent source of reliable knowledge and understanding about conserving species and ecological communities in Western Australia, managing the public lands and waters entrusted to DCLM, and carrying out DCLM 's other legislative responsibilities.
- To ensure that Science Division is responsive to the needs of policy makers and output purchasers in DCLM and FPC by bringing science to bear on the solution of the State's most pressing problems relating to conservation and land management.
- To advise DCLM and FPC on sustainable resource development opportunities and to promote the conservation of biological resources through their sustainable utilization
- To communicate and transfer to managers in DCLM and FPC knowledge, information and other insights obtained through scientific investigation in Western Australia and elsewhere.
- To attain a worldwide reputation for excellence in science by publishing knowledge obtained through scientific research in the premier national and international scientific journals and through electronic means.
- To contribute, as an integrated part of DCLM, to meeting the need for knowledge on conservation and land management matters by the public of Western Australia.

STRATEGIES

To meet its Mission and Objectives, Science Division has adopted the following strategies:

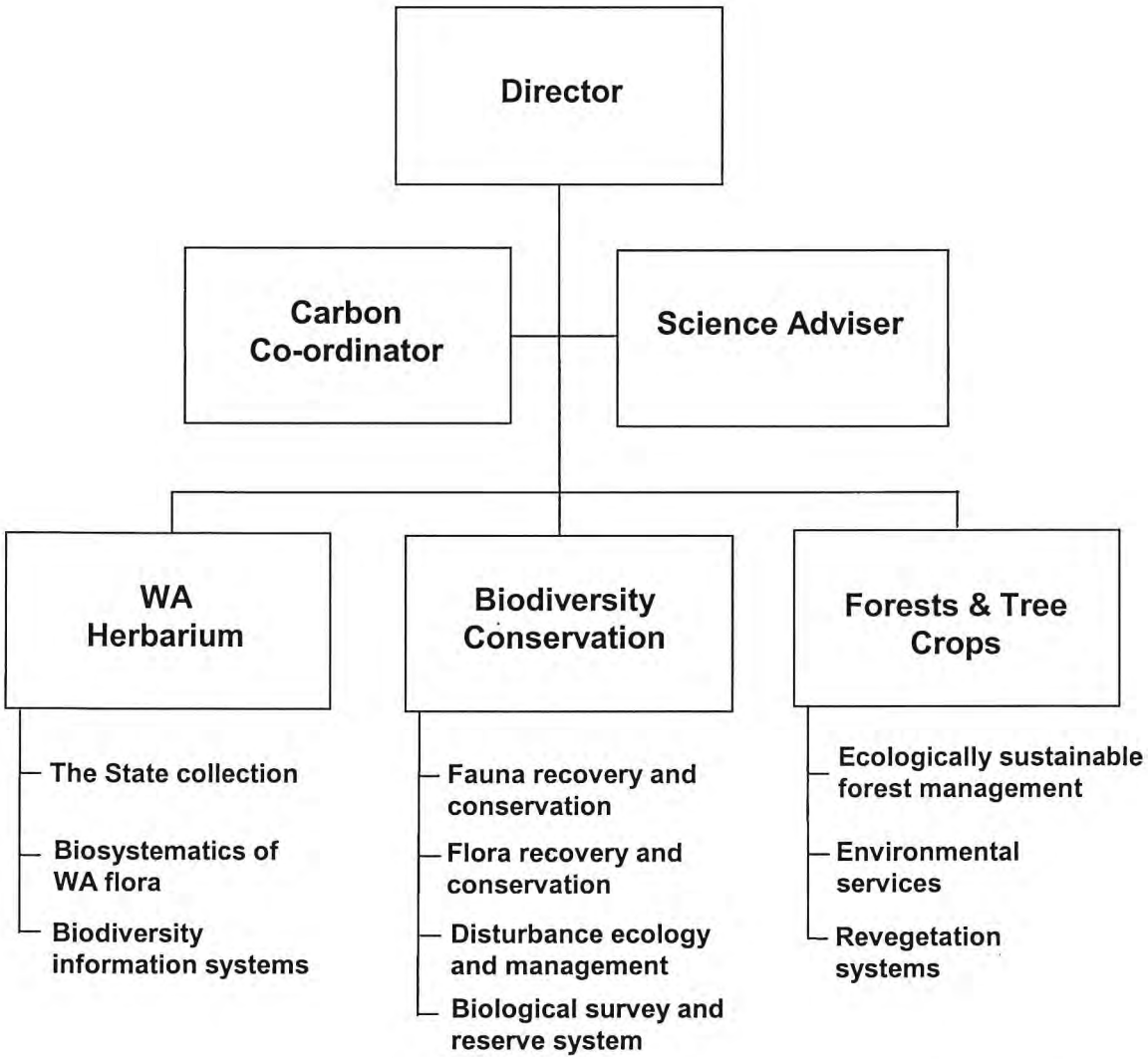
- Work in partnership with DCLM's output accountable Divisions of Nature Conservation, Sustainable Forest Management, and Parks and Visitor Services to prioritize the important scientific and technical issues that need to be addressed in order to achieve DCLM's mission. DCLM's Executive Director and the Forest Products Commission may also be purchasers of Science Division's services.
- Assemble outcome-based program teams to find scientifically sound and practical solutions for conservation issues, and to develop new technologies within a specified time and budget.
- Identify relevant purchasers and secure the necessary resources to support the core functions and projects of the Division.
- Carry out a balanced program of short-term and long-term research.
- Collaborate with DCLM's Regional, District and other staff in technology transfer and timely implementation of practical solutions and new policies, prescriptions and technologies.
- Patent new technologies or innovations that have commercial potential.
- Keep abreast of worldwide scientific and technological advances via the literature and attendance at scientific meetings and seek opportunities to utilize or adapt these to suit DCLM's needs.
- Communicate, promote and market the contribution of Science Division in attaining DCLM's Mission.
- Develop and project Science Division's reputation as a credible and dependable source of sound knowledge about conservation, land management and sustainable utilization matters.
- Uphold DCLM's commitment to obtaining scientifically sound information through improved resourcing of Science Division.
- Continue to apply the most cost-efficient means of carrying out research such as providing resources for post-graduates, collaborating with other agencies, and actively seeking external funds.
- Collaborate with other Government agencies, universities, industries, other interest groups and the public to conduct or co-ordinate research when such interaction will be of benefit in meeting DCLM 's objectives.
- Maintain science resources such as high standards of herbarium curation, computer and library facilities.
- Continue a commitment to individual performance management through DCLM's Individual Development and Performance Enhancement System.
- Enhance project co-ordination and staff management skills.

BUSINESS PROFILE

The Science Division is one of seven Divisions in the Department of Conservation and Land Management and is one of four service provider Divisions. The Division's activities are spread throughout Western Australia with major research centres, providing laboratory and other support facilities, located at Woodvale, Kensington and Manjimup. Other Divisional staff are located at DCLM Regional and District offices at Dwellingup, Busselton, Albany, Karratha and Kununurra. Co-located at the Research Centre at Kensington is the DCLM WA Herbarium, the principal State botanical collection. Regional herbaria are located at Karratha, Manjimup, and Albany; and library and information services are located at Kensington and Woodvale.

The Science Division is structured around three Key Science Themes, or Groups:

SERVICE DELIVERY STRUCTURE



The Director, the three Group Managers and the Science Adviser comprise the Science Management Council (SMC), which develops strategic plans, business plans and service provider agreements, and determines policy and resource allocation within the Division. Group Managers are responsible for ensuring that science services provided by the Group are delivered effectively, efficiently and at a high standard to end users, and for ensuring that relevant scientific expertise in the Group is integrated and co-ordinated within the Group and throughout the Division. Outcome-based, multi-disciplinary teams (Programs) that align with the Division's Key Result Areas support each Group. Each is administered by a Program Team Leader who is responsible for the integration of priorities within a program, the effectiveness and quality of the research, and fostering interaction within the program and with other relevant staff. The Carbon Co-ordinator is responsible for the development and implementation of policy relating to carbon sequestration and Greenhouse issues.

SWOT ANALYSIS

Strengths

The Science Division has a number of advantages over other potential providers of conservation and land management science and technology. These include:

- Clear focus on our core business - knowledge (both theoretical and practical).

- Reputation as a credible and dependable source of sound knowledge about conservation, land management and sustainable utilization issues.
- A history of conducting high quality applied research underpinning DCLM's innovative and internationally acclaimed management activities such as Western Shield and bioprospecting; *Landscope* magazine; key contributions to fire behaviour tables, silvicultural guidelines, site evaluation, status of threatened species, Salinity Action Plan and information technology applications.
- Demonstrated capacity and willingness to work effectively with stakeholders in DCLM (Regions, Districts and Output Purchaser Directorates) and the Forest Products Commission (FPC) to identify the important scientific and technical issues that need to be addressed in order to achieve the mission of DCLM.
- Ability to assemble outcome-based project teams to deliver scientifically sound and practical solutions within a specified time and at a competitive price.
- Dedicated, motivated teams of trained, skilled and experienced people across a variety of disciplines, thereby enabling a very broad range of scientific problems to be investigated.
- Well-developed strategic planning, operations planning, individual performance planning and reporting of outcomes.
- Effective communication and marketing strategies.
- Capacity to carry out a balanced program of short-term and long-term research.
- Technology transfer strategies and timely implementation of practical solutions and new policies, prescriptions and technologies.
- Demonstrated willingness to collaborate with operations staff to ensure ongoing training and effective uptake of new ideas and technologies.
- Patenting of new technologies or innovations that have commercial potential.
- High standard of professionalism, supported by explicit guidelines.
- Many scientists in the Division are nationally or internationally recognized as experts in conservation biology, ecology, geomorphology, nutrition, forestry, pathology, and molecular genetics.
- Commitment to keep abreast of worldwide scientific and technological advances via the literature and attendance at scientific meetings, and to seek opportunities to utilize or adapt these to suit end user needs.
- Collaboration with other Government agencies, universities, industry, other interest groups and the public to conduct or co-ordinate research when such interaction will benefit our clients.
- Cost-efficient means of carrying out research such as providing resources for post-graduates, collaborating with other agencies, actively seeking external funds and employing contract or consultant staff where appropriate.
- Criteria progression career pathway for research scientists and technical officers.
- Staff recognize and accept change as necessary and ongoing.
- Support facilities such as laboratories and research centres throughout Western Australia and staff that are readily available to provide quality advice on a range of conservation and land management issues.
- Demonstrated capacity to secure necessary resources and support, including external grants and community participation.
- Readily accessible science resources such as high standards of herbarium curation, computing and library facilities (three collections).
- Superior and accessible biological information and Information Technology systems.

Weaknesses

- The age structure is unbalanced, with few young officers in the Division. A workforce planning strategy must be developed to ensure skills future capacity.
- Most of the Divisional budget is allocated as salary to full time, permanent officers, or as overheads; this leads to inflexibility.
- Too risk-averse.
- No capability to conduct social research and limited capacity to conduct marine research.
- Good performance by staff is not adequately recognized and rewarded.
- Perceptions that some staff focus research in own area of interest.
- Some scientists are unproductive, particularly in terms of publication record.
- Some scientists have poor citation records in the scientific literature.
- Unproductive scientists require more management, which sometimes results in neglect of more productive scientists.

Opportunities

- Output Purchaser Provider business model and foreshadowed DCLM structural review (Nature Conservation Division) will refine the focus of the Department and its science needs.
- Recognition of science as fundamental to a knowledge-based economy.
- Increasing complexity of management and the essential role of science in providing solutions.
- Foreshadowed mixed model of outsourcing and permanent workforce.
- Improve linkages with universities through the provision of more PhD Scholarships.
- Involvement in bioprospecting provides funds for flora conservation activities.
- Potential to attract sponsors of crucially important conservation research.

Threats

- Relativism – the view that there are no objective standards by which knowledge can be evaluated. Opinion, prejudice and personal belief are of equal status with science-based knowledge.
- Ageing workforce and loss of corporate knowledge with impending staff retirements.
- Perception of some managers in DCLM that science is a luxury and not fundamental to the Department's mission.
- Perception that Science Division, at approximately 12% of the Department's resources (staff and CF allocation), is too large a component of DCLM.
- Corporate Executive could decide to increase level of outsourcing of science activity.
- Misfocus on short-term research.
- Anti-science and anti-agency bias shown by the Federal Government, an important source of external funds.

One of the purposes of this plan is to provide direction to the Science Division in order to optimize the strengths and opportunities while managing the weaknesses and threats.

STAFF RESOURCES

Details of staff resources in Science Division (as at June 2002) are as follows:

	Research Scientists	Technical Officers	Administrati on Officers	Total
Full time permanent FTEs	53	37.2	13	103.2
Contract FTEs	8.6	6.7	3.7	19
Contract FTEs – externally funded	7.6	7.4	2.4	17.4
				139.6

FINANCIAL INFORMATION

The value of services provided to internal and external purchasers as at June 2002 is as follows:

Group	NC Output	SFM Output	Executive Director	FPC	Total	External Purchaser
WA Herbarium	1 545 202				1 545 202	140 000
Biodiversity Conservation	4 105 704				4 105 704	1 460 000
Sustainable Resources	1 111 817	1 920 143	137 671	752 000	3 921 631	2 200 000
Directorate	715 983	113 828		48 000	877 811	0
Total	7 478 706	2 033 971	137 671	800 000	10 450 348	3 800 000

Figures *per annum*

SCIENCE DIVISION MARKETING STRATEGY

Marketing strategy
Marketing involves the identification of products and services for which there is a demand and which can be provided, as well as effective promotion and communication of activities, outputs and outcomes. The Science Division is largely in the business of generating new science and innovative science solutions to underpin conservation and land management in Western Australia.

Market demand - Purchaser needs
The need or demand for the services provided by the Division is identified by a variety of formal and informal processes. The formal processes include futuring workshops and formal meetings with relevant output purchasers and operations (Regional Services) staff, the development of Service Provider Agreements (SPAs) in consultation with output purchasers, the requirement for output purchaser Directors to endorse any project that is initiated outside the SPA process, and annual review of programs and projects. The Division is responsive and flexible, and depending on the nature and importance of the request and the availability of resources, has a capacity to respond to short term issues and demands as they arise.

To ensure ongoing satisfaction of purchaser needs, Group Managers will meet twice yearly to brief output Directors on the progress of the SPAs and on new and emerging scientific issues. They will also seek feedback on performance and issues or concerns held by output purchasers. Group managers will also visit each Regional office at least once per annum to brief staff on progress and to seek input to new and emerging research issues.

Partnerships
The Division will continue to seek opportunities to collaborate with universities, CSIRO and other kindred institutions where these align with DCLM's mission. Partnerships with non-government institutions and the public will be fostered through activities such as the regional herbaria network, DCLM 's volunteer program and FORESTCHECK.

Communications plan
It is crucial that sound, applied science is communicated effectively. The Science communications plan is flexible and responsive to the changing needs of the Division and the Department, and provides the Division with a focused and co-ordinated approach to both internal and external communication. The plan identifies key communications issues, objectives, target audiences, strategies, key messages, and measures for evaluation.

The key communications issues are
- Internal reputation and integration between Science and other Divisions of DCLM.
- Strategic approach to co-ordinated communication.
- Taking credit for Divisional initiatives and achievements.
- Identifying the Division's media potential and publicizing scientific advances.
- Focusing on science to reinforce that DCLM is a science-driven organization and that progress depends on innovation and knowledge.

The objectives are:
- increased Departmental and external awareness, understanding and support for the Science Division and its work.
- reinforcement that DCLM is a scientific organization and that sound science underpins Departmental policies and actions.
- alerting other sections of DCLM to the science-based research and information that is available to them through the Division.

The target audiences are all DCLM staff (including Corporate Executive), other research organizations (e.g. CSIRO, universities), Federal, State and local government agencies, non-government organizations, and the people of Western Australia.

Performance Indicators

- Level of utilization and uptake of Science expertise and findings.
- Feedback from DCLM staff (including Corporate Executive and Science Division)
- Amount and tone of coverage in the media and on the Internet, Intranet and in DCLM publications.
- Amount and quality of scientific publications.
- Number of partnerships/collaborations formed.
- Number of post-graduate programs supported.
- Number of seminars and speaking engagements.
- Number of volunteers involved in Science activities.
- Number of visits to research centres, including the WA Herbarium.

SCIENCE SERVICE DELIVERY PLAN

During the period July 2002 – June 2004 the Science Division will implement the following plan to provide agreed services to underpin conservation and land management in an efficient and effective manner. This plan, and the accompanying Operations Plan, will also be used to track the delivery of services and to serve as a mechanism for reporting performance.

WA HERBARIUM

KEY SCIENCE THEME *Description and documentation of Western Australia's botanical diversity.* Western Australia has a very rich flora with a diverse array of ecosystems and habitats. Science Division will continue with the inventory of systematic, biological and ecological information.

AIM To maintain and extend the State resource centre for taxonomic, conservation and economic information on the native and alien flora.

PROJECTS

- The State collection
- Biosystematics of WA flora
- Biodiversity information systems

RELEVANT CORPORATE OBJECTIVES

- To protect, conserve and, where possible, restore Western Australia's natural biodiversity.
- To generate social, cultural and economic benefits through the provision of a range of services that are valued by the community and are consistent with the principles of ecological sustainability.
- To develop community awareness and appreciation of the biological and physical diversity natural to Western Australia and promote community involvement in and support for its protection, conservation and restoration.

RELEVANT CORPORATE STRATEGIES

- Expand and improve the marine and terrestrial conservation reserve system to achieve world's best standards.
- Promote off-reserve conservation that complements the reserve system.
- Recover threatened flora, fauna and ecological communities.
- Protect biodiversity from threatening processes, agents and activities, including feral animals,

weeds, dieback, and other exotic diseases, salinity and inappropriate fire regimes.
- Ensure that the use of wildlife is sustainable.
- Provide enriched visitor experiences through quality information, memorable interpretive activity programs and innovative visitor facilities and services.
- Improve community knowledge of biodiversity conservation issues and awareness, understanding and support for DCLM's activities, services and policies.
- Be responsive to the community.
- Partner with agencies and groups with similar interests.

PURCHASERS REQUIRING SERVICE
- Nature Conservation
- Parks and Visitor Services

PROGRAM THE STATE COLLECTION

Description
This program serves the Departmental functions as specified in the Conservation and Land Management Act 1984, Section 33 (1) (db), '*To be responsible for the permanent preservation of the plant collections of the Western Australian Herbarium and to care for and extend those collections*' and Section 33 (1) (ca) '*To promote and encourage the use of flora for therapeutic, scientific or horticultural purposes for the good of people in this State or elsewhere, and to undertake any project or operation relating to the use of flora for such a purpose*'.

As a permanent, fully databased repository of plant specimens and information about them, the WA Herbarium collections underpin much of the scientific research and many of the environmental management activities of the Department and those of external organizations. The latter include the Forest Products Commission, Environmental Protection Authority, Agriculture WA, Department of Land Administration, other government agencies, universities, regional herbaria, and community interest groups concerned with land management.

Objectives
- Documentation of the WA flora to adequately represent species distribution and variation, based on authenticated specimens held at the Western Australian Herbarium.
- Maintenance of currency of corporate databases relating to species names and distribution.
- Operation of a Regional Information Network of trained parataxonomists whose activities are focused on local herbaria in collaboration with landcare and kindred groups.
- Collection, processing and vouchering of bioprospecting samples of the WA vascular flora and management of the Plant Extracts Library.

Significance and Benefits
The Collection of accurately identified and well-curated specimens underpins conservation of the WA flora. The related electronic information systems provide authoritative, scientific data concerning the flora of the State. The Visitor Centre at the WA Herbarium, and its online information systems, promote greater appreciation of the WA flora by the community and provide an essential service to DCLM staff and external consultants involved in conservation and land management. The Regional Herbarium and Weeds Information Network schemes serve to extend these benefits to rural WA, thus fostering local knowledge of the State's flora and of conservation issues among community-based organizations.

Results Expected
- A total holding of 550 000 vascular plant specimens (approximately 40 specimens per taxon) will be attained. Historical (type) collections of species of 5 WA genera held in other herbaria will be represented.
- The Reference Herbarium Collection will represent 90% of the currently accepted WA species.
- Enhanced outreach to salinity, landcare, weed and nature-based tourism groups.
- Three trained parataxonomists to staff the volunteer identification unit.

Performance Indicators
- 10 000 specimens incorporated into the State Collection.

- 500 specimens received from regional herbaria according to established protocols.
- 400 regional volunteer collectors.
- Known weed populations listed for 15 local government areas.
- Revenue from bioprospecting.

Anticipated Outcome
The WA Herbarium has a comprehensive, adequate and representative collection of specimens of the State's vascular and non-vascular flora, to support flora conservation.

Adoption Strategy
Collaboration with DCLM Regional, District and other staff to develop training programs in collecting techniques; utilization of electronic means to identify gaps in knowledge; extension of the volunteer specimen collecting programs (Regional Herbarium Network, Weed Information Network).

PROGRAM BIOSYSTEMATICS OF WA FLORA

Description
This program contributes to the Nature Conservation Output Strategic Plan objectives of '*An understanding of our State's natural biodiversity and biodiversity conservation needs*', and '*A Department that works effectively with the wider community to achieve biodiversity conservation and a community that is knowledgeable about, interested in, supportive of, and involved in, biodiversity conservation*'.

Western Australia's terrestrial flowering plant flora is one of the most diverse in the world, yet many of the species are threatened. Knowledge of the flora is hampered by inadequately defined species, and poorly surveyed species. There is high public interest in the identification of vascular flora. Increasing attention is being paid to fungi, marine and other non-flowering plants.

Objectives
- Provision of reliable taxonomy to underpin effective conservation management.
- Maintenance of an up-to- date census of the WA flora.

Significance and Benefits
Biosystematic knowledge is fundamental to effective conservation of a highly diverse south-west WA flora that has evolved in an ancient landscape devoid of pronounced geographical and climatic barriers. Since European settlement, weeds have invaded the State posing a significant threat to many native species. There is an ongoing need for an up-to-date understanding of the taxonomic status of these weeds in order to access information on their biology.

Results Expected
- Increased proportion of the flora with accurately defined taxonomy.
- Improved resolution of taxonomic problems affecting taxa with conservation priority.
- Extension of inventories to lichens and fungi.

Performance Indicators
- 50 new species described or taxonomically clarified.
- Number of species downgraded on threatened flora list as a result of taxonomic resolution.
- Descriptions of species added to database.
- Number of new identification keys for species groups posted on the FloraBase information system.
- Number of non-vascular species with newly published inventory.
- Number of advisory communications to Wildlife Branch concerning identity, biology, and conservation status of individual species.
- Taxonomic status of 200 weed species validated.

Anticipated Outcome
Reliable and stable taxonomy and nomenclature underpin the effective conservation of the State's flora.

Adoption Strategy

Collaboration with taxonomists; dissemination of knowledge via FloraBase; participation in workshops with DCLM Regional, District and other staff and the community; contribution of information to flora recovery teams; seminars, workshops and conferences; research findings published as reports or in journals within twelve months of data collection.

PROGRAM BIODIVERSITY INFORMATION SYSTEMS

Description
This program contributes to the Nature Conservation Output Strategic Plan objectives of '*An understanding of our State's natural biodiversity and biodiversity conservation needs*'.

The program develops, manages and extends DCLM 's corporate information systems for the benefit of conservation. These systems include the comprehensive list of all current and obsolete plant names (WACensus), a record of all herbarium specimens (WAHERB), and E-flora, an online identification system that is an integral part of FloraBase. These information systems and their underlying databases provide comprehensive knowledge of the plant species of Western Australia, their distribution and their ecological attributes. In this way a wide range of conservation activities, research and field surveys are supported.

Objectives
- Provision of easily accessed, computer-based botanic information systems to efficiently manage biological inventory.
- Detection of gaps in knowledge of species distributions.

Significance and Benefits
Corporate decision systems depend on timely delivery of integrated information. Computer based botanic information systems facilitate the identification of species and the efficient retrieval of information about them.

Results Expected
- Database of name, location, habitat and other label data for 550 000 vascular plant specimens (approximately 40 specimens per taxon).
- Geographical gaps in collections identified.
- WACensus updated to incorporate non-vascular plants.
- Predicted distribution maps of all 12 000 WA vascular plant taxa produced and included in FloraBase and WABiota.

Performance Indicators
- Increased taxonomic and geographic coverage of the State in WAHERB.
- Number of databased plant species names increased by 100.
- Number of registered FloraBase users increased by 200.
- Number of clients paying for FloraBase/Max services increased by 10.
- Number of users accessing WABiota increased by 50.

Anticipated Outcome
Comprehensive databases facilitate the rapid retrieval of scientific information about the WA flora.

Adoption Strategy
Publicity for the databases to DCLM staff, universities and the public; production of books, interactive CDs and web pages; seminars, workshops and conferences; research findings published as reports or in journals within twelve months of data collection.

BIODIVERSITY CONSERVATION GROUP

KEY SCIENCE THEME *Protection and conservation of Western Australia's biological diversity.* Science Division will provide knowledge of threatened species, communities and ecosystems. It will continue to identify processes and organisms that threaten the State's biological diversity and develop scientifically sound applied technologies to ameliorate these threats. Systematic biological surveys of the State will be ongoing to provide the basis for a comprehensive, adequate and representative reserve system. The impact of major ecological disturbances such salinity, fire and flooding will also be assessed and protocols developed for their management.

AIM To provide a scientific basis for the protection and enhancement of the State's biological diversity, and for the establishment of a comprehensive, adequate and representative reserve system.

PROGRAMS
- Fauna recovery and conservation
- Flora recovery and conservation
- Disturbance ecology and management
- Biological survey and reserve system

RELEVANT CORPORATE OBJECTIVE
- To protect, conserve and, where possible, restore Western Australia's natural biodiversity.
- To develop community awareness and appreciation of the biological and physical diversity natural to Western Australia and promote community involvement in and support for its protection, conservation and restoration.

RELEVANT CORPORATE STRATEGIES
- Expand and improve the marine and terrestrial conservation reserve system to achieve world's best standards.
- Promote off-reserve conservation that complements the reserve system.
- Recover threatened flora, fauna and ecological communities.
- Protect biodiversity from threatening processes, agents and activities, including feral animals, weeds, dieback, and other exotic diseases, salinity and inappropriate fire regimes.
- Improve community knowledge of biodiversity conservation issues and awareness, understanding and support for DCLM's activities, services and policies.
- Be responsive to the community.
- Partner with agencies and groups with similar interests.

PURCHASER REQUIRING SERVICE
- Nature Conservation

PROGRAM FAUNA RECOVERY AND CONSERVATION

Description
This program contributes to the Nature Conservation Output Strategic Plan objective of '*Successful recovery of threatened species and ecological communities, while also preventing additional species or communities becoming threatened or any species becoming extinct as a result of human action/inaction*'.

Many species of vertebrate fauna have declined or become extinct in Australia. Western Australia has about 50 percent of Australia's threatened mammals, as well as many threatened bird, reptile, frog, fish, and invertebrate species. This program provides the scientific basis for management prescriptions relating to the conservation of threatened fauna. It also identifies and develops management protocols for the major threatening processes for vertebrate fauna conservation (control of fox and feral cat predation), as well as other threatening processes.

Objectives

- Provision of reliable knowledge to underpin the conservation of threatened fauna (terrestrial and marine) in Western Australia.
- Development of more efficient and cost effective methods for controlling feral cats in Western Australia.

Significance and Benefits

Medium-sized mammal and ground-dwelling bird species are threatened by foxes and feral cats. In order to recover such species, cost-effective means of reducing the abundance of these exotic predators are required. The intensity and frequency of baiting therefore needs to be optimised. Once predators are controlled, native fauna populations are able to increase, and translocation programs can be safely implemented. Knowledge about marine megafauna assists in their management and the reservation of marine parks.

Results Expected

- The downlisting and/or removal of species from the threatened fauna lists.
- Improved success at captive breeding Gilbert's Potoroo.
- Improved transfer of knowledge into the recovery planning process.
- Development of an effective baiting strategy for cat control.
- Understanding of the interaction between foxes and feral cats in the south west.
- Integration of marine turtle research into management.

Performance Indicators

- Increase in the number of taxa downgraded or removed from the State's threatened fauna list.

Anticipated Outcome

The Western Shield initiative is supported by reliable knowledge about protection of existing populations of threatened species, recovery of critically endangered and other threatened species, and reversal of processes threatening the long-term persistence of these species.

Adoption Strategy

Seminars and workshops with Nature Conservation Division and Regional Services staff; participation in recovery team meetings; training of Regional Services Staff to conduct fauna monitoring; seminars, workshops and conferences; research findings published as reports or in journals within twelve months of data collection.

PROGRAM FLORA RECOVERY AND CONSERVATION

Description

This program contributes to the Nature Conservation Output Business Plan objective of '*Successful recovery of threatened species and ecological communities, while also preventing additional species or communities becoming threatened or any species becoming extinct as a result of human action/inaction*'.

The program focuses on the conservation and recovery of the Western Australian flora with particular emphasis on the conservation of rare and threatened flora, and the management of remnant vegetation in fragmented landscapes. There are 2413 rare and threatened plant taxa in WA, of which 337 are threatened with 120 critically endangered requiring immediate recovery action. This program provides a sound scientific basis for the recovery of rare and threatened flora through the management of key populations, *ex situ* germ plasm conservation and translocation programs, and the amelioration and control of major threatening processes such as invasive weeds and *Phytophthora* root rot. This work is complemented by a population viability analysis approach to the management and conservation of remnant vegetation in fragmented landscapes, particularly the wheatbelt.

Objectives

- Provision of reliable knowledge to underpin the conservation of threatened/rare flora and remnant vegetation.
- Maintenance and improvement of an *ex situ* germplasm storage facility for threatened/rare flora.

- Development of appropriate recovery techniques, including translocation techniques, for threatened flora.
- Improved understanding of processes threatening flora and ecological communities so that the impacts of these processes can be minimized.
- Provision of phylogenetic and molecular systematic knowledge to facilitate understanding of the WA flora.

Significance and Benefits
Accurate assessment of the conservation status of threatened (Declared Rare Flora) and Priority Flora is essential to their recovery. Maintenance of an *ex situ* germplasm storage facility underpins translocation and restoration programs. Amelioration and control of threatening processes such as weeds and *Phytophthora* root rot are fundamental to *in situ* management of threatened flora populations and threatened ecological communities. Development of guidelines for the appropriate management of viable vegetation remnants in degraded and fragmented landscapes is fundamental to ensuring the long term persistence of native flora in areas such as the WA wheatbelt.

Results Expected
- Removal of plant taxa from threatened species lists.
- Improved conservation status ranking of threatened flora and priority flora.
- Development of techniques to ameliorate and control threatening processes, particularly weeds and *Phytophthora cinnamomi.*
- Better management of remnant vegetation.

Performance Indicators
- Increase in the number of taxa downgraded or removed from the State's threatened flora lists.
- Representative *ex situ* germplasm storage of threatened and high priority flora, particularly those nominated through the Salinity Action Plan and Millennium Seed Bank Project.
- Number of critically endangered flora populations successfully established through translocations

Anticipated Outcome
The conservation and recovery of the Western Australian flora is supported by reliable knowledge about protection of existing populations of threatened species, management of remnant vegetation in fragmented landscapes, recovery of critically endangered species, and reversal of processes threatening the long-term persistence of these species.

Adoption Strategy
Recommendations on conservation status of threatened flora to Nature Conservation Division; incorporation of information into recovery plans; training of Regional Services Staff to conduct flora monitoring; seminars, workshops and conferences; research findings published as reports or in journals within twelve months of data collection.

PROGRAM DISTURBANCE ECOLOGY AND MANAGEMENT

Description
This program contributes to the Nature Conservation Output Strategic Plan objective of '*An understanding of our State's natural biodiversity and biodiversity conservation needs*'.

The program focuses on understanding change in populations, communities, ecosystems and landscapes over time, including those changes resulting from disturbance in the context of overall environmental patterns. It covers both terrestrial and aquatic ecosystems, and fire, grazing, mining and related clearing, flooding and changes to water quality.

Objectives
- Improved understanding of the natural and anthropogenic processes that influence populations, communities, ecosystems and landscapes.
- Formulation of guidelines for the management of populations, communities, ecosystems and

landscapes.

Significance and Benefits
Scientific understanding of natural and human-induced processes is crucial to the management of nature reserves and off-reserve conservation areas. Guidelines based on reliable knowledge will improve the quality of management decisions and practices.

Results Expected
- Ranking of the ecological importance of disturbances, including salinization, fire, flooding and grazing, for maintenance of biodiversity.
- Initiation of a comprehensive study into the impacts of frequent and extensive late season fires on biodiversity in the Kimberley.
- Identification of best practice in management and restoration of the conservation estate and off-reserve areas.
- Guidelines for rehabilitation following disturbance, including the application of disturbance ecology principles at the landscape level.

Performance Indicators
- Disturbances categorized, ranked and monitored in two focal areas of the DCLM estate.
- Increased biodiversity conservation value of rehabilitated disturbed areas.
- An understanding of the impacts of fire in the Kimberley and an amelioration of detrimental impacts.

Anticipated Outcome
Management of the conservation estate and off-reserve conservation areas is based on a sound understanding of the natural and human-induced disturbances causing changes to the quality of these areas.

Adoption Strategy
Recommendations provided to Nature Conservation and Regional Services Divisions; training of Regional Services Staff to conduct monitoring; liaison with landholders; seminars, workshops and conferences; research findings published as reports or in journals within twelve months of data collection.

PROGRAM BIOLOGICAL SURVEY AND RESERVE SYSTEM

Description
This program contributes to the Nature Conservation Output objectives of '*An understanding of our State's natural biodiversity and biodiversity conservation needs*', and '*A comprehensive, adequate and representative reserve system managed by DCLM that conserves as much as possible of our natural biodiversity*'.

The program focuses on systematic, point-based, zoological and botanical surveys of the bioregions of WA. It provides quantitative data on patterns in the species composition of native plant and animal communities. An array of smaller projects are undertaken to complement the regional surveys, including surveys of localized areas, communities and taxa of particular conservation interest (on and off-reserve), and investigations of biological survey strategies, sampling methods and data analysis techniques.

Objectives
- Identification of gaps in the current formal and informal reserve network to achieve a CAR reserve system.
- Provision of information about environmental and ecological patterns to underpin strategic land-use planning.
- Improved understanding of the factors that affect the persistence of ecological communities.

Significance and Benefits
Knowledge of biodiversity patterns, ecological relationships, and conservation status provide the scientific basis for planning a reserve system that is optimised to sample and retain WA's biodiversity. Point-based sampling allows the results of different surveys to be combined, gradually accumulating coverage of the entire State. This yields a stratified network of long-term monitoring sites across WA's bioregions, for

evaluating trends in species and community status.

Results Expected

- Data matrices compiled and archived on species composition and physical attributes at a representative set of sites throughout the State.
- Recommendations for strategic acquisition of land for a CAR reserve system.

Performance Indicators

- Number of advisory communications to Nature Conservation Division recommending additions to the CAR reserve system.

Anticipated Outcome

The CAR initiative is supported by the formal reservation of large areas of uncleared land, based on biological survey, so that all elements of local and regional biodiversity are represented and persist in the long-term. The Salinity Action Plan is supported by the selection of biodiversity recovery catchments, which are intended to reverse the process of salination. The Pilbara stygofauna survey initiative and the proposed Pilbara surface biota survey will provide a better context for mine clearance assessments, species and community status and reserve system gap assessment to improve nature conservation planning in the region. The Biodiversity Audit contributes to state nature conservation planning by providing a standardized summary of the nature conservation issues and values for each of the State's IBRA sub-regions, a basis for setting priorities between sub-regions and nature conservation activities.

Adoption Strategy

Recommendations provided to Nature Conservation Division; seminars, workshops and conferences; research findings published as reports or in journals within twelve months of data collection.

FORESTS & TREE CROPS GROUP

KEY SCIENCE THEME *Sustainable utilization of woody perennials in Western Australia's revegetation, native forest and plantation systems.* Science Division will provide the scientific basis to ensure that the State's revegetation, native forest and plantation resources are used in an ecologically sustainable manner, which minimizes adverse impacts on the environment. Valid indicators of sustainable forest management will be developed. The information necessary to establish revegetation and plantations for environmental services and commercial products will be provided.

AIM To provide the scientific basis for ecologically sustainable forest management systems, and for the cost-effective establishment and management of revegetation and plantations for environmental and commercial purposes.

PROGRAMS
- Ecologically sustainable forest management
- Environmental services
- Revegetation systems

RELEVANT CORPORATE OBJECTIVES
- To protect, conserve and, where possible, restore Western Australia's natural biodiversity.
- To generate social, cultural and economic benefits through the provision of a range of services that are valued by the community and are consistent with the principles of ecological sustainability.
- To develop community awareness and appreciation of the biological and physical diversity natural to Western Australia and promote community involvement in, and support for, its protection, conservation and restoration.

RELEVANT CORPORATE STRATEGIES
- Protect biodiversity from threatening processes, agents and activities, including feral animals, weeds, dieback, and other exotic diseases, salinity and inappropriate fire regimes.
- Ensure that the use of wildlife is sustainable.
- Manage the forests and woodlands entrusted to us, and the resources they provide, on an ecologically sustainable basis.
- Improve community knowledge of biodiversity conservation issues and awareness, understanding and support for DCLM's activities, services and policies.
- Be responsive to the community.
- Partner with agencies and groups with similar interests.

PURCHASERS REQUIRING SERVICES
- Sustainable Forest Management, DCLM
- Nature Conservation, DCLM
- Forest Products Commission

PROGRAM ECOLOGICAL SUSTAINABLE FOREST MANAGEMENT

Description

This program contributes directly to the objectives of the Sustainable Forest Management Division of maintenance and enhancement of biodiversity and other values of publicly-owned forests; and provision for harvesting, regeneration and growth of forest products from State forests and timber reserves in accordance with approved forest management plans and principles of ecologically sustainable forest management.

This program integrates a series of related projects that investigate the impact of disturbance (fire and

harvesting) on soil, water yield and quality, microbiota, flora and vertebrate fauna of the forest. The impact of forest management on the sustainability of the forests will be determined using a system of integrated forest monitoring (FORESTCHECK). With the reduction of harvesting in Karri forest, productivity from regrowth stands will be enhanced by development of appropriate thinning and fertilization treatments. The program also includes the Vegetation Health Service.

Objectives

- Improved understanding of the impact of timber harvesting and associated silvicultural treatments on soil, water and biodiversity and use of this information to develop indicators of ESFM.
- Improved understanding of the long term ecological effects of fire regimes.
- Formulation of silvicultural guidelines that maximize productivity and sustainability of Karri regrowth stands.
- Monitoring of forest biodiversity at appropriate spatial and temporal scales.
- Provision of knowledge of the impact of fuel loads and environmental conditions on fire behaviour in dry eucalypt forest.
- Protection of the State's vegetation resource through accurate diagnosis of plant disease.

Significance and Benefits

ESFM requires the implementation of policies and practices that maintain ecological processes and biodiversity. Assessment of the sustainability of forest management, by international agreement, depends on the application of criteria and indicators. FORESTCHECK provides an integrated monitoring system that will assist in achieving ESFM. Prescribed fire is used extensively in WA forests for fuel reduction and to meet silvicultural objectives, but its use is contentious. Science-based knowledge will contribute to the resolution of this issue. Effective disease detection is central to minimizing the spread and impact of plant diseases in forests.

Expected Results

- Definition of the impact of management practices on soil, water and biodiversity.
- Development of practical and reliable indicators of sustainable forest management.
- Guidelines for thinning and fertilizing regrowth Karri forests.
- Improved predictions of the impact of fuel load and environmental conditions on fire behaviour.
- Provision of timely and accurate disease diagnosis of plant and soil samples.

Performance Indicators

- Number of advisory communications to Sustainable Forest Management Division with recommended improvements to forest management planning and harvesting guidelines.
- Refinements to fire management guidelines.
- High level of use of the Vegetation Health Service.

Anticipated Outcome

Ecological sustainable management of forest and woodland ecosystems is based on a sound understanding of the impacts of natural processes and human-induced disturbances.

Adoption Strategy

Recommendations on ESFM to Sustainable Forest Management Division; incorporation of information into the Forest Management Plan; seminars, workshops and conferences; research findings published as reports or in journals within 12 months of data collection.

PROGRAM ENVIRONMENTAL SERVICES

Description

This program contributes to the Nature Conservation Output Strategic Plan objective of '*A network of private conservation activities that conserve biodiversity and are complementary to the conservation reserve system*'. This program contributes to the Forest Products Commission objectives of '*Providing forest products from publicly owned and managed plantations*'; and '*Increasing the area of hardwood and softwood plantations to meet regional development opportunities and environmental objectives*'; and '*Promoting increased level of economic return to WA from the use of forest products*'.

The program provides the essential genetic, silvicultural and land capability information needed to underpin the management of established revegetation, tree crop and plantation species, and the development of new plant species for lower rainfall areas.

Objectives

- Provision of knowledge of genetic diversity relevant to water use, salt tolerance, growth, form, wood density, oil production and disease resistance so that environmental benefits and the effectiveness and productivity of revegetation and tree crop systems are optimised.
- Provision of silvicultural and ecological knowledge to underpin effective management of plantations, revegetation and tree crops.
- Assessment of the carbon sequestration potential of revegetation and tree crop systems in southern WA.

Significance and Benefit

Knowledge of genetic resources enables efficient development of species for revegetation programs and commercial farm forestry for salinity management. Viability and productivity of commercial farm forestry and plantations depend largely on genetically improved germplasm. Genetic marker technology improves the efficiency of breeding to maximize genetic gains. Production of dieback resistant Jarrah will enable rehabilitation of severely dieback-affected sites in Jarrah forests. Revegetation and tree crops are crucial to reversing the impact of dryland salinity at landscape scale. Increased revegetation depends on development of improved management systems and carbon accounting methods. Refined silvicultural systems for higher rainfall plantations will maximize their economic performance.

Expected Results

- Improved silvicultural systems and genotypes that maximize productivity from plantations and tree crops.
- New revegetation and tree crop species for the lower rainfall areas.
- Accurate site selection system for Maritime pine in the medium rainfall zone.
- Tree planting layouts and arrangements that provide control of ground water.
- Productive and dieback resistant jarrah that can be used in plantations and forests
- Practical and effective carbon accounting systems for tree crops and plantations.

Performance Indicators

- Increased adoption of tree crops in severely disturbed landscapes.
- Uptake of silvicultural recommendations for the management of plantations in the higher rainfall areas.

Anticipated Outcome

The Salinity Action Plan is supported by the widespread adoption of tree crops in agricultural landscapes, to assist in reversing the process of salination. Management of plantations is underpinned by effective silvicultural and genetic information.

Adoption Strategy

Liaison with Nature Conservation Division on environmental benefits of revegetation and tree crops; recommendations on silviculture, tree breeding, species selection and genetic resources to Forest Products Commission; seminars, workshops and conferences; research findings published as reports or in journals within 12 months of data collection

PROGRAM Revegetation systems

Description

This program contributes to the Nature Conservation Output Strategic Plan objective of '*A network of private conservation activities that conserve biodiversity and are complementary to the conservation reserve system*'. This program contributes to the Forest Products Commission objectives of '*Providing forest products from publicly owned and managed plantations*'; and '*Increasing the area of hardwood and softwood plantations to meet regional development opportunities and environmental objectives*'; and '*Promoting increased level of economic return to WA from the use of forest products*'.

The program pioneers the domestication of native plant species and the creation of new large-scale revegetation programs and perennial crop industries to assist with the amelioration of dryland salinity. It seeks to build on the emerging development of the oil mallee industry and aims to increase the adoption of existing tree crops so that proven commercial tree crops become mainstream agricultural practice.

Objectives

- Provision of knowledge to underpin effective management of oil mallee and maritime pine tree crops.
- Identification and assessment of 3 prospective native tree crop species.
- Provision of information for the development of revegetation systems and a eucalypt sawlog industry in lower rainfall areas.
- Dissemination of knowledge about sustainable management of revegetation and tree crops to landholders.

Significance and Benefit

Salination in south-west agricultural areas is pervasive, destructive and ongoing. It severely impacts on commercial, conservation and social activities along drainage lines and valley floors and has the potential to affect more than 30% of the landscape. Large-scale revegetation is a key component of salinity control and the most feasible option involves commercial tree crops and associated processing industries, which need to be extended to lower rainfall areas.

Expected Results

- Provision of 90% genetically improved seed of oil mallees.
- Optimal harvest regimes and biomass yields for oil mallees.
- Effective low cost operational prototype mallee harvester.
- Increased adoption by farmers of revegetation and tree crop planting integrated in farm management.
- Guidelines for sustainable management of revegetation and tree crops for landholders.

Performance Indicators

- Extent that commercial tree crop industries are underpinned by reliable knowledge.
- Increased adoption of revegetation and tree crops integrated into agricultural systems.

Anticipated Outcome

The Salinity Action Plan is supported by the widespread adoption of tree crops in agricultural landscapes, which is intended to assist in reversing the process of salination.

Adoption Strategy

Liaison with Nature Conservation Division on environmental benefits of tree crops; recommendations to landholders on revegetation and commercial tree crops; seminars, workshops and conferences; research findings published as reports or in journals within twelve months of data collection.