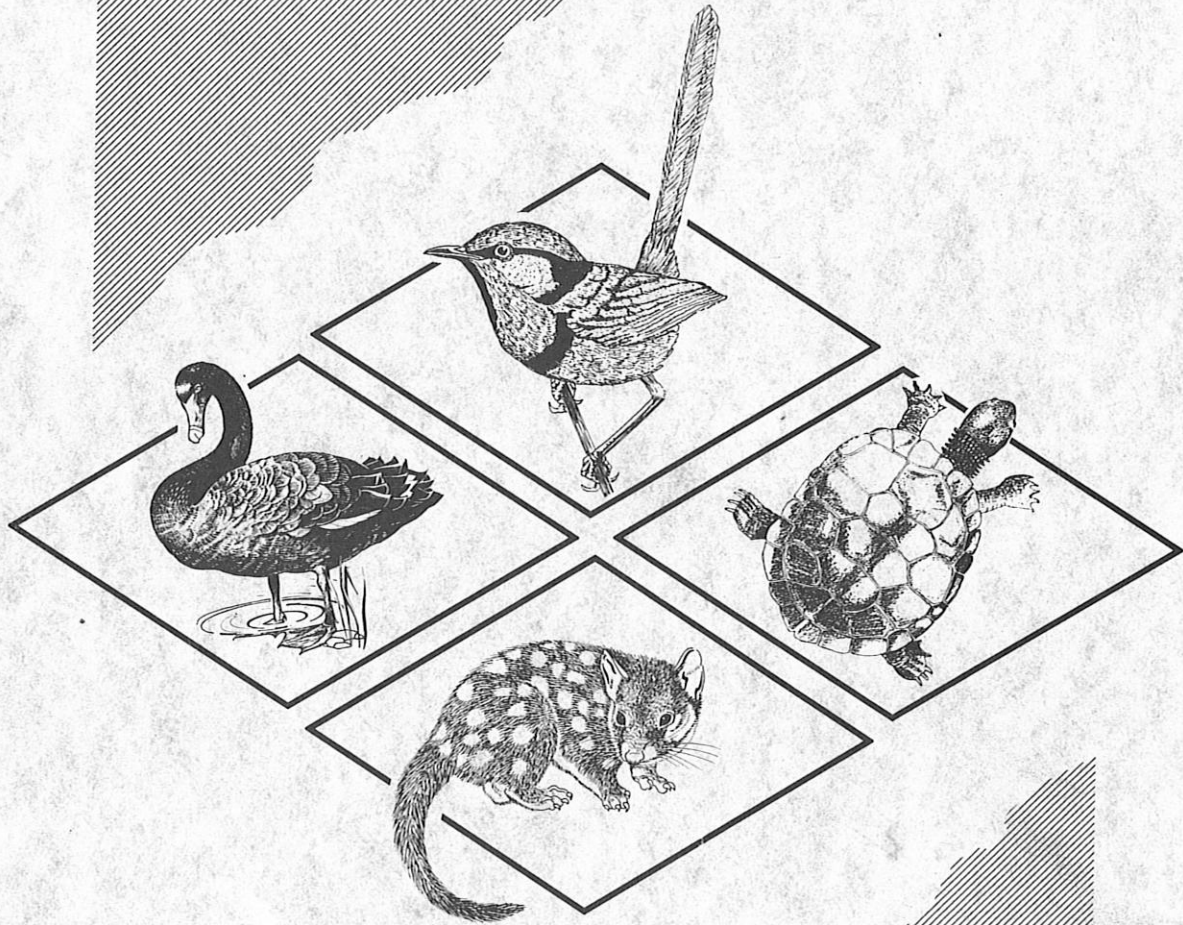


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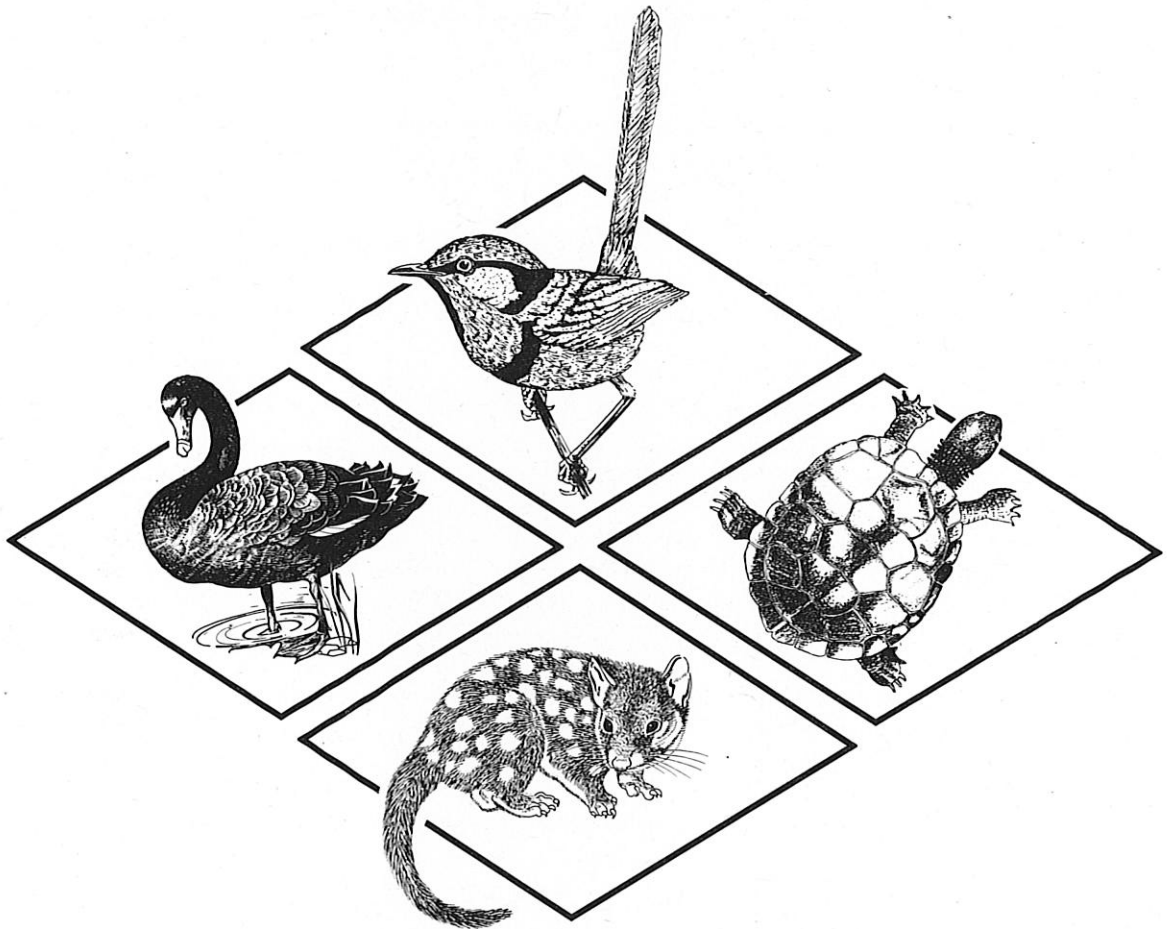


Department of Conservation and Land Management
1 July 1990 to 30 June 1991



1990-1991

ANNUAL REPORT



Department of Conservation and Land Management
1 July 1990 to 30 June 1991



PRINTED ON RECYCLED PAPER

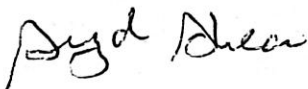


HON MINISTER FOR THE ENVIRONMENT

In accordance with Section 62 of the Financial Administration and Audit Act 1985, I submit for your information and presentation to Parliament the Annual Reports of the Department of Conservation and Land Management and the Roadside Conservation Committee, for the year ending 30 June 1991.

Included in this report are performance indicators by which the effectiveness and efficiency of some departmental operations can be measured. These are as prescribed in the Financial Administration and Audit Act.

This Report also contains general statistics, tables and appendices which convey the Department's performance for the year and provide a comparison against previous years.



Syd Shea
EXECUTIVE DIRECTOR

This document contains the annual reports of the:

- . Department of Conservation and Land Management (CALM)
- . Roadside Conservation Committee

Address: Department of Conservation and Land Management
50 Hayman Road
COMO WA 6152
Telephone: 367 0333

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SUMMARY 1990-91

The Department of Conservation and Land Management (CALM) and three statutory controlling bodies were established under the Conservation and Land Management Act 1984. The Department commenced operations on 22 March 1985 and the controlling bodies shortly after.

On behalf of the people of Western Australia, CALM manages national parks, nature reserves, marine parks, marine nature reserves, State forests and timber reserves. It also manages other designated lands and conserves and protects indigenous flora and fauna.

In the knowledge that Western Australia has a beautiful and diverse natural environment which provides material, aesthetic and spiritual benefits and that the natural environment is an essential component of the quality of life for West Australians, CALM has as its mission:

**To Conserve Western Australia's Wildlife And Manage Lands And Waters
Entrusted To The Department For The Benefit Of Present And Future Generations.**

Five primary objectives have been adopted:

- **Management**
To protect, restore and enhance the value of resources entrusted to the Department so as to meet, as far as possible, the diverse expectations of the community.
- **Conservation**
To conserve indigenous plants and animals and environmental processes in natural habitats throughout the state.
- **Production**
To provide and regulate the supply of those renewable resources that Government decides should be used, on a sustained yield basis for the satisfaction of long term social and economic needs, and in a manner that minimises impact on other values.
- **Recreation**
To facilitate public enjoyment of the natural attributes of public lands and reserved waters in a manner that does not compromise conservation and other management objectives.
- **Knowledge**
To seek a better understanding of the natural environment and to promote awareness and appreciation of its values.

Management Programs

CALM conducts its operations under five programs:

Wildlife Management in which activities are directed towards conserving the indigenous plant and animal species and environmental processes in natural habitats throughout the State.

Recreation Management facilitates enjoyment by the public of the natural attributes of the lands and waters managed by CALM in a manner which does not compromise conservation and other management objectives.

Forest Resources Management is the program by which State forests designated for multiple use on a sustained yield basis are managed to supply resources (such as timber) for the satisfaction of long term social and economic needs.

This program includes forest management and timber supply, the latter being a commercial operation which generates revenue, which covers expenditure.

Services to the Community Program is used to satisfy demands on assets and skills possessed by CALM staff where uses do not relate to the primary objectives; for example, protecting the community and its values from threats (such as wildfires).

The Corporate Services Program supports the other programs.

Results for 1990-91

For CALM, 1990-91 was significant for a renewed effort to increase public awareness of the dieback disease and its potential impact on the State's flora, further success in the endangered species recovery programs and the Sanko Harvest saga in which oil-contaminated New Zealand Fur-seal pups were rehabilitated and released. While the economic downturn severely affected the timber industry and thus resources harvested on State forests, there was excellent support by farmers for integrated tree planting on their farms under sharefarming arrangements. Within CALM there was major progress in integrating skills and resources for solving and implementing conservation and land management problems and initiatives.

CRF REVENUE	71 750 799
OPERATING EXPENDITURE	
Wildlife Management	13 096 213
Recreation Management	14 535 032
Forest Resources Management	72 409 583
Services to the Community	7 293 830
Corporate Services	13 590 338
	<hr/>
	120 924 996
CAPITAL WORKS EXPENDITURE	16 240 908

Detailed reports on activities, financial results and evaluations of CALM's performance are contained in the following pages.

EXECUTIVE DIRECTOR'S REVIEW

As with every organisation both private and public throughout Australia, CALM's activities have been affected by the general decline in the economy. Both our revenue and expenditure budgets were severely constrained in the previous twelve months. I believe, for Government agencies at least, that even when we are through this period of recession we will still be faced with a declining, or at the best, stable budget allocation.

It would obviously be easier to provide the services demanded by the community of CALM if we had extra largesse in our budget. But I do not believe that it would be in the best interests of the Department or the community that we return to the halcyon days when it was possible to launch initiatives in the public sector with minimal concern about the need to fund them.

It cannot be said that the community's requirements of CALM are diminishing, which may be the case with some other Government functions. This means that if we are going to maintain our level of service without placing extra demands on the community purse, we have to be more efficient and look at innovative ways to implement projects without using the tax dollar.

I am delighted with the Department's response to the challenge of doing more with less. One of the most effective ways of becoming more efficient has proved to be the full implementation of an integrated approach to conservation and land management.

The capacity of the Department to function as an integrated team during emergencies has been demonstrated in the past, and this year was tested to the limit. During February we had one of the most severe fire weather situations on record. The Department coordinated a massive response involving CALM personnel, many volunteers and staff from other private and public agencies. Without this effort I have no doubt the south-west of Western Australia would literally have been ablaze.

Similarly, CALM worked closely with the Department of Marine and Harbours and local volunteers when the *Sanko Harvest* ran ashore at Esperance and caused a massive threat to the environment. Again an environmental disaster was averted because of a professional integrated response within and between agencies and the community.

It is much more difficult to achieve an integrated approach to problems when an organisation is not in an emergency mode. But increasingly the Department is making major progress in dealing with seemingly intractable conservation and land management problems by integrating its skills and resources.

There is no better example of this than what the Department has called "Desert Dreaming". This project has been developed over more than a decade and aims to reintroduce, to the desert, mammals which have been made extinct because of changes of the habitat and introduction of feral animals. The project has been made possible because of the integration of the skills of wildlife biologists, botanists, fire behaviour experts, fire management officers, communications specialists and a host of other CALM personnel, backed up by resources such as aeroplanes which could only be provided by an integrated land management agency. This project is entering its final phase with WAPET sponsoring the translocation of selected mammals from Barrow Island (an operating oil field which is abundant in mammals which are rare or extinct on the mainland) to the reconstructed habitat of the desert.

Notwithstanding the difficulty with resources, I believe that the year past has been one of significant achievement in all of the major functions that CALM is asked to perform by the community.

There are more than four million visits each year to land managed by CALM. Even though the estate is large - more than 19 million hectares - the Department is progressively upgrading its recreational facilities in key areas throughout the State.

While the timber industry is experiencing perhaps the most severe recession on record, the Department's capacity to develop more sophisticated forest management systems has increased substantially and the forest industries have continued to respond to the Timber Strategy by investing in plant and equipment to produce value-added products. The landscape of the south-west of the State is developing a quilt of tree plantings as farmers continue to enthusiastically develop joint tree planting projects with CALM and private companies.

Perhaps the highlight of the Department's achievements in the conservation area is the dramatic demonstration by field trials that the removal of the fox will result in a rebounding in the numbers of native species.

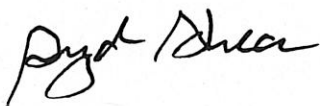
The changes that are occurring in public administration are necessary, but of course painful. But this Department accepts that they must be made. I am pleased to record my appreciation of the dedication and positive and often innovative response of everybody in the Department to the changes that are confronting us.

The Department has also enjoyed strong support from its three statutory controlling bodies - the National Parks and Nature Conservation Authority, the Lands and Forest Commission and the Forest Production Council.

I would like to particularly record my and the Department's appreciation of the work that Norman Halse, who retired from the chairship of the NPNCA this year, has done for the Department and the cause of conservation and land management in the six years that he has been chairman.

He has been able to maintain the independence of the NPNCA while at the same time develop a positive relationship with the Department. His leadership and good humour will be missed.

I certify that the performance indicators used throughout this report are based on proper records and fairly represent the performance of the Department of Conservation and Land Management for the year ended 30 June 1991.

A handwritten signature in cursive script, appearing to read "Syd Shea".

Syd Shea
EXECUTIVE DIRECTOR

15 August 1991

GENERAL INFORMATION

On behalf of the people of Western Australia, the Department of Conservation and Land Management (CALM) directly manages national parks and marine parks, State forests and timber reserves, nature reserves and marine nature reserves, and any associated fauna, flora and forest produce. It is also responsible for conserving flora and fauna throughout the State.

The Department and three statutory controlling bodies were established under the Conservation and Land Management Act 1984. The controlling bodies are the Lands and Forest Commission, the National Parks and Nature Conservation Authority and the Forest Production Council. All are responsible to the Minister for the Environment.

Functions under the Legislation

The Conservation and Land Management Act specifies a series of functions for the three controlling bodies¹ and the Department.

In brief the functions of the Lands and Forest Commission, in which State forests, timber reserves and other lands are vested, are:-

- . consider changes to the purpose, boundary and area of vested lands;
- . develop policies to achieve or promote the multiple use and sustained yield of the indigenous forest resource for the satisfaction of long term social and economic needs, and for exotic species, the optimum yield in production;
- . process and monitor land management plans for vested areas;
- . advise the Minister for the Environment when requested;
- . provide advice to the public on matters related to vested lands;
- . instigate policy research.

The functions of the National Parks and Nature Conservation Authority, in which national parks, nature reserves, marine reserves and other lands are vested, are:-

- . consider changes to the purpose, boundary and area of vested lands;
- . develop policies for the preservation and enjoyment of the natural environment and the promotion of appreciation of flora and fauna, consistent with the essential purposes of vested lands;
- . process and monitor land management plans for vested lands;
- . advise the Minister on the development of policies for the conservation and management of flora and fauna when requested;
- . provide advice to the public on matters related to vested lands;
- . instigate appropriate research.

¹While the functions of the three controlling bodies are reported here, their activities and achievements for 1990/91 are described in separate reports.

The Forest Production Council's functions are to advise the Minister on:-

- . matters relevant to production from State forests and timber reserves;
- . improvement in production consistent with maintenance of other forest values;
- . improvement in use, processing and marketing of forest produce;
- . research to achieve multiple use and sustained yield of the forest resource;
- . contents of proposed management plans for State forests and timber reserves.

The functions of the Department of Conservation and Land Management are:-

- . manage State forests, national parks, nature reserves, marine reserves and other lands and the associated forest produce, fauna and flora;
- . assist the Commission, Authority and Council in their functions;
- . encourage the development of forest production requirements;
- . conserve and protect flora and fauna, and administer the Wildlife Conservation Act;
- . carry out research into land management, and conservation and protection of flora and fauna;
- . advise and cooperate with others in the public interest;
- . advise the Minister on land matters.

In its nature conservation functions the Department administers the Wildlife Conservation Act 1950 and associated regulations. This Act applies to any indigenous or migratory fauna and any flora native to the State, whether found on Crown land, private land or territorial waters of the Commonwealth. Its essential purpose is the conservation of flora and fauna in the State.

Although the Forests Act 1918 and the National Parks Authority Act 1976 were repealed to make way for the Conservation and Land Management Act 1984, the Forests regulations and the National Parks regulations remain in force until replaced by new regulations.

The Department also administers the following Acts:

Sandalwood Act 1929, which gives control over sandalwood gathering via a fixed quota, licensing and limiting collection of sandalwood on private property.

East Perth Cemeteries Act 1932, for management and control of the disused cemeteries which are now an historical precinct.

That part of the Timber Industry Regulation Act 1926 which relates to the registration of timber mills.

Other Legislation

Relationship of Mining and Government Agreements Acts with the CALM Act

A frequent enquiry is why the Conservation and Land Management Act 1984 does not protect land managed by the Department from mining or development projects. The reason is the way the State's legislation is structured. Section 4 of the CALM Act states that nothing in the Act shall derogate or take away from the operation of any Act relating to minerals or petroleum or any agreement Act for a development project. The agreement Acts are administered by the Minister for State Development, eg Alumina Refinery Agreement Act 1961. The CALM Act does not impose restrictions on mining or on development projects subject to an Agreement Act. The requirements for mining and development projects with respect to land managed by the Department are stated in the Mining Act 1978 and the individual agreement Acts. The Environment Protection Act 1986 also needs to be satisfied with such projects on land managed by the Department.

The mining and petroleum Acts which prevail over the Conservation and Land Management Act include:

- Mining Act 1978
- Petroleum Act 1967
- Petroleum Pipelines Act 1969
- Petroleum (Submerged Lands) Act 1982

In accord with the Government's recently announced policy on mining and conservation lands, no mining will occur on national parks. Parliamentary approval will continue to be required for mining on A Class nature reserves and will be required for the new land category of conservation parks.

Under the Mining Act the concurrence of the Minister for the Environment and the approval of Parliament must be obtained before mining can proceed on other categories of land managed by the Department. The categories are State forest, CALM Act timber reserves and other A Class reserves within the South-West Land Division and the Shires of Esperance and Ravensthorpe. Applications for mining tenements on other land managed by CALM must be referred to the Minister for the Environment for his recommendation.

The Department is involved in drawing up conditions for mining on land it manages.

The Iron Ore (Wittenoon) Agreement Act 1972 is topical, governing the Marandoo iron ore project which is proceeding on an area excised from the Karijini (Hamersley Range) National Park.

Agreement Acts which involve clearing land managed by CALM or which require access to forest resources also include specific responsibilities of the Department. The bauxite and coal operations predominantly require permission to be given by the Department for the companies to harvest the timber prior to mining operations. The Agreement Acts with specific Departmental responsibilities are:

- Alumina Refinery Agreement Act 1961
- Alumina Refinery (Pinjarra) Agreement Act 1969
- Alumina Refinery (Wagerup) Agreement and Acts Amendment Act 1978
- Alumina Refinery (Worsley) Agreement Act 1973
- Collie Coal (Griffin) Agreement Act 1979
- Collie Coal (Western Collieries) Agreement Act 1979
- Silicon (Pictou) Agreement Act 1987
- Wesply (Dardanup) Agreement Authorisation Act 1975
- Wood Chipping Industry Agreement Act 1969

The Mineral Sands (Western Titanium) Agreement Act 1975 affects the Department's management of the land involved in the project.

Other Acts which affect the Department's Management

The Act which probably influences the management of land by CALM most frequently is the Bush Fires Act 1954, which has requirements of the Department with respect to fires on land managed by the Department.

Other Acts which affect CALM's land management are as follows:

- Aboriginal Heritage Act 1972
- Aerial Spraying Control Act 1966
- Agriculture and Related Resources Protection Act 1976
- Agriculture Protection Board Act 1950
- Country Areas Water Supply Act 1947
- Dividing Fences Act 1961
- Environmental Protection Act 1986
- Fisheries Act 1905
- Heritage of Western Australia Act 1990
- Land Act 1933
- Metropolitan Water Supply, Sewerage, and Drainage Act 1909
- Rights in Water and Irrigation Act 1914
- Soil and Land Conservation Act 1945
- State Energy Commission Act 1979
- Swan River Trust Act 1988
- Town Planning and Development Act 1928

Commonwealth Acts relevant to the Department's activities are:

- Arts, Territories and Environment Legislation Amendment Act 1982
- Australian Heritage Commission Act 1975
- Conservation Legislation Amendment Act 1988
- National Parks and Wildlife Conservation Act 1975
- Whale Protection Act 1980
- Wildlife Protection (Regulation of Exports and Imports) Act 1982
- World Heritage Properties Conservation Act 1983

International Agreements relevant to the Department's activities:

Agreement between the Government of the People's Republic of China and the Government of Australia for the Protection of Migratory Birds and their Environment.

Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment.

Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Agreement).

Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Convention for the Protection of the World Cultural and Natural Heritage.

Ministerial Responsibility

The Department is responsible to the Minister for the Environment.

Strategic Plan

The Strategic Plan for CALM which follows is reviewed annually.

Mission Statement

Western Australia has a beautiful and diverse natural environment which provides material, aesthetic and spiritual benefits. The natural environment is an essential component of the quality of life for West Australians. The statement of mission adopted for the Department of Conservation and Land Management is therefore:-

TO CONSERVE WESTERN AUSTRALIA'S WILDLIFE AND MANAGE LANDS AND WATERS ENTRUSTED TO THE DEPARTMENT FOR THE BENEFIT OF PRESENT AND FUTURE GENERATIONS.

Primary objectives are:

MANAGEMENT

To protect, restore and enhance the value of resources entrusted to the Department so as to meet, as far as possible, the diverse expectations of the community.

CONSERVATION

To conserve indigenous plants and animals and environmental processes in natural habitats throughout the State.

PRODUCTION

To provide and regulate the supply of those renewable resources that Government decides should be used, on a sustained yield basis for the satisfaction of long-term social and economic needs, and in a manner that minimises impact on other values.

RECREATION

To facilitate the public enjoyment of the natural attributes of public lands and reserved waters in a manner that does not compromise conservation and other management objectives.

KNOWLEDGE

To seek a better understanding of the natural environment and to promote awareness and appreciation of its values.

To achieve the primary objectives the Department will:

Provide an effective administrative framework for the conservation of wildlife throughout the State and the management of lands, waters and natural resources entrusted to the Department.

This will involve:

- Maintaining a corporate executive to establish, review and refine departmental aims, policies and priorities; to monitor the implementation of management plans and to see that goals are achieved.
- Maintaining operations staff to implement policies and management plans and to set up efficient financial, administrative and management systems.
- Providing a Research Division to provide the scientific basis for conservation and land management, and provide scientific and environmental monitoring and advice to managers.
- Establishing a system of regional and district management, where staff convert plans and policies into work programs, carry out the work, provide feedback on progress and policy and planning needs, and maintain close, constructive relationships with local communities.
- Maintaining supporting or service branches to prepare management plans, to set standards and to assist with the implementation of research findings, new technology, and improved methods of conservation and land management.
- Developing and maintaining corporate information systems to facilitate the sharing of data, efficient communication and decision making.
- Recruiting and maintaining a well motivated and competent staff.
- Providing programs for health, safety, development and training of staff.
- Ensuring liaison, cooperation and coordination with other agencies or people with a function or interest in conservation and land management.
- Maintaining national and international liaison and cooperation in the field of nature conservation and the management of renewable natural resources.

Establish and maintain a system of secure reserves which protect viable representative samples of all the State's natural ecosystems and species, both terrestrial and aquatic, as well as areas of archaeological, historic or scientific importance, of natural beauty suitable for recreation and areas for the production of renewable natural resources.

This will involve:

- Developing and maintaining, in conjunction with other Government instrumentalities and the public, a comprehensive data base on the occurrence and conservation status of the State's ecosystems and species.
- Evaluating existing nature conservation reserves and identifying additions, deletions or exchanges.
- Categorising lands and waters entrusted to the Department into priority use zones and applying the principle of multiple use to provide for the needs of nature conservation, recreation and production.
- Protecting ecosystems, landscape and the cultural heritage on lands and waters entrusted to the Department from damage by fire, disease, chemicals, grazing, feral animals and people.
- Developing prescriptions for control of disturbance and for rehabilitation of degraded forests, parks and reserves.

- Opposing the incompatible use of lands and waters entrusted to the Department and opposing the release of such lands and waters for other purposes.

Ensure that conservation and land management is carried out according to sound, well-researched scientific principles.

This will involve:

- Carrying out, encouraging, supporting and publishing scientific, economic and social research relevant to the Department's needs.
- Establishing long-term monitoring of ecosystems and individual species, and of recreation requirements and effects.
- Collecting, preserving, identifying and determining the biological characteristics of the State's native flora.
- Developing and maintaining inventories of biological resources on lands and waters entrusted to the Department, and where appropriate, Statewide.
- Liaising with other research and land management organisations to define, prioritise and coordinate research programs and publishing results.
- Ensuring the efficient transmission of research findings into operational practice.

Provide public information and community education programs designed to increase community awareness, understanding and support for nature conservation and natural land management, and to promote wider cooperation in the prevention and solution of conservation and natural land management problems.

This will involve:

- Developing and implementing effective communication strategies and plans to address the major issues relating to conservation and natural land management.
- Preparing and disseminating relevant information through publications, audio-visual productions, displays, signage, advertising, interpretation facilities and other information and education activities.
- Working cooperatively with other government agencies, the private sector and non-government organisations to increase awareness, knowledge and appropriate behaviour concerning conservation and natural land management.
- Promoting direct interaction between staff and public.
- Encouraging and facilitating publicity for nature conservation and natural land management.

Consult as appropriate with public groups and Government organisations in the planning of policies, programs and projects.

This will involve:

- Establishing forums for the Department, other government agencies, industry and the public to exchange ideas and information, clarify positions and expectations, and work together to develop constructive solutions and strategies on important conservation and land management issues.

- . Equipping the Department with more accurate and timely knowledge and insight on conditions, concerns, values and priorities.
- . Providing other government agencies, industries and the public with better understanding of the Department's programs and responsibilities, constraints and options.

Encourage and assist the public to participate in the development of conservation and land management policies and the implementation of management and research programs.

This will involve:

- . Using formal processes which will involve the:
 - Lands and Forest Commission;
 - National Parks and Nature Conservation Authority;
 - Forest Production Council; and
 - public submissions to the planning process, as described in the Conservation and Land Management Act, 1984.
- . Establishing a corps of volunteers and developing activity programs for them which will contribute to the achievement of conservation and land management objectives.
- . Forming and encouraging "Friends" groups and similar associations.
- . Training staff in the objectives and techniques of public participation.

Prepare and implement management plans for lands and waters entrusted to the Department.

This will involve:

- . Establishing priorities for management plan preparation according to set criteria.
- . Preparing and implementing management plans according to agreed priorities.
- . Developing and implementing "Interim Guidelines for Operations", according to an approved procedure and format, where there is a need for protection of people, property, land, flora and where there is no approved management plan.

Prepare and implement wildlife management programs for wildlife throughout the State.

This will involve:

- . Providing special protection for declared rare (threatened) flora by regulating use of their habitat.
- . Managing threatened animal populations to ensure their survival.
- . Managing the commercial exploitations of species to maintain sustainable populations and ensure their long-term conservation.

Prepare and implement strategies to promote and encourage development of the forest production requirements of the State.

This will involve:

- . Continuously reviewing supply and demand data for forest products.

- . Developing cost effective procedures for growing, processing and marketing timber at the level sustainable under sound forest management.
- . Establishing pine forests to supplement available hardwood supplies when necessary.
- . Intensively managing the highest quality hardwood forests to maximise timber production.
- . Supplementing production from native forests and assisting soil and water conservation by reforestation of cleared lands with hardwood forests.

Manage approved commercial operations on renewable natural resources according to the following principles:

- resources are managed to ensure their long-term conservation;
- a fair and equitable return is received by the State for the resource;
- harvesting operations are commercially viable and managed to minimise waste.

Prepare and implement strategies to promote and encourage recreational use of lands and waters entrusted to the Department in ways which:

- are consistent with the purpose of the area;
- produce a return to the Department for services and amenities provided;
- provide an equitable allocation of land and resources where there is competition between user groups;
- allow for commercial operators to provide services where appropriate.

Using expertise in conservation, land management and associated training, provide skills and services to other organisations and groups.

This will involve:

- . Maximising income from the sale of services in Western Australia and overseas.
- . Maximising recovery of costs involved in provision of information and services to other organisations.

Organisation

The Department is headed by an Executive Director who is appointed for a five-year term. Besides being the permanent head the Executive Director is a member of the Lands and Forest Commission, an ex-officio member of the National Parks and Nature Conservation Authority and Chairman of the Forest Production Council.

The management philosophy adopted by the Department is one of devolution of authority and recognition, development and utilisation of the skills of staff. Given requisite ability there is no impediment to the progress of an individual in the organisation.

The Department operates a successful corporate executive. The diverse nature of functions makes this approach essential. It comprises the Executive Director, General Manager, eight Directors and a Manager with support staff. Regional, branch and other specialist officers are involved according to the relevance of matters discussed.

Regions

Since its formation in 1985, a priority for CALM has been to develop and strengthen its regional presence.

CALM's regions provide the benefits of small autonomous organisations in close proximity to their area of operations while enjoying access to specialisation and services that are best provided by a larger integrated organisation. Regions are responsible for the management of all lands and waters entrusted to the Department and for conservation of native flora and fauna within their boundaries.

Figure 1 shows CALM regional boundaries and the location of regional and district offices.

The general responsibilities allocated to regions are to:

- prepare financial estimates and manage approved budgets;
- participate in project teams preparing land and marine area management plans;
- prepare and supervise work programs (based on approved management plans, programs or necessary operations) for staff, employees and contractors;
- help, guide and train departmental staff in the region and promote the health and safety of the departmental personnel;
- ensure the conservation of indigenous flora and fauna;
- supervise and regulate industry (eg. wildflower pickers, apiarists, timber and mining operations) on lands managed by the Department;
- preserve or restore the natural environment on departmental managed land;
- provide information and advice on land management and conservation to people in the region; promote conservation and good land and marine area management;
- provide a focal point for interaction between research and operations; and
- liaise with State Government and local Government agencies in the region; represent the Department on interdisciplinary working groups, and advisory committees.

CALM's management programs are operational generally across all regions. It is the level of activity which varies. For example, timber production (except for sandalwood) is confined largely to the three forest regions in the south-west of the State. A report on key activities which occurred in the regions during 1990-91 appears later in this report in the section, Regional Activities.

Specialist and Service Branches

Operations throughout the State are directed by the Corporate Executive and supported by specialist and service branches located in Perth.

C.A.L.M. ADMINISTRATION

KEY

- Region Boundary ———
- Region Office ■
- District Office •

STATE HEADQUARTERS Hackett Drive, Crawley
 STATE OPERATIONAL HEADQUARTERS 50 Hayman Road, Como

SCALE
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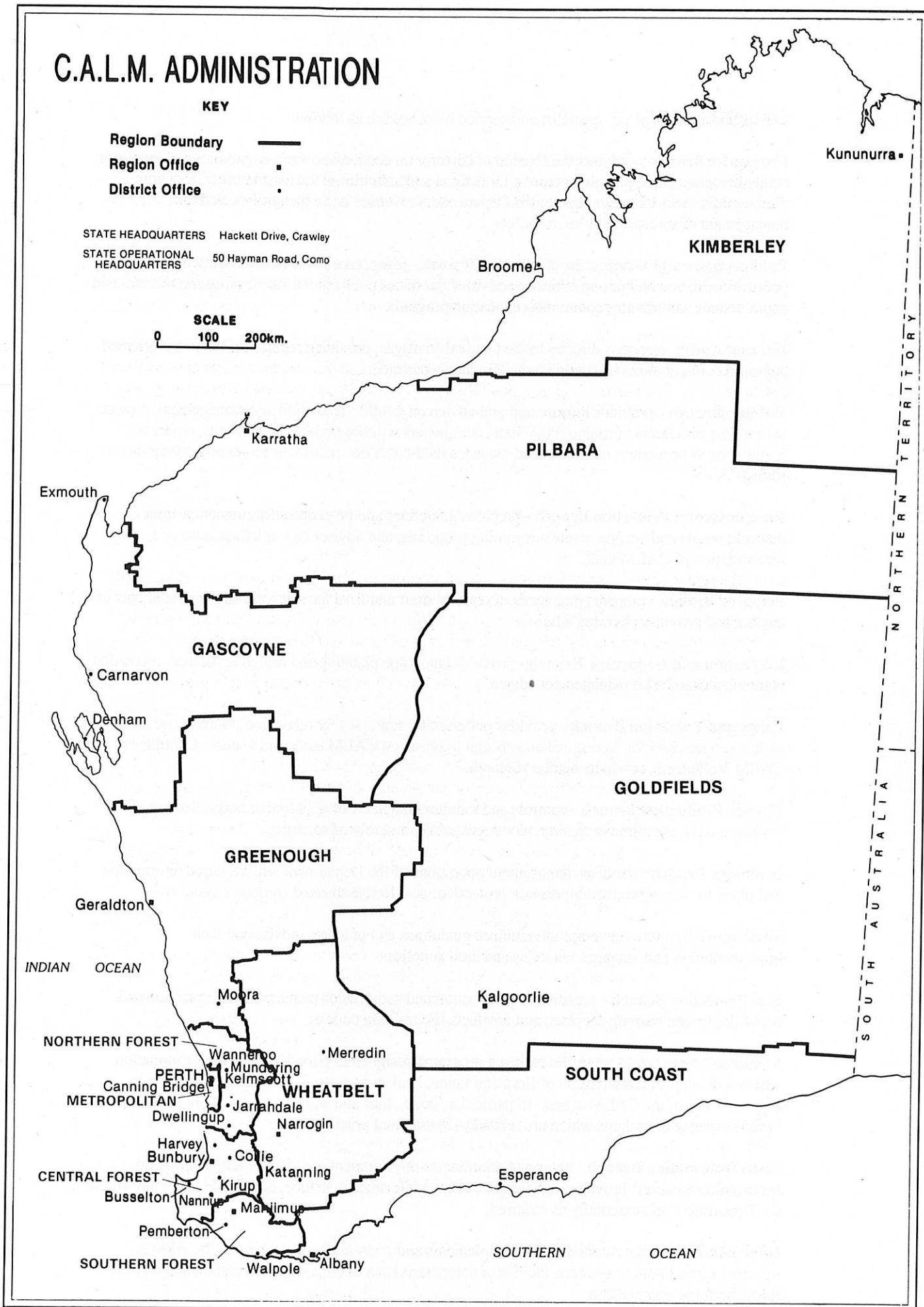


Figure 1

The responsibilities of the specialist and service branches are as follows:

Economics Branch - advises the Executive Director on economics, socio-economics and long-term strategic management planning across all functions and activities of the Department. The work directly influences the magnitude of the Department's revenues and expenditures, and the management of forests and other resources.

Public Affairs and Community Education Branch - plans, coordinates and implements CALM's public information and public relations activities, produces publications, displays, media releases and audio-visuals, coordinates community education program.

Internal Audit - responds directly to the General Manager, providing regular management oriented appraisals of operations and activities within the Department.

Wildlife Branch - provides information and advice on wildlife protection and management, protects native flora and fauna throughout the State, administers wildlife licences and permits, enforces regulations as necessary, maintains and manages data-bases on wildlife resources and conservation status.

Environmental Protection Branch - prepares guidelines and procedures for protection from dieback, weeds and vermin, evaluates mining proposals, and advises on implementation and rehabilitation of CALM land.

Planning Branch - prepares management plans in draft and final form according to requirements of the Act and provides planning advice.

Recreation and Landscape Branch - provides landscape planning and design assistance, recreation planning research and management advice.

Policy and Extension Branch - provides policies and strategies for recreation, tourism and other visitor services and for Aboriginal and special interests on CALM lands and waters. Coordinates CALM Volunteers, conducts market research.

Timber Production Branch - controls and monitors the harvesting of timber and collection of royalties; advises on timber quality, wood technology and related matters.

Inventory Branch - services management operations of the Department with resource information and plans for forest production, disease protection; develops associated computer systems.

Silviculture Branch - develops silvicultural guidelines and practices, advises on their implementation and manages nurseries and seed supplies.

Fire Protection Branch - prepares fire protection and suppression plans, provides detection and aerial prescribed burning services, and conducts fire training courses.

Research - there are 14 scientific research programs designed to provide specialised information which will support conservation of flora and fauna, land and resource management planning in discrete areas of the CALM estate. In particular, issue plans and wildlife management programs are based on research findings which are related to operational practice.

Land Information Branch - plans and coordinates development of CALM's Integrated Land Information Systems; provides a geographic related information service, digital and analogue, within the Department and externally as required.

Information Systems Branch - plans, implements and coordinates management of CALM's information technology systems, facilitates computerisation of corporate information and its flow throughout the organisation.

Library Services - provides a corporate book and scientific literature reference service to CALM staff, serves as a reference source for information on wildlife, forestry and conservation to external parties.

Records Management Branch - controls the Records Management System, associated hard copy file information, research reference and Parliamentary Question databases, ensures the flow of information.

Human Resources Branch - provides human resource management through coordination of selection and training of staff, liaison with unions and industrial associations, conducting a safety, health and welfare program, and maintaining staff records.

Finance Branch - maintains, operates and develops financial systems and procedures and provides users with financial training, expertise, reports and budgeting information.

Engineering Branch - administers the vehicle fleet, houses and buildings, and stores, and consults on the engineering of various projects.

Land Administration Branch - administers land and marine tenure and transactions, as well as applications, leases, permits and offences within the CALM estate.

The detailed structure of divisions, regions and branches as at 30 June 1991 is shown in Figure 2. The names and qualifications of the officers occupying managerial positions are shown in the table following.

Department of Conservation and Land Management

Organisational Structure as at 30 June 1991

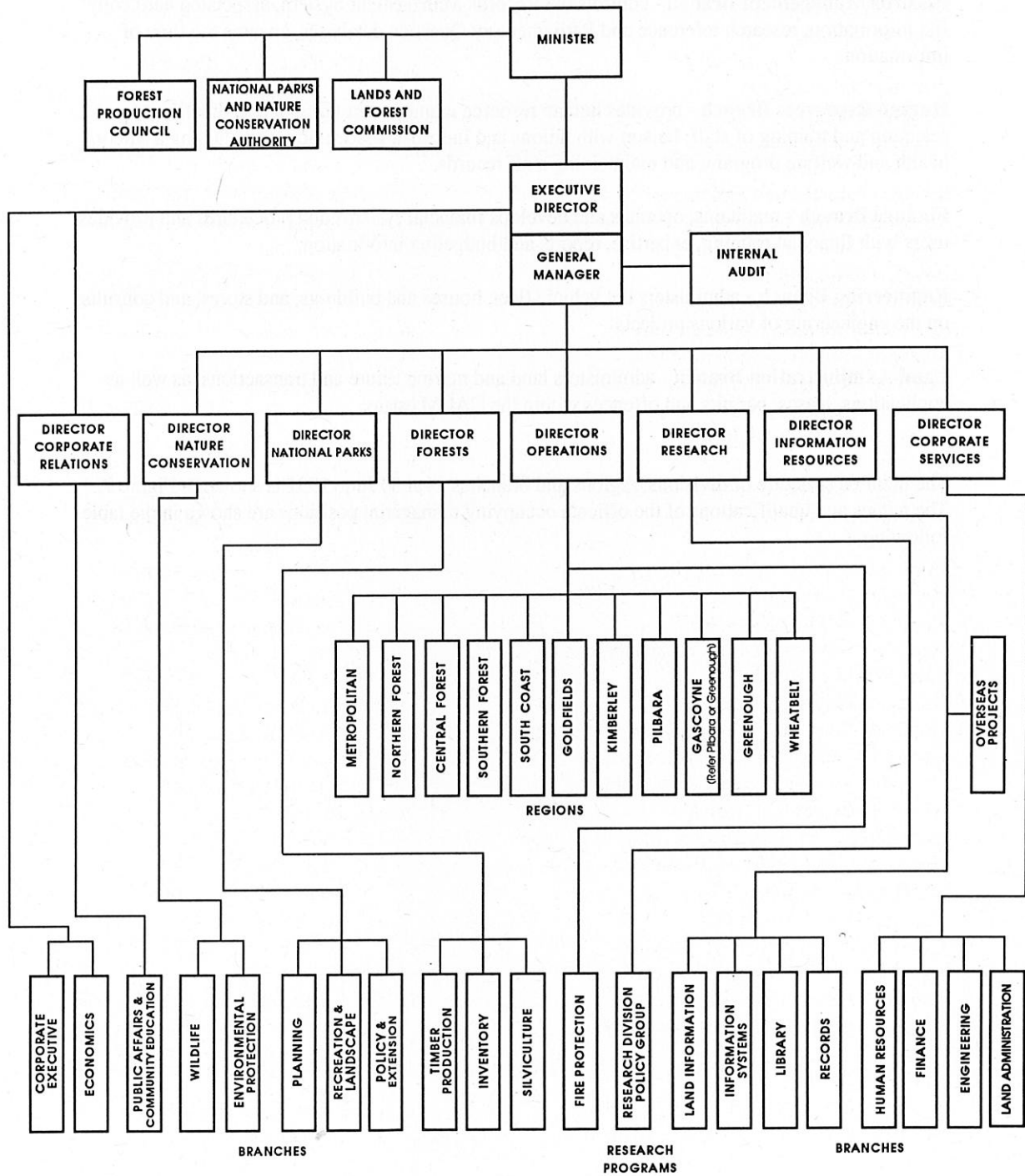


Figure 2

SENIOR DEPARTMENTAL OFFICERS

Executive Director	S R Shea Ph D, MSc, BSc
General Manager	R J Underwood M For, BSc, Dip For
Director Nature Conservation	B R Wilson Ph D, BSc, FTS
Director National Parks	C D Haynes BSc For
Director Forests	D J Keene BSc For
Director Operations	C J Edwards BSc For
Director Research	A A Burbidge Ph D, BSc Hons
Director Information Resources	F H McKinnell Ph D, BSc Dip For
Director Corporate Services	A G Errington AIT Pub Admin
Director Corporate Relations	R A Kawalilak* BA
Director Economics	G Malajczuk Ph D, MSc, Bsc
Regional Manager, Metropolitan	D A Haswell MSc, BSc For
Regional Manager, Northern Forest	E A Jenkins BSc For, Dip For
Regional Manager, Central Forest	D Spriggins BSc For
Regional Manager, Southern Forest	K R Vear BSc For
Regional Manager, South Coast	J R Watson Ph D, BSc, ARIC
Regional Manager, Goldfields	I G Kealley BSc For
Regional Manager, Kimberley	C C Done BSc For
Regional Manager, Pilbara/Gascoyne	H W Chevis BSc For
Regional Manager, Greenough/Gascoyne	G W Mercer B App Sci, Grad Dip (Env Studies) Dip T
Regional Manager, Wheatbelt	K J Wallace BSc Hons, Dip Ed
Manager, Corporate Executive	D B Johnston M App Sci, Dip Cart
Manager, Wildlife Branch	K J McNamara B Nat Res
Manager, Environmental Protection Branch	F E Batini MSc, BSc For
Chief Wildlife Officer	D J Mell AATA
Manager, Planning Branch	A J Williamson M For, MSc, BSc
Manager, Recreation and Landscape Branch	W G Schmidt M For, BSc
Manager, Policy and Extension Branch	J R Sharp M Ed, Dip Phys Ed
Manager, Timber Production Branch	J H Murch BSc For Hons
Manager, Inventory Branch	H Campbell BSc For
Manager, Silviculture Branch	F J Bradshaw BSc For
Manager, Fire Protection Branch	J K Smart BSc For
Principal Operations Officer	P C Kimber BSc For Hons
Curator, WA Herbarium	J A Armstrong BSc Agric Hons
Senior Principal Research Scientist	P E Christensen Ph D, BSc Hons
Senior Principal Research Scientist	S D Hopper Ph D, BSc Hons
Manager, Land Information Branch	P J Bowen Grad Dip S&M, Dip Cart
Manager, Information Systems Branch	B J Kerr B Bus (Admin), Dip Comp Prog
Librarian	H F Clift MA Hons
Manager, Human Resources Branch	R G Cooper BA
Manager, Finance Branch	J C Byrne Ph D, MBA, FCPA
Manager, Engineering Services Branch	I R Darragh AIT Mech Eng

* Acting

Program Management

Approved programs and sub-programs by which the Department conducted its activities in 1990-91 are:

PROGRAM	SUB-PROGRAMS
Wildlife Management	Planning and Research Management
Recreation Management	Planning and Research Management
Forest Resources Management	Planning and Research Forest Management Timber Supply
Services to the Community	Emergency Services Advisory and Management Services Recoupable Works and Services Grants to Non-Government Agencies
Corporate Services	

Activities for the year conducted within the programs are detailed in the following pages.

Further Information

Further information about the functions and activities of the Department can be obtained from the following sources by:

- writing to the Executive Director, PO Box 104, Como, WA, 6152, or telephoning 3868811;
- visiting the operations headquarters at 50 Hayman Road, Como, or telephone 3670333;
- subscribing to Landscape, a quarterly conservation, wildlife and forests magazine published by the Department, which features current policy and management issues.

CHANGE AND ORGANISATIONAL DEVELOPMENT

Government Policy and Legislative Changes

The following Government policy decisions during 1990-91 affected CALM:

1. **'Resolution of Conflict'**

The Government announced a policy of no mining in national parks in its statement 'Resolution of Conflict'. Exploration will be allowed on those national parks with mining interests - Karijini (Hamersley Range), Rudall River and D'Entrecasteaux. The boundaries of these three parks and Neerabup and Watheroo National Parks will be rationalised because of the conflicting land use claims. Additionally, mining on A Class nature reserves will continue to require the approval of Parliament.

2. **Conservation Parks**

This category of conservation reserve was proposed in the 1987 Forest Region Management Plans. It will be formally established when the 1991 amendments to the CALM Act are proclaimed. Meanwhile the Government has also agreed that the policy for mining on 'Conservation Parks' will be as for A Class nature reserves. That is, permission to undertake mining will be subject to approval by Parliament.

3. **Mt Lesueur**

Early in 1991, the Government announced that it would create a national park in the Mount Lesueur area. The issue is currently before Parliament.

4. **Nullarbor Plain, World Heritage Listing**

In January 1991, the Hon Minister for the Environment announced that Western Australia would assist in jointly assessing the Nullarbor for nomination to the list of World Heritage Areas. Liaison with the Commonwealth Department of Arts, Sport, the Environment, Tourism and Territories (DASET) and the South Australian National Parks and Wildlife Service (SANPWS) has commenced.

5. **National Estate Forests**

CALM and the Australian Heritage Commission have agreed to cooperate with the assessment of all WA forests for the Register of the National Estate. The assessment will be carried out using CALM's database for all WA forests - including those already in the Register and the Interim List, and those nominated. The assessment will include all WA forests.

6. **Wetlands Conservation Program**

In November, the Government endorsed the principles contained in a policy and program for the conservation of wetlands in South-western Western Australia. The policy and program are currently being developed under the direction of the Minister for the Environment.

The Conservation and Land Management Amendment Bill 1991 was passed by Parliament at the end of the 1991 Autumn Session of Parliament but will not come into operation until the 1991/92 financial year. The amendments represent the first overall review of the 1984 principal Act and will give the Department increased management flexibility over the land it manages.

A detailed revision of the Wildlife Conservation Act 1950 proceeded during the year, with the required consideration of major policy issues. The Amendment Bill is likely to be put to Parliament during the 1991/92 financial year.

Regulations made under the Conservation and Land Management Act were gazetted to allow fees to be charged for State forest, marine parks and section 5(g) land. The fees introduced were for camping, entrance and use of facilities.

Regulations made under the Wildlife Conservation Act were gazetted for a wide range of management issues. Aspects included increased fees and royalties, reduced aviculture (caged birds) controls and aspects relating to the kangaroo management program.

Revised draft forest management regulations made under the Conservation and Land Management Act are well advanced. A set of draft land management regulations for all of the land managed by the Department are being pursued.

Organisation Change

Matters to do with the natural environment are high on the list of issues of public concern. Responsibilities of the Department are often at the centre of public debate.

Accordingly, during the year, approval was obtained to establish the position of Director, Corporate Relations to be part of the Corporate Executive and to be the Department's senior public relations executive. The position has responsibility for planning, developing, implementing and controlling all public affairs activities including public relations, strategic communications planning, advertising, marketing, and community education concerning the natural environment. The position and its relationships can be seen in figure 2.

During the year the organisational structure of the Information Resources Division was modified to improve the effectiveness of some services. The former Computer Services Branch was renamed the Information Systems Branch to better reflect its functions, and several new positions were approved for the Branch to redress long-standing staff resource problems. A new position of Information Systems Manager was created and filled and steps were taken to improve the control of applications development, database management, staff training and PC user support.

The position of Manager, Land Information Branch was reclassified to Level 8 and the Land Information Branch was restructured into work groups which reflect the Department's main program activities.

Some other minor restructuring took place in regions and branches.

KEY ISSUES

Dieback

Dieback in the forests and heathlands of the State is caused by a number of species of the fungus *Phytophthora* but mainly *P. cinnamomi*. While the extent of the disease in the forests has been understood for many years, and management techniques have been developed to contain it, its impact on heathland is potentially very severe and is much more difficult to control. South Coast and Northern Sandplain heathlands are justly famous for their richness in plant species but a high proportion of the species belong to groups known to be susceptible to dieback disease. Extensive areas of infection have been recorded, including many within conservation reserves. Death of vegetation is causing significant changes in plant community structure, also changing habitats for fauna, and there is risk that the disease may increase the threat of extinction of some gazetted species.

Late in the year a Parliamentary Select Committee was established to investigate and report on the effects of dieback disease. Discussions have been held with the three members of the Committee. A range of data was provided to them and visits were arranged to a number of infected sites in the coastal heathlands in the Moora District.

The first phase of a broad based community education and information program concerning the nature of dieback disease and what people can do to restrict its spread was prepared. A cooperative public awareness campaign on this subject with Rotary International District 946 was begun.

Conservation Strategy

Over the past six years the Department has developed a series of Policy Statements dealing with aspects of nature conservation and wildlife management. This year an initiative was undertaken to collate these with an aim to producing a consolidated Nature Conservation Strategy. The project has particular significance in the context of current national enquiries on ecologically sustainable development and biodiversity. In order to obtain input from outside the Department several workshops have been planned to which members of the public are invited. The project will be completed late in 1991.

Management Strategies for South West Forests

Linked to the Nature Conservation Strategy, a review of management strategies for the south west forests commenced this year. This comprehensive review is complementary and sequential to the commitments given in the 1987 Regional Management Plans and the document Timber Production in Western Australia (often referred to as the Timber Strategy). It seeks to enhance all forest values through the integration of management activities with the primary goal of sustaining the biodiversity of the forests.

During the preparation of the draft strategy there has been wide consultation with the community through a program of seminars, workshops and field trips.

The major issues considered in the review are:

- . A more sophisticated road, river and stream zone protection system;
- . Refinements to the conservation reserve system;
- . The identification and management of places of national estate significance;

Refinements to silvicultural procedures to sustain forest values at the local level including wildlife, water and aesthetic values.

The draft document is timed for completion in 1991.

Endangered Species

Concern is growing at the increasing number of plant and animal species considered to be threatened with extinction or vulnerable to it. The causes of the increase in extinction rate are many and include loss of habitat through clearing and ecosystem changes following excessive grazing pressure, changes in fire management practices, weed invasion, and competition and predation by feral animals. Predation by foxes and cats has been shown to be a major factor in the local extinction of middle-sized mammals. The Department has increased its research effort on these threatening processes, revised its policies, and introduced new management and administrative procedures for dealing with the most urgent problems.

Fox Control

Research has identified fox predation as one of the most significant causes of the extinction of middle-sized native mammals. The Department has developed effective fox control methods for relatively small areas and these have been put into effect with remarkable success on a number of conservation reserves. However, large scale fox control remains a problem. Consequently, through the good offices of CONCOM, a national program of fox control research has been initiated, with CALM and CSIRO as the main operatives, with the objective of finding means of control over large areas. The CSIRO is investigating the possibilities of genetic engineering and biological control techniques while CALM is continuing work on baiting and on the natural history of feral foxes in the wild.

Shark Bay

Further progress has been made with the implementation of recommendations of the Shark Bay Region Plan during the year. Peron Station (105,200 hectares) was purchased by the Government in October. The northern portion of the property is to be declared as national park while the southern portion (ie. south of the Monkey Mia Road) is yet to be decided. The Department has put in place an interim management structure and taken some interim management actions including de-stocking the property.

The Shark Bay Marine Park was gazetted on 30 November 1990, covering 7,487 square kilometres. In consultation with the Shark Bay and Carnarvon Shire Councils and the local fishing industries, a preliminary draft management plan was prepared for the park. Further planning and community consultation will continue and a draft management plan is expected to be issued for public comment next year.

In October the Commonwealth Government nominated Shark Bay and some of the adjacent pastoral and conservation land for World Heritage Listing. A UNESCO inspection team visited the area following the IUCN General Assembly held in Perth in November and it is understood that their assessment has been completed and that a decision on the nomination will be announced late in 1991.

Conservation in a Fragmented Landscape

Recent departmental and public attention has focused on the special problems of nature conservation in those parts of the State where urbanisation or clearing has resulted in the isolation of small reserves of natural vegetation. Such reserves suffer progressive species loss through frequent wildfires, weed and feral animal invasion, inappropriate use of vehicles and other human factors, as

well as natural increase in local extinction rate as a consequence of small size and isolation. This problem is especially critical in the wheatbelt.

During the year particular attention has been paid to management of small isolated reserves. However, the gravity of the species loss problem on wheatbelt reserves has brought sharp focus to the need to enhance their conservation effectiveness by supporting conservation initiatives on other, surrounding public and private lands.

Development of the Conservation Reserve System

A review of the adequacy of the State's conservation reserve system has concluded that the system is not yet sufficiently representative of the ecosystems and biota, that in some regions there are few reserves, eg. the Kimberley, Gascoyne and Canning regions, and that in the Wheatbelt there are many reserves but they are mostly very small.

During the year considerable progress has been achieved in implementing the Red Book and other recommendations for new reserves. The area of nature reserves was increased by 7,671 hectares and additions were made to six national parks. In addition, continuing the review of B and C class nature reserves, 95 have been upgraded to A Class. Of a total of 987 reserves under review, 423 have been so upgraded. An update of the Red Book System 7 (the Kimberley Region) recommendations was published containing new proposals for conservation reserves. The Shark Bay Marine Park was declared (approximately 748,735 hectares) and work has continued on the assessment of coastal areas in the north of the State which may be worthy of declaration as marine park or marine nature reserve.

Community Involvement Program

Following the introduction of a volunteer program in 1989/90, the Department has seen a rapid growth in volunteer participation during this financial year.

Existing programs such as campground hosts, visitor information, wildlife research and friends groups continue to grow in strength and numbers.

New programs have been established to monitor and report on threatened fauna, cave rehabilitation, holiday activity programs, and community liaison.

A wide range of other volunteer projects were completed including erosion control, visitor surveys, work experience for students, newsletter preparation, earth education, and staffing shopping centre displays.

Over 40 programs operated throughout the year with 980 volunteers participating in the community involvement program.

The Interests of Aboriginal People

CALM is committed to assisting Aboriginal involvement in conservation and land management practices. The incorporation of traditional Aboriginal ecological knowledge and practices has already enhanced the Department's management and improved the protection and appreciation of both natural and cultural resources.

Particular attention was focused on the West Kimberley where CALM participated in an interdepartmental committee dealing with Aboriginal and conservation interests in the Buccaneer Archipelago. A training officer was also transferred to the West Kimberley to initiate the development of a new ranger training program for Aborigines to be based in the Fitzroy Valley.

Extensive negotiations have been pursued with traditional Aboriginal custodians during the preparation of management plans for the Purnululu (Bungle Bungle) and Karijini (Hamersley Range) National Parks. The plans will propose formalisation of the Aboriginal input to the management of both parks.

Development of a report is proceeding on Aboriginal activities and nature conservation in the south west.

Aboriginal contractors were employed on 11 projects, funded by the Australian National Parks and Wildlife Service program.

Assessment of National Estate Values in South-western Forests

The Department of Conservation and Land Management and the Australian Heritage Commission have developed a joint agreement for the identification and management of the National Estate forest in Western Australia. This agreement follows several years of uncertainty regarding the listing of south west forests on the register of the National Estate.

Outstanding nominations for National Estate listing include many State forest areas which are outside the existing and proposed reserve system of national parks, conservation parks and nature reserves. The State forest areas are currently available for timber production under the State Government approved Regional Management Plans and Timber Strategy and are classified as "multiple use" forests in CALM's plans.

These nominations have been held in abeyance by the Australian Heritage Commission awaiting a thorough investigation of National Estate values.

In September 1990 the Australian Heritage Commission visited Western Australia and inspected the nominated forest areas, with CALM staff. At the conclusion of that visit an agreement was reached to conduct a joint evaluation of data to determine National Estate values for the southern forest of Western Australia.

CALM's GIS (Geographic Information System) database has been beneficial in preparing and overlaying mapped data. To June 1991, significant progress has been made on the data exchange, joint assessment of forest values, adequacy of the reserve system and assessment of management practices impacting on Estate values. The final agreement is expected to be concluded by October 1991.

This regional approach to the evaluation of National Estate values could provide a model for this process to be applied throughout the forests of Australia.

Site Selection, Growth and Yield Prediction for Tree Plantations

The Department has established approximately 6,000 hectares of *Eucalyptus globulus* by sharefarming arrangements on cleared farmland, and the area is increasing each year. To help manage this estate, a system which selects suitable sites and predicts growth and yield, has been developed by the Department. During the development phase over 6,000 individual trees were measured and 75 environmental attributes measured in 76 forest plots.

The system termed the *Eucalyptus Globulus* Growth Simulator (EGGS) is currently used to select sites for plantings and predict future yields of existing plantations. Over 500 permanent measurement plots have been established for this process.

Utilisation of Marri and Low Quality Sawlogs

The restructuring of the hardwood royalty scales has resulted in a significant increase in the utilisation of marri and other low grade logs into sawn products. Previously low grade marri logs were left in the forest as waste, or used for low value materials such as firewood, fence posts, or processed directly to woodchips.

The Collie sawmill now cuts marri logs and the Diamond/Jardee complex has also significantly increased processing of marri into sawn material. A total of 122,703 cubic metres of marri was sold as sawlogs during the year, an increase of 250 percent on last year.

Plant Propagation Centre

The Plant Propagation Centre (PPC) at West Manjimup has been redeveloped over the last four years. This followed the amalgamation of seed and seedling activities, genetics and tree breeding and plant propagation research on the PPC site to reduce costs by economics of scale, and to concentrate plant propagation expertise.

The restructured PPC conducts the following functions:

Container stock production: The nursery produces between 10 and 13 million seedlings annually which are used for softwood and hardwood plantations, and to support afforestation and regeneration programs for major native species. With such intensive seedling propagation operations, CALM is able to support the interest shown in reforestation. This level of commitment facilitated sales Australia-wide, with the South Australian Government purchasing 350,000 *Eucalyptus globulus* seedlings.

Pine seedlings and cuttings: Almost 4 million bare-root seedlings and cuttings were produced for sharefarming, second rotation planting on plantations and private sales.

The nursery has a capacity to produce 17 million seedlings per annum with possible expansion to 24 million and is the largest known nursery facility in the Southern Hemisphere.

Seed Centre: This seed centre extracts, tests and stores up to 260 species of native and exotic seeds. These species are used both locally and overseas.

Research: The PPC is actively involved in a range of basic and applied research relating to plant propagation, genetics and tree improvement.

Jarrah Forest Inventory

The new Jarrah Forest Inventory project, which was scheduled to be completed by early 1992, is 95 percent complete and will be finalised six months ahead of schedule. The survey covers the 1.3 million hectares of jarrah forest which lie within areas of forest gazetted for multiple use including timber production.

The new inventory has been designed to facilitate implementation of the Timber Strategy by providing the information required to re-determine the sustainable yield of the jarrah forest and hence the allowable harvest of sawlogs and other wood products. The information will assist in the identification of new opportunities for the development of forest based industries and quantify the constraints on the capacities and locations of both new and established industries.

The inventory is providing accurate estimates of the whole of the gross bole volume, some of the crown wood volume, all of the standing dead wood, and some of the ground wood, of 28 tree species occurring in the jarrah forest. The inventory results provide for the partition of the gross bole volume into timber grades suitable for a variety of industries or for different standards of log utilisation.

The inventory has been integrated into the Department's Geographic Information System, which has great flexibility to manipulate the information in addressing multiple planning and management objectives.

Policy Statements

New policy statements approved during the year are:

- 27 CALM's Role in Management of Native Vegetation in Rural Areas.
- 33 Conservation of Endangered and Specially Protected Fauna in the Wild.
- 37 Filling Vacancies by Promotion or Transfer.
- 38 Business Units.
- 39 Fees and Charges.

Policy statements revised during the year are:

- 3 Phytophthora Dieback (revised and restructured).
- 18 Recreation (revised and expanded).
- 20 A Marine and Estuarine Reserves System in Western Australia.
- 36 Post Graduate Studies and Study Grants.

At an advanced stage of development are:

- Conservation and Management of Crocodiles.
- Radio Communications Sites.
- Road Management.

Consistent with the usual procedure, policies are developed by either Directors or specialist branches and before examination by the Corporate Executive, are passed to regions and branches and other specialists for comment. After approval by the Corporate Executive, the documents are submitted to the National Parks and Nature Conservation Authority and/or the Lands and Forest Commission as appropriate.

LANDS AND WATERS MANAGED BY CALM

TOTAL ESTATE

As at 30 June 1991 total area was 19 018 584 ha.

This was an increase of 905 486 ha during 1990/91.

The terrestrial area (ie. marine reserves not included) is 7.1 per cent of the land area of Western Australia.

NATIONAL PARKS

National parks are for the purposes of wildlife and landscape conservation, scientific study, preservation of features of archeological, historic or scientific interest, together with recreational enjoyment by the public. They have national or international significance for scenic, cultural or biological values.

Area of national parks as at 30 June 1991 - 4 849 205 ha.

NATURE RESERVES

Nature reserves are for the purposes of wildlife and landscape conservation, scientific study and preservation of features of archeological, historic or scientific interest. Wildlife values may not be commercially exploited, and no recreation which damages natural ecosystems is allowed.

Area of nature reserves as at 30 June 1991 - 10 433 554 ha.

STATE FORESTS

State forest is managed for multiple uses including water supplies, recreation, sustainable timber production and wildlife conservation. It also provides for public utilities and mineral production, where these activities are imposed.

Area of State forest as at 30 June 1991 - 1 750 467 ha.

MARINE RESERVES

Marine parks are managed for marine conservation and recreation, with areas zoned for commercial fishing on a sustained yield basis.

Marine nature reserves are managed for the conservation of marine and terrestrial flora and fauna and their habitats. Fishing and collecting are not permitted.

Area of marine parks as at 30 June 1991 - 1 012 220 ha (approx).

Area of marine nature reserves as at 30 June 1991 - 132 000 ha (approx).

OTHER RESERVES, FREEHOLD LAND AND PASTORAL LEASES

Miscellaneous reserves and timber reserves are normally transitional classifications, and in the interim may be managed for wildlife conservation, recreation or sustainable timber production.

Area of other reserves as at 30 June 1991 -

conservation/recreation	-	188 928 ha
timber reserves	-	144 287 ha

Area of pastoral land held by the Executive Director as at 30 June 1991 - 475 445 ha.

Area of freehold land held by the Executive Director as at 30 June 1991 - 32 478 ha.

National Parks

Definition:

Areas to be managed for wildlife conservation, scientific study and public enjoyment.
 Have important conservation, cultural and scenic values.
 Nationally or internationally unique, in terms of landscape and/or biota.
 Size must be sufficiently great to accommodate recreation or historical uses without significantly detracting from conservation values.

Additions were made to Cape Le Grand, D'Entrecasteaux, Fitzgerald River, Leeuwin-Naturaliste, Nambung and Warren National Parks.

Areas involved in the proposed Marandoo iron ore project were excised from Karijini (Hamersley Range) National Park.

As at 30 June 1991, the following 59 national parks were vested in the National Parks and Nature Conservation Authority:

National Park	Area (ha)	National Park	Area (ha)
Alexander Morrison	8 501	Moore River	17 543
Avon Valley	4 366	Mt Augustus	9 169
Badgingarra	13 121	Mt Frankland	30 830
Beedelup	1 530	Nambung	18 319
Boorabbin	26 000	Neerabup	1 082
Brockman	250	Peak Charles	39 959
Cape Arid	279 415	Porongurup	2 572
Cape Le Grand	31 578	Purnululu (Bungle Bungle)	208 723
Cape Range	50 581	Rudall River	1 569 459
Collier Range	277 841	Scott	3 273
D'Entrecasteaux	58 109	Serpentine	4 362
Drovers Cave	2 681	Shannon	52 598
Drysdale River	435 906	Sir James Mitchell	497
Eucla	3 342	Stirling Range	115 661
Fitzgerald River	329 039	Stokes	9 742
Frank Hann	61 420	Tathra	4 322
Geikie Gorge	3 136	Torndirrup	3 938
Goongarrie	60 356	Tuart Forest	1 785
Gooseberry Hill	33	Tunnel Creek	91
Greenmount	58	Walpole Normalup	15 877
Hassell	1 265	Walyunga	1 812
Hidden Valley	2 068	Warren	2 970
John Forrest	1 508	Watheroo	44 512
Kalamunda	375	Waychinicup	3 982
Kalbarri	186 071	West Cape Howe	3 517
Karijini (Hamersley Range)	607 953	William Bay	1 739
Leeuwin-Naturaliste	16 354	Windjana Gorge	2 134
Lesmurdie Falls	56	Wolf Creek Crater	1 460
Millstream-Chichester	199 746	Yalgorup	11 819
		Yanchep	2 799
TOTAL			4 849 205

Nature Reserves

Definition:

Areas to be managed for wildlife conservation and scientific study.
Have important conservation value, either as part of a reserve system, as a remnant or because of particular species.
No historical commitments to inappropriate uses or activities.

The area in this category at 30 June 1991 was 10 433 554 ha; an increase of 7 671 ha during the year.

State Forests and Timber Reserves

Definition:

Areas to be managed for multiple use, with the primary uses in most cases being sustainable timber production and protection of water catchments.

The total area of State forest as at 30 June 1991 was 1 750 467 ha, which is 110 ha more than last year's total. This increase was mainly due to the inclusion into State forest No 10 of a former freehold property held in the name of the Executive Director.

The aggregate area of timber reserves fell by 112 ha during 1990/91 to 144 287 ha. Most of this decrease can be attributed to the excision of a portion of Timber Reserve No 198/25 which has been affected by past mining and which will be further degraded by future mineral activity.

The following table shows the major forest types which occur within State forest, timber reserves and Executive Director land as at 30 June 1991.

TYPE	AREA (Ha)
Jarrah	1 367 000
Karri	126 000
Wandoo	106 000
Mallet	8 000
Tuart	1 000
Goldfields' species	47 000
Radiata pine	36 000
Pinaster pine	29 000
Exotic eucalypts	5 000
Very open areas	202 000
TOTAL	1 927 000

Description of Forest Types

Jarrah includes: pure jarrah; jarrah with marri, WA blackbutt, wandoo, WA sheoak and bullich as minor species; stands dominated by marri with jarrah as the minor species; stands dominated by WA blackbutt with jarrah or marri as the minor species; stands dominated by bullich with jarrah or marri as the minor species.

Karri includes: pure karri; karri with marri, and/or jarrah and the three species of tingle as the major or minor species.

Wandoo includes: pure wandoo; pure powderbark wandoo; wandoo and powderbark wandoo with jarrah, marri and brown mallet as minor species.

Mallet includes: plantations; natural mallet with wandoo as the minor species.

Tuart consists of pure stands only.

Goldfields species include: pure stands of salmon gum, Dundas Mahogany, Dundas blackbutt, Cleland's blackbutt, silver gimlet, sandalwood, jam and many others, or any of these species in combination.

Radiata pine includes: pure stands plus a very small area of other species, in plantations only.

Pinaster pine includes: pure stands plus a very small area of other species, in plantations only.

Exotic eucalypts include: many species in rehabilitated dieback and mined areas and in trial plots.

Very open areas includes: swampy and rocky areas; areas with sparse tree canopy; areas cleared for mining and not yet rehabilitated; powerlines and dams.

Marine Reserves

Definitions:

Marine Nature Reserve:

Areas to be managed for wildlife conservation and scientific study.
Have important conservation value, either as part of a reserve system, as a remnant or because of particular species.
No historical commitments to inappropriate uses or activities.

Marine Park:

Marine areas managed for conservation, study, public enjoyment and commercial fishing on a sustained yield basis.
Where zoning includes commercial fishing, a marine park must be large enough to allow this fishing without detracting from the overall conservation and recreational value.

On 28 September 1990 the Marmion and Ningaloo Marine Parks were reclassified to class "A", providing greater security of tenure.

On 30 November 1990 Shark Bay Marine Park was declared. It is classified class "A" and has an area of approximately 748 735 hectares.

Conservation and Recreation Reserves

The area of reserves in this category as at 30 June 1991 was 188 928 ha.

Freehold Land

Freehold land held in the name of the Executive Director totalled 32 478 ha, a decrease of 40 ha for the year. The major portion of this land is committed to commercial forestry operations.

Purchases

The Department purchased the following areas of freehold property for addition to various categories of the land estate:

- . 439 hectares west of Bolgart to be set aside as a nature reserve.
- . 16 hectares near Narrogin to establish an experimental sandalwood plantation.*
- . 6 hectares at Gunyidi to be added to the adjacent nature reserve.

In addition, the following pastoral leases were purchased:

- . 154 267 hectares north-west of Kalgoorlie to be set aside as State forest.*
- . 105 200 hectares at Shark Bay with the northern portion to be declared national park.
- . 441 hectares at Scott River to be mostly used for land exchange.

* Funds for these purchases were provided from the Sandalwood Conservation and Regeneration Project (SCARP).

WILDLIFE MANAGEMENT PROGRAM

Objective: To conserve the indigenous plant and animal species and environmental processes in natural habitats throughout the State.

Program Description: This Program includes responsibility for the management of public lands and reserved waters for nature conservation; producing and implementing management programs for endangered or commercially exploited species; regulating activities such as wildflower picking, aviculture and duck shooting; preventing illegal taking of protected species from the wild; encouraging conservation of native species on private property and road reserves; and coordinating emergency action such as whale stranding rescues.

Operating Expenditure

\$13 096 213

Planning and Research

Objective: To provide the planning and research necessary to achieve the wildlife management objective, giving priority to those areas or species in greatest need of conservation, protection or rehabilitation.

Description: This Sub Program includes responsibility for preparing management plans for nature reserves and ensuring wildlife protection provisions are included in management plans for other CALM estate; preparing management programs for endangered and commercially exploited species; planning the extension of State nature reserves and marine parks; management of the State Reference Herbarium; and research programs in flora, fauna and marine conservation (including specific programs for the Western Swamp tortoise, numbats, the rose mallee and coral reef parasites).

Operating Expenditure

\$7 017 940

Management Plans

The predominance of the planning effort has been directed towards national parks, marine parks and recreation reserves. Whilst accommodating recreation, these reserves also contain significant nature conservation provisions.

A final management plan for Lane Poole Reserve was completed and released by the Minister in December 1990. Fragile environments identified within the Reserve include mosses and ferns, communities on granite outcrops, and communities associated with small ephemeral creeks. Gazetted endangered fauna includes the Chuditch, Peregrine Falcon, Red-eared Fire-tail Finch and the Skink Lizard. The plan and a summary of public submissions are available from CALM offices.

The Fitzgerald River National Park (FRNP) management plan will be released by the Hon Minister for the Environment in July 1991. The key issues identified in the planning process were dieback, fire and recreation. A locally based Advisory Committee assisted in all stages of the plan's preparation.

Fitzgerald River National Park is one of two Biosphere Reserves in Western Australia. It is one of the richest areas for plants in Australia and includes about 75 endemic flora species. The park also has a richer fauna than any other conservation area in the south west, and includes the Ground Parrot, Dibbler, Heath Rat, Western Bristlebird and Western Whipbird.

Dieback disease (*Phytophthora* species) is the greatest single threat to the Park's conservation values and is more widespread than previously thought. The plan recommends that the central park area is closed to public vehicle access and three peaks are closed to bush walkers. In addition, there is the provision for closure of roads/tracks/paths during or following rain if they present a dieback risk.

Fire management proposals were reviewed following wildfires in late 1989 started by lightning. The fire management program will be determined annually by a fire advisory group which comprises representatives from local organisations. It provides for a combination of fuel reduced buffers, mosaic burns within cells, burns for vegetation/habitat management and areas from which planned burns will be excluded.

Marmion Marine Park draft management plan was released for public submissions in October 1990 and 22 submissions were received. Revision of the draft plan is well advanced. The Marine Park contains diverse and colourful marine plants and animals and includes the Australian Sea-lion, dolphins and whales (seasonal). A management zoning scheme proposes sanctuary areas, from which fishing is excluded. Ongoing research and monitoring is an essential component of management.

Purnululu (Bungle Bungle) National Park management plan is nearing finalisation. Purnululu National Park will be the first park in WA to be managed by CALM with formal input to park management from Aboriginal traditional custodians. Continuing active rehabilitation, associated with a successful program of control of feral cattle and donkeys, is restoring large areas of natural vegetation within the park. The plan includes the development of resource management programs for fauna, flora, soils, hydrology, fire, rehabilitation and landscape.

The draft management plan for the Shoalwater Islands was released for public submissions in November 1990 and 57 submissions were received. The islands consist of nature reserves, the Penguin Island recreation reserve and Crown land. The plan proposes that access to all islands, with the exception of Penguin Island, be closed. Seal Island, an important resting site for the Australian Sea-lion, may be visited on guided tour or alternatively, Australian Sea-lions can be viewed from boats. Access on Penguin Island will be channelled along boardwalks and walk tracks to protect penguins, terns and other birds. Weeds, pests and fire will be controlled and rehabilitation undertaken.

The draft Walpole-Nornalup National Park management plan was released for public comment in July 1990 and 64 submissions were received. Responses have now been analysed and amendments to the plan prepared. The public generally supported proposals to rationalise vehicle access in order to protect the park's flora from dieback disease and associated fauna.

The draft plan for West Cape Howe National Park is near completion. Nature conservation values include the presence of significant invertebrate fauna, such as relict populations of spiders, and the occurrence of populations of the Western Ring-tail Possum, Dell's Skink and the Red Eared Firetail Finch, all gazetted as endangered.

The final management plan for the Department's South Coast Region is near completion. Submissions to the draft have been analysed and amendments made. The plan proposes extensive additions to the conservation reserve system along the coast.

The Department's Goldfields Region Regional draft management plan has progressed to near completion.

The draft management plan for John Forrest National Park is proceeding, with the goals and objectives having been endorsed by the National Parks and Nature Conservation Authority. An objective of the plan will be to protect native species, particularly those that are threatened or vulnerable to human disturbances.

A new draft management plan is being prepared for Karijini (Hamersley Range) National Park, following representation from the Karijini Aboriginal Corporation for a role in management similar

to that of Aboriginal traditional custodians in Purnululu National Park. Issues include iron ore tenements within the park, Yampire Gorge access road, management zoning and park boundaries, and how these relate to protection of the park's natural and cultural environment.

Planning has commenced for the Stirling Range and Porongurup National Parks, the Shark Bay Marine Park and the Monkey Mia Reserve. The Monkey Mia Reserve is jointly vested with the Shire of Shark Bay and the Executive Director, and the plan will be the first produced for this type of vesting.

Other Planning

Dieback Disease: The policy on dieback disease was reviewed and changes came into effect in January 1991. A dieback protection plan for the Metropolitan Region is nearing completion.

Research has continued into the application of airborne and satellite remote sensing for monitoring and mapping vegetation condition, with reference to forests and coastal heathlands. Significant analysis has been undertaken within the Stirling Range National Park.

Interim fire management guidelines were developed for the Yalgorup National Park and for three (3) nature reserves in the Cranbrook Shire. Several others are in various stages of development.

Draft plans for community education and interpretation of the natural environment were prepared for the South Coast and Wheatbelt Regions. Interpretation plans were completed for Dryandra State Forest and reserves on the Nullarbor Plain.

Concept plans for passive recreation facilities and protection of nature conservation values have been prepared for Boyagin Rock Nature Reserve, Thomsons Lake Nature Reserve and the Harry Waring Marsupial Reserve, Hamelin Pool, Vasse Conservation Reserve and Beeliar Wetlands.

In association with the Environmental Protection Authority (EPA) a draft landscape character typing proposal is being developed for managing visual resources.

A research program was undertaken to investigate and document the human and natural values of the Buccaneer Archipelago, located at the north end of King Sound, Kimberley Region. This document collates the known natural resource data and relates this to the various human interests in the area. The study will provide important baseline data for a future management strategy in this area.

A study was conducted on the use of Crown land by Aboriginal people in the South-west region of WA. Those wildlife species likely to be affected by Aboriginal activities were documented - approximately 24 plants and 12 animals were recorded as target species over a range which includes up to 33 nature reserves. It was not possible to accurately assess the full impact of these activities on the nature conservation values of the CALM reserves.

Research

Nature Conservation research is carried out from the Wildlife Research Centre at Woodvale and the Manjimup Research Centre. Some research projects are also carried out by staff in regional and district offices. The boundary between research and management is often blurred and some activities of research staff are reported in the wildlife management section.

Biogeography Program

The editorial preparation of the forthcoming book on Kimberley rainforests was completed. The study provides an overview of Kimberley rainforests and their conservation significance, and

includes recommendations for improvements in the conservation reserve system and for management of rainforest in Western Australia.

A major review of the conservation estate in the Kimberley was finalized and published.

A major project to identify conservation needs in pastoral lands was completed.

Analysis and writing up of data from the Eastern Goldfields survey continued: the MS for the Kurnalpi/Kalgoorlie cell was completed and edited ready for publication, and a draft MS has been prepared for the Norseman-Balladonia cell. Survey sites in the Goldfields were re-visited and accurately positioned using the satellite-based Global Positioning System, in order to facilitate future monitoring.

A report was prepared reviewing the data available to assess the adequacy of the jarrah forest conservation reserve system in the Dale Botanical District.

A major paper was published explaining the methodology, outcome and recommendations of the Nullarbor District survey.

A number of specific areas were surveyed and/or reports produced. Areas covered included John Forrest National Park, VCL east of Kalbarri, portion of Boolardy Station, Cape Arid National Park, various parts of the Swan Coastal Plain, Greenmount National Park, Ashmore Reef National Nature Reserve, Mitchell Plateau, Fitzgerald River National Park, North-west islands, Lancelin-Dongara islands and Exmouth Gulf islands.

Compilation of a Checklist of the flora of the Pilbara was commenced. It will provide an improved data base for future work in the region. The Census of Australian Vascular Plants, for which the Biogeography Program provided distributional data for the 8 316 Western Australian taxa, was published by ABRS.

Bibliographic data-bases of the Pilbara Region and of conservation reserves and proposals across the State were commenced.

Fauna Conservation Program

A workshop to determine priorities in fauna conservation research was held on the 10 October 1990. It was attended by a wide cross-section of CALM staff, from Operations Division and other parts of the Department with an interest in fauna and its conservation. The main outcomes were that the program should maintain the present mix of species-oriented and process-oriented research, but that more attention should be focussed on feral cats and introduced herbivores, invertebrates and the fauna of the jarrah forest.

Program members were again very successful in raising external funds. New and ongoing grants were received for research on Western Mouse, Red-tailed Phascogale, Quenda, fox biology and control, small mammals on Barrow I, Greater Stick-nest Rat, Western Swamp Tortoise, marine turtles and the coral-eating gastropod *Drupella*.

Funds were also successfully sought from ANPWS to produce Species Recovery Plans for the Tamar, Woylie, Black-flanked Rock-wallaby, Shark Bay Mouse and the endemic frogs *Geocrinia alba* and *G. vitellina*.

A research project funded by the World Wide Fund for Nature on the conservation of the Western Mouse has provided important biological information on this threatened species. A previously unknown population was discovered at Rock View NR, and the use of radio-tracking has shown that these rodents nest in burrows, but are partially arboreal.

Previously unknown populations of the Red-tailed Phascogale, a threatened species apparently restricted to the wheatbelt, have been discovered in Highbury State Forest, and at three Nature Reserves in the Great Southern. The species has been found to be still present in Dongolocking, Boyagin, Tutanning and East Yormaning Nature Reserves, and in Dryandra State forest.

An aerial baiting program in part of the Fitzgerald River NP was implemented in order to test further the hypothesis that predation by foxes is regulating populations of native mammals. A census of the Ground Parrot within and outside the baited area was also carried out to allow measurement of the effect of foxes on this threatened species.

Techniques were developed to eradicate the introduced Black Rat from Barrow Island while minimising the effect on native mammals.

Fire Program

Prescribed burning of vertebrate and invertebrate sampling areas in the Stirling Range National Park was completed during the year, the burns being carried out in November 1990 (spring) and March/April 1991 (autumn). Regular trapping to monitor the impact of these fires is continuing.

Research on the effects of prescribed burning on vertebrates and invertebrates in wheatbelt nature reserves is also progressing. All of the burns planned for this project have now been completed, the most recent being on East Yorkrakine Nature Reserve in March 1991. Regular post-fire fauna sampling is continuing at Tutanning, Durokoppin and East Yorkrakine Nature Reserves. Post-fire trapping and radio-telemetry studies on the rare dasyurid *Phascogale calura* have also continued at Tutanning in conjunction with the Fauna Program.

The effects of fire on the vegetation in the Stirling Range National Park and at the Tutanning Nature Reserve continued to be monitored.

Autumn and spring samples of invertebrates from Jarrah forest in the Perup Nature Reserve have been collected as part of a long-term study of fire and invertebrates in this forest type. No burns have yet been conducted on these plots.

Fire ecology plots established in jarrah forests throughout the south-west were experimentally burnt again in spring 1990 and autumn 1991. This study aims to determine the long term effects of various fire regimes on the forest understorey. Assessment of the response of vegetation to various fire regimes is continuing.

Stem sections from large, old jarrah trees were analysed in an attempt to obtain hard data on the forest fire regime prior to European settlement. Preliminary results show that prior to settlement, incidence of fire injury, was low, but increased significantly following settlement. This suggests that either fires were very infrequent (40-120 years apart), or were of low intensity and therefore frequent. Given the wide use of fire by Aborigines and the frequency of lightning strikes, the latter is most likely. Fire exclusion during the early part of this century allowed fuels to accumulate with the result that wildfires were very intense and damaging to the trees. The incidence of fire injury has reduced since the 1960s with the introduction of broadacre fuel reduction burning.

The experimental burning program in the Stirling Range National park continued with a further seven plots burnt. This work has confirmed the importance of litter fuel moisture content in determining thresholds for fire spread in mallee-heath fuels. Research staff gathered data during a number of prescribed fires and wildfires in the South Coast Region. Studies of crown fire initiation of *Pinus pinaster* stands were undertaken jointly with Fire Protection Branch and a visiting researcher from Forestry Canada.

Studies on the effect of fire on desert vertebrates are progressing. In Queen Victoria Spring Nature Reserve, study plots were sampled on three occasions and show interesting trends in species succession in agamids and small mammals. The study area in the Gibson Desert Nature Reserve was

burnt in October 1990 to leave patches of unburnt vegetation of different sizes. The vertebrate assemblages in these patches are being sampled in an ongoing study.

Old and senescing *Melaleuca viminea* thickets east of Collie were burnt last autumn to regenerate habitat suitable for the Tammar wallaby.

Regeneration was poor as the fire was not intensive enough to stimulate seedfall. Another area is planned for regeneration with a higher intensity fire.

Flora Collections Program

In excess of 30 000 new records were entered into the WA Herbarium specimen database, WAHERB; this database now contains 115 000 specimen records. A grant of \$105,000 from the Environmental Resources Information Network was received to enter the genus *Eucalyptus*, selected grass genera and Kimberley *Acacia* species; to date almost 8 000 records, from an estimated 28 000, have been processed. Funds from the Nature Conservation & National Parks Trust Account have enabled the project to continue. Names have been captured for inclusion in the Census of W.A. Plant Names, WACENSUS.

Flora Conservation Program

Area based Wildlife management programs for rare and threatened flora in the CALM Merredin District and the CALM Metropolitan Region are near completion following extensive surveys of these areas. In total 164 rare and threatened taxa were surveyed including 42 Declared Rare Flora. Some 140 new populations were documented which also included populations of two presumed extinct species *Sowerbaea multicaulis* and *Calytrix breviseta* ssp *breviseta*.

Conservation genetic, breeding system and population ecology studies have been completed for three Species of Declared Rare Flora *Acacia anomala*, *Banksia cuneata*, and *Stylidium coroniforme* and are near completion for *Diuris purdiei*. The preparation of Wildlife Management Programs for these species has been initiated. These studies have been particularly informative in the development of strategies for the conservation of genetic resources and management of these and other rare or threatened plant species. The preparation of ANPWS funded recovery plans for *Eucalyptus rhodantha*, *Acacia anomala*, *Banksia cuneata*, and *Stylidium coroniforme* is also underway.

Flora Information Program

The enormous task of preparing the manuscript of the *Flora of the Kimberley Region* is now at typesetting stage. The project, which has taken six years to complete, keys out and describes all of the flowering plants recorded in the Kimberley Region.

Treatments of the genera *Kippistia*, *Minuria* and *Olearia* for the forthcoming Flora of New South Wales were completed.

Dr Terry Macfarlane completed his tour of duty as Australian Liaison Botanist at the Royal Botanic Gardens, Kew, England. During this year he also spent three months in Paris at the invitation of Le Musée d'Histoire Naturel.

A plant identification course was held for the CALM's Northern Forest Region.

A total of 7 671 general enquiries were serviced. In Addition, a further 340 forensic enquiries were handled.

Plant Diseases Program

Results from trials on the control of *Phytophthora cinnamomi* with phosphorous acid continue to be very encouraging. *Banksia grandis* treated with phosphorous acid has contained infection by *Phytophthora cinnamomi*. In comparison infection by *P. cinnamomi* kills untreated *B. grandis* within 12 months. One injection of phosphorous acid has protected trees for at least 4 years (the longest time the trials have been running). In spray trials in an infected stand of rare and endangered *B. brownii*, plants have stopped dying in sprayed plots but continue to die in unsprayed plots.

A functional mycology laboratory has been established at the Manjimup Research Centre. Susceptibility of plant species to *P. cinnamomi* has been assessed in the Walpole-Nornalup National Park and in the South Coast Region.

In screening trials, mortality of *P. cinnamomi* resistant jarrah clones continue to be less than 10%. Susceptible clones have mortality levels of at least 40% with 100% mortality of some clones. Growth of resistant clones is significantly greater than surviving susceptible clones.

A project on survival of *P. cinnamomi* zoospore cysts funded by ALCOA has been completed. Predictive formulae for zoospore cyst survival were developed for each soil type and matric potential and cyst survival in field soil conditions was compared with predicted outcomes.

A trial assessing rate of lesion extension of *P. cinnamomi* in artificially inoculated stems of jarrah in variously thinned plots is continuing. The water relations of the trees in each treatment are being investigated to determine the effects of tree water status on lesion extension.

A project funded by ALCOA of Australia and sand mining companies has identified improved methods for the production of oospores by *Phytophthora* species. The improved methods will facilitate *Phytophthora* identification.

From mid April 1990 to mid April 1991, 171 cultures were forwarded by the detection service for identification. Eighty one of these were *Phytophthora* species, all of which were identified to species level and added to the database.

Pathogenicity tests have shown that death of *Banksia coccinea* is associated with infection by a *Diplodina* species. Surveys of *B. coccinea* stands around Albany have revealed extensive cankering from *Diplodina*. A number of canker fungi are causing death of *Banksia* species throughout south-western Australia.

Wetlands And Waterbirds Program

During the past year funding was obtained for a major survey of the invertebrate aquatic fauna and fringing and emergent flora of wetlands of the south coast, from Cape Naturaliste to Albany. This work is to be completed by early 1992. Further funding is likely to be obtained in 1991-92 for surveys of wetland-associated vertebrates (principally fish and frogs) and submerged aquatic flora of the region. Knowledge of the conservation values of the wetlands of the south coast will be greatly improved by this work.

The aquatic fauna of Two Peoples Bay Nature Reserve was documented. Forty-two species of waterbird, eight species of fish and 118 species of aquatic invertebrate have been recorded. This work will be published in a departmental Research Bulletin on Two Peoples Bay in 1992.

Work continued on a long-term multi-disciplinary study of Lake Gregory in the Great Sandy Desert. Collections of aquatic invertebrates and waterbird counts have been made in October 1989, when the lake was saline and about to dry out and in June 1990, after the lake had re-flooded and was fresh. Approximately 80 000 birds were counted on both occasions and the number of aquatic invertebrates was high, especially after the lake re-flooded. Geological work is about to begin. Cores taken from

the lake can be used to study past climatic conditions. Small invertebrate fossils in the cores can be used to study how the ecology of the lake and the fauna within it have changed with climate.

Research undertaken by scientists of Murdoch University, with partial funding and supervision from CALM, has identified a more environmentally acceptable alternative to the organophosphate Temephos for midge (chironomid) control. This work has also demonstrated the importance of good catchment management (particularly reductions in nutrient discharge) in long term control of midge populations.

A wetland-waterbird database, incorporating data obtained from the 1981-85 surveys of waterbird usage of Wetland Nature Reserves of the South West and from subsequent surveys, has been established. It is intended that historical and contemporary data will be added as and when funding permits, and that this will be the major State repository for data concerning waterbird usage of Western Australian wetlands.

Management

Objective: To manage wildlife in a manner consistent with research findings and the most effective use of available resources.

Description: This Sub Program includes responsibility for implementing management plans for nature conservation; implementing management programs for commercial and endangered species; regulation and administration of activities such as wildflower picking, aviculture, duck shooting, crocodile parks, emu farms and wildlife parks; preventing illegal taking of protected species from the wild; encouraging conservation of native species on private property and road reserves; coordinating emergency action such as whale stranding rescues; control of foxes, rabbits and feral animals and exotic plants and weeds on CALM lands; and setting the parameters for the rehabilitation of conservation reserves after mining and other activities.

Operating Expenditure

\$6 078 273

Dieback

Concern continues about the spread of dieback in the conservation reserves on the northern sandplains. A group known as the Northern Sandplain Dieback Working Party has been formed in an attempt to promote public awareness of the problem and provide direction for research and management assistance to user groups in the area. CALM is represented by officers from the Moora District and Environmental Protection Branch. The Northern Sandplains Working Party also includes representation from local mining companies (Tiwest, AMC and CRA) the Main Roads Department and the Department of Mines. The working party has resulted in a regional dieback survey of the area and increased awareness of the threat of dieback disease through information sessions and field days for local interest groups, shires, beekeepers, farmers and wildflower pickers.

Control of public access to large areas of the proposed Mount Lesueur National Park has been instigated with the assistance of the Department of Land Administration and financial and practical assistance from CRA and local conservation groups in an effort to prevent further spread of dieback disease there.

The spread of dieback disease in some parts of the flora rich heaths of the South Coast Region is of particular concern and several rare and threatened species are at risk as a consequence.

Dieback disease maps were produced for West Cape Howe, Stirling Range, Fitzgerald River, William Bay National Parks and Two Peoples Bay Nature Reserve and the Dieback Protection Plan

for Stirling Range National Park was reviewed. Preventing dieback disease spread was a particular emphasis of the Fitzgerald River National Park management plan.

The maintenance and control of Disease Risk Areas in State forest has been hampered by restrictions in finance and staff availability.

The Department has increased its training of staff to provide knowledge and skills of the dieback disease. The demand to provide information about dieback to external organisations is increasing rapidly. In the past year information sessions have been delivered to 4WD clubs, educational institutions, tour guides and adventure group leaders, Main Roads Department personnel, logging contractors, staff from mining industries and conservation groups.

Fire Management

Detection

Detection of fires on or near to conservation lands and forest areas between Denmark and Moore River was provided by the Departmental aerial/tower detection network. Areas remote from this surveillance system relied on neighbours, the general public, the aviation industries and CALM staff patrols for fire reporting.

Weather Forecasts

Fire weather forecasts provided through the Departmental contract agency cover national park and other conservation land located within and adjoining forest areas. Conservation lands remote from forest areas were covered by the state-wide fire weather forecasts provided by the Bureau of Meteorology.

Prescribed Burning

The Department uses fire as a management tool to provide wildlife habitat, regenerate cutover forests and reduce fuels within strategically located areas for the protection of conservation and community values on or near CALM managed lands.

A total of 355,240 ha of CALM managed lands were burnt under management prescriptions throughout the State in 1990/91. Part of this total area provides for the protection and management of wildlife values on CALM lands.

Prescribed burns that were of special significance to wildlife conservation included:

- . Karijini (Hamersley Range) National Park and Chichester/Millstream National Park. Approximately 286 km of narrow strip burning was conducted using both ground and aircraft ignition. It is worthy of note that these buffers were instrumental in stopping a large 19,500 ha wildfire in the Karijini National Park.
- . 455 km of aerial ignited narrow strip buffers in the Kimberley Region were conducted in association with the Bush Fires Board.
- . A large scale mosaic burn was aurally ignited in the Great Victoria Desert for the provision of wildlife habitats.
- . Stirling Range National Park burn covering 31,000 ha was ignited by aircraft in autumn 1991 for park protection and flora management purposes.
- . Two large mosaic burns (approximately 10,000 ha) were conducted in the D'Entrecasteaux National Park.

Fire Suppression

465 wildfires were attended by Departmental forces throughout the State during 1990/91. These fires burnt out a total area of 1,221,102 ha of which 897,314 ha were on lands managed by CALM.

Approximately 14,452 ha burned in State forest, 486,003 ha in national parks and 396,859 ha burned in nature reserves.

Appendix 11 provides details of the numbers, areas, tenure and causes of wildfires.

Significant large fires that affected conservation values are given below:

- (a) As a result of a series of lightning strikes in December 1990, a number of fires burnt in remote lands in the South Coast Region. These included nature reserves, national parks and other crown lands. The progress of these fires was monitored over the summer period and where they posed a direct threat to agricultural lands, direct suppression action was undertaken by the local bushfire organisations. The most important of these fires included:
 - . Dundas Fire: A series of fires joined up and burnt 472,000 ha of the Dundas Nature Reserve and adjoining Crown lands.
 - . Peak Charles/Frank Hann Fires: Several fires covered a total of 128,000 ha of which 16,500 ha was within national park.
 - . Cape Arid: 63,425 ha of national park was burnt out of a total of 84,000 ha.
- (b) A large fire in the Drysdale National Park burnt a total of 245,000 ha of national park. Approximately 130,000 ha was burnt within the Prince Regent Nature Reserve. These were two of several very large fires that burnt grasslands in the Kimberley region during the 1990 dry season.
- (c) Yanchep fire of 30 January 1991 burnt 1,260 ha of national park out of a total of 5,821 ha burnt.
- (d) Approximately 19,500 ha of the Karijini (Hamersley Range) National Park was burnt as a result of a lightning strike in November 1990. This fire was contained by a recently burnt strategic fuel reduced buffer.
- (e) CALM fire fighters joined forces with local bushfire brigades for the Ravensthorpe Shire in November 1990 to contain a lightning caused fire which burnt in vacant Crown land directly north-east of the Fitzgerald River National Park. The use of aircraft to burn out a buffer in advance of the wildfire proved to be an effective measure in containing such a fire in inaccessible lands. This exercise was successfully repeated in December 1990 in the containment of a wildfire in the Ravensthorpe Ranges.

Fire Equipment

Almost all of the Departmental fire fighting fleet (see Appendix 10) has some direct involvement with fire management operations on nature conservation lands.

Training

A series of fire training courses were conducted during the year. Participants included staff with fire management responsibilities on nature conservation lands.

Feral Animal and Weed Control

The Department is responsible for control of declared weeds and feral animals on land under its control. Many of these non-native species have damaging effects on native flora and fauna and their habitats. In addition there are control programmes on exotic plants and feral animals which are not declared but are harmful to native species.

Liaison was maintained with the Agricultural Protection Board (APB), its regional advisory committees and zone control authorities in implementing the Department's weed and feral animal control programmes. This includes the operations of the APB's bait factory where over 48,550 baits were prepared for CALM use, mainly for fox control in several reserves in the Wheatbelt Region.

A "Manual on Fox Control" was produced by Research Division as an outcome of financial support from the World Wide Fund for Nature (Project 106) and forwarded to the funding body for publication.

Baiting for fox control was done on the Lake Muir, and Two Peoples Bay Nature Reserves, on the Cape Range, Fitzgerald, Stirling Range, Walpole-Nornalup National Parks, Busselton District, and on Batalling Block in State Forest. In the Narrogin District 39,000 baits were laid over a distance of some 5,600 km, mostly in nature reserves and Dryandra Reserve

An excellent example of the positive effects of fox baiting on native mammal populations is on the Dryandra Reserve where the numbers of Woilies and Numbats have increased dramatically during this year in response to a fox control program. There is evidence of similar results emerging on the Boyagin Rock and Tutanning Nature Reserves.

On the debit side, the first evidence has emerged in Narrogin District that effective fox control may result in an increase in rabbit numbers. It will be necessary to deal with foxes and rabbits together in some areas.

A fox-proof fence was constructed around the Ellen Brook Nature Reserve where fox predation is believed to be a significant factor in the decline of the last population of the critically endangered Western Short-necked Swamp Tortoise. In collaboration with CALM staff, the APB and CSIRO, the Useless Loop community (Shark Bay) has also constructed a fox-proof fence on Heirrisson Prong and baited for foxes in preparation for the proposed re-establishment there of Boodies and Golden Bandicoots from Bernier Island.

Control programs for other feral animals also continued. For example, in the Kimberley Region the impacts on feral cattle and donkeys in Purnululu National Park were successful, resulting in satisfactory regeneration of degraded vegetation and soil erosion. In the Goldfields Region nearly 200 goats and a number of donkeys, feral sheep and camels were destroyed on Wanjarri, Karrimindie, Cave Hill and Jaurdi Reserves. Goldfields staff also took part in joint goat control operations in collaboration with the APB and Land Conservation District Committees. Goats were destroyed in Walyunga National Park. In the Pilbara Region feral cattle were mustered from Karijini and Millstream-Chichester National Parks and 20km of fencing were erected around the boundary of the Barlee Range Nature Reserve to exclude cattle and donkeys.

In the Central Forest Region poison baits for feral pigs proved moderately successful, as did a trial programme using a professional hunter. Trapping also proved successful in the Northern Forest Region where 71 feral pigs were destroyed. Feral pigs were also destroyed in Shannon National Park.

Rabbit poisoning was done in collaboration with the APB on the Peak Charles, Frank Hann, Cape Arid, and Stokes National Parks, in the Burma Road, Dalyup, Woody Lake, Lake Warden and Nuytsland Nature Reserves, and in Helms Forestry Reserve.

In July 1990, a population of Black Rats was discovered on Barrow Island, one of the State's most important nature reserves. An eradication program was designed immediately. Field trials were initially undertaken to develop a poison baiting technique that would eradicate rats while not

poisoning the abundant native fauna, in particular rare mammals. These trials were successful and a major operation in three stages, was completed in early July. Monitoring so far indicates that eradication was successful. Using the same technique rats will be eradicated from nearby Middle Island in September 1991.

Weed control programmes included:

- . Blackberries in State Forest and Porongorup National Park;
- . African Box Thorn on the Beagle Islands and some of the Abrolhos Islands;
- . Parkinsonia, Galland's Curse, Date Palms, Indian Water Weed and Khaki Weed in the Millstream National Park;
- . Buffel Grass and kapoc infestations on Dampier Archipelago Nature Reserve islands;
- . Mexican Poppy and Afghan Thistle on Arboretum (Goldfields);
- . Bathurst Bur on Rowles Lagoon Nature Reserve;
- . Arum Lily in D'Entrecasteaux National Park and on Garden Island;
- . Pampas Grass in Jandebup Nature Reserve.

Mining on Public Land Under CALM Management

There is close liaison with the Mines Department, Department of State Development and the Environmental Protection Authority relating to the impacts of mining on environmental values of land under management and the Department is represented on several committees and working groups associated with mining.

Revenue from compensation for mining on public land under the Department's control totalled \$1.46 million.

Pending introduction in late 1990 of the Government's new policy on mining on conservation reserves, ("Resolution of Conflict - A Clear Policy for National Parks") a backlog of tenement referrals had accumulated, especially relating to nature reserves. A batch processing procedure, developed in collaboration with the Department of Mines, has been introduced to deal with this. Consequently, the numbers of tenements processed are currently unusually high but will tend to stabilize in the future (see the following table). Comprehensive environmental conditions for mining on reserves have been reviewed and agreed with the Environmental Protection Authority and the Department of Mines.

**Mining Tenements
Referred Under Section 24 of Mining Act
for Year Ending 30 June 1991**

	Processed		Pending	
	Exploration Prospecting	Mining	Exploration Prospecting	Mining
National Parks & Nature Reserves	12		76	16
State Forest	12	14	24	32
Goldfields Timber Reserves			34	8
		38	190	

Of particular note this year have been:

- negotiations relating to iron ore tenements over portions of the Karijini National Park with a view to park extensions and rationalization of existing park boundaries;
- inspection of exploration in the Rudall River National Park to ensure compliance with conditions;
- work on a PER document prepared by Cable Sands relating to exploration access to the D'Entrecasteaux National Park;
- supervision of a range of petroleum activities on island nature reserves off the Pilbara coast;
- assessment of mineral sand mining developments at Bremer Bay and at the Beenup development near Augusta with its associated transport and power line corridors;
- assessment of bauxite mining on the Darling Scarp, quartzite mining at Moora, gold mining at Boddington, sand mining at Shark Bay, and limestone mining north of Wanneroo;
- liaison with Ametech Exploration regarding mining of high quality silica in the Gngangara Mound;
- formal assessment by the EPA was requested for gypsum mining lease applications over Lake Campion Nature Reserve; a survey indicated that 20% of the reserves plant species are restricted to those habitats where the mining would occur.

In addition, the Department was involved in assessment of the Adelaide to Perth optic fibre route, proposals for the new Collie Power Station, the Cervantes town water supply extensions, the Rottnest Island Water Supply and Waste Disposal PER, and various subdivision proposals.

Approximately 250 hectares of jarrah forest was cleared for bauxite mining in the Dwellingup District and a similar area is under rehabilitation using native species. Approximately 60 hectares and 90 hectares respectively were mined in the Jarrahdale and Willowdale Districts. Treatments under the Forest Improvement and Rehabilitation Scheme included approximately 40 hectares of dieback rehabilitation and 15 hectares of rehabilitation thinning in the Dwellingup District. Cobiac Block and part of Mundlimup Block have been temporarily closed to allow for photographing dieback disease, and logging prior to mining.

Rehabilitation of gravel pits was carried out by CALM and the Esperance Shire in the Cape Arid and Cape Le Grand National Parks and in several nature reserves in that area.

Amendments to the Wildlife Conservation Regulations

In June 1991 major amendments were made to the Wildlife Conservation Regulations to bring licence and royalty fees more into line with administrative costs and to simplify the licensing system.

Most licence fees had not been amended for ten years and as such there was an urgent need for review. Consideration was given to the need to keep any increases within affordable levels and for this reason many licence fee and royalty increases are less than the increase which would have been justified considering Consumer Price Index rises.

Licences for wildlife farming operations and aviculture were simplified to reduce the number of licences required to farm and process emus and crocodiles, and also to reduce the need for aviculturists to keep detailed records of their stock, to only a few key species.

Other significant amendments provided for the duration of licences to be extended for periods greater than 12 months and for greater flexibility in tailoring licence return and report forms to specific activities.

Kangaroo Management

Kangaroo management operations continued throughout 1990/91. Management programs for three species of kangaroo, the Red Kangaroo, the Western Grey Kangaroo and the Euro were approved by the Western Australian Minister for the Environment and the Commonwealth Minister for the Arts, Sport, the Environment, Tourism and Territories.

The approved management programs retained as their principal aims, maintenance of kangaroo populations over their natural ranges and mitigation of the deleterious effects of kangaroos on other land management practices.

The 1990 calendar year maximum commercial harvest quotas and actual harvests were as follows:

Species	Quota	Harvest
Red Kangaroo	290,000	224,000
Western Grey Kangaroo	45,000	37,000
Euro	10,000	5,000

During 1990, aerial surveys were conducted to estimate populations of Red Kangaroos and Western Grey Kangaroos in Western Australia. These surveys were conducted by the Australian National Parks and Wildlife Service with financial assistance of \$30,000 from CALM. Surveys covered most

of the range of these species including the major harvest areas, but excluding the forested areas of the south-west corner. In the total area surveyed, the Red Kangaroo population was estimated to number 2,373,000 and the Western Grey Kangaroo population was estimated to number 1,072,800. The table below gives the summary population estimates for the two species in commonly surveyed areas since 1981.

Species	1981	1984	1987	1990
Red Kangaroo	951 000	1 554 000	2 138 000	2 178 000
Western Grey Kangaroo	362 000	404 000	537 000	1 070 000

While the Red Kangaroo population appears to have stabilised since 1987, the Grey Kangaroo population has apparently continued to increase. The major Grey Kangaroo increase has, however, been in remote areas of the south-east of the State. The 1990 harvests represented some 9.2% and 3.4% of the population estimates for Red Kangaroos and Grey Kangaroos respectively and were therefore very conservative.

In August 1990 the consulting group ACIL Australia Pty Ltd provided its report "The Kangaroo Processing Industry in Western Australia - a review and analysis of the industry's role, situation and potential" to the Ministry of Economic Development and CALM. While ACIL found no significant evidence to suggest that the processing industry was inefficient, it recommended that some restrictions, such as limits to the number of processing establishments, should be removed to provide for greater efficiencies. The report has been circulated widely for comment and is to be considered by the Government.

Emu Management

The emu farming industry continued to expand during the year, with the number of licensed farms rising from 17 to 24. Farm returns at the end of December 1990 gave the total captive emu stock as just over 12,000 birds.

No open season was declared for emus during the year, carrying on from the cancellation of the previous open season last year. Landholders experiencing damage to crops from emus were able to reduce the number of wild emus on their properties through damage licences issued by CALM.

Crocodile Management

Considerable progress was made in the development and refinement of crocodile management. A draft management program for Saltwater and Freshwater Crocodiles, together with a draft CALM policy statement on crocodiles, were produced and circulated to various interest groups for comment. The draft program provides for the conservation of both Saltwater and Freshwater Crocodile species, through limited wild harvests, captive breeding, population monitoring and problem crocodile control.

The number of crocodile farms increased from one to three with farms at Broome and Fremantle licensed in addition to that previously established at Wyndham. As at June 1991 these farms held stocks of over 800 Saltwater Crocodiles and over 2,000 Freshwater Crocodiles, sourced predominantly from limited egg and hatchling harvests, captive breeding and interstate purchases.

An initial trial processing of Northern Territory sourced crocodiles was conducted at Fremantle in January 1991 involving a total of 25 Saltwater and 9 Freshwater Crocodiles.

The Wyndham Crocodile Farm conducted and reported on a survey of Saltwater Crocodile numbers in the Cambridge Gulf area in September 1990.

Aviculture Licensing

Following a series of meetings with aviculture and bird dealer groups further amendments were made to the aviculture aspects of the Wildlife Conservation Regulations. The amendments reduced the number of species for which detailed records must be kept and generally re-focussed the most stringent controls to those species for which the conservation concern is greatest, including Baudin's and Carnaby's Black Cockatoos.

Beekeepers Consultative Committee

The committee chaired by the Director of Nature Conservation met on 4 occasions. Significant matters dealt with were input into formulation of a CALM Beekeeping Policy, guidelines for the return of beekeeping to disease risk areas of the forest and a review of beekeeping regulations in water catchments.

Changes to regulations were implemented to allow for extra site entitlements and reduced changes in the remote zone.

Duck and Quail Shooting

A year long open season for the shooting of ducks outside of the South West and Eucla Land Divisions had been declared by the Minister and remained in force until the end of 1990.

The Government decided that it was opposed in principle to duck and quail shooting for sporting or recreational purposes and introduced amendments to the Wildlife Conservation Act to ban such shooting. The legislation was defeated in the Legislative Council.

By virtue of a notice published in the Government Gazette on 10 June 1983, an open season on Brown Quail and Stubble Quail had been declared automatically from 1 January to 30 June each year. Consistent with the policy decision made by the Government, the open season was cancelled by Ministerial notice published in the Government Gazette on 14 December 1990.

In January 1991 the Minister announced that there would be no 1991 duck shooting season.

There was, however, recognition that ducks can in certain circumstances cause damage to rural enterprises and in these circumstances damage licences were issued to provide mitigation of the detrimental impacts of high duck populations.

Threatened Species Management

Following a review of the acute species extinction problem in the State, new procedures have been established for threatened species management.

Two new committees have been established, one for Threatened Flora and one for Threatened Fauna, each charged with responsibility for reviewing the lists of gazetted species, and providing advice on priorities for research programs, recovery plans, captive-breeding programs and management actions. The committee memberships comprise departmental staff and specialists from other agencies including the W. A. Museum, Perth Zoo, tertiary institutions, King's Park, and the Conservation Council. Officers of the department have also participated in the work of the Commonwealth Endangered Species Advisory Committee.

An important initiative during the year has been the adoption of a policy for the development of "recovery plans" for critically endangered species. For each plan a "recovery team" will be appointed, involving people with appropriate expertise and responsibility for research, habitat management and captive-breeding or cultivation. The teams will be responsible for development and implementation of the plans. However, there are so many gazetted threatened species that recovery plans can be developed only for the most critical cases.

Translocation projects, supported by fox control and revised fire management programs, have continued for the threatened Noisy Scrub Bird and the Numbat, and are proposed for other species, for example, Boodies and Golden Bandicoots from Barrow Island to sites in the Gibson Desert Nature Reserve, and from Bernier Island to a site on the Shark Bay mainland.

Captive-breeding projects in collaboration with Perth Zoo continue to be successful for the Western Short-necked Tortoise, Numbat and Chuditch. There has also been success with experimental cultivation of several endangered plant species in collaboration with King's Park, most notably with Purdies Donkey Orchid (*Diuris purdiei*).

Implementation of Species Recovery Plans and Interim Management Plans is proceeding for several threatened species with encouraging results.

Threatened Fauna

On 16 November 1990 revised schedules of the threatened and specially protected fauna of Western Australia were published in the Government Gazette.

While 26 species had been removed from the previous list due to surveys showing they were not as rare as previously thought, 17 species were added.

Additions to the list included the Southern Brown Bandicoot, populations of which have disappeared from the western wheatbelt in recent times and two frog species known only from restricted locations, the White-bellied Frog and the Yellow-bellied Frog.

Species deleted from the threatened list included the Long-tailed Dunnart, recently shown to be widespread across the Gibson Desert, Pilbara and Murchison areas, and the Rainbow Pitta found to be reasonably common in northern wet forests.

The threatened fauna list now contains 41 mammal species, 58 birds (including 22 protected by international treaties), 7 reptiles, 2 frogs and 2 fish. A total of 15 species have been classified as specially protected, comprising 3 mammals, 7 birds and 5 reptiles.

Threatened fauna species include those which are currently threatened with extinction due to low populations or severely restricted distribution and also those which are currently presumed extinct. Specially protected fauna include species which are not under immediate threat of extinction but which could become so through illegal taking due to their high commercial or intrinsic value. Examples of specially protected fauna include Saltwater Crocodiles, Dugongs and Major Mitchell Cockatoos. Illegal taking of either threatened or specially protected fauna is subject to a maximum fine under the *Wildlife Conservation Act 1950* of \$10,000.

Seals

Considerable progress was made in the collection of data on populations of both Australian Sea-lions and New Zealand Fur-seals around the Western Australian coast. As a result of surveys conducted in early 1990 and again in early 1991 the Fur-seal population was estimated to be of the order of 5,700 with 16 known breeding colonies off the southern coast, and the Sea-lion population was estimated to be in excess of 3,100, with breeding on 20 islands off the south coast, 3 islands in Jurien Bay and the Abrolhos Islands.

Conflict between Sea-lions and the south coast estuarine fishery became an issue again, with a number of damage licences issued to scare sea-lions from nets. Two adult sea-lions were illegally shot, one at Albany and one at nearby Cheynes Beach. Initial discussions were held between CALM and the Fisheries Department on the development of management strategies to minimise future conflict between sea-lions and fisheries operations.

The sinking of the Sanko Harvest off Esperance, as detailed elsewhere in this report, required a major clean-up operation for New Zealand Fur-seal pups. A total of 38 pups on Hood Island and 172 pups on Seal Rocks were cleaned of oil contamination. Follow-up visits later in the year located 4 carcasses of dead pups at Hood Island and none at Seal Rocks. It is likely that some other pups also died but from pup counts made during these follow-up visits it appears that the vast majority of treated pups survived.

Naretha Blue-bonnet Parrots

A captive breeding program for Naretha Blue-bonnet parrots was commenced in January 1991. Under the program a group of private aviculturists are hoping to establish a viable breeding population of the species in captivity. The aviculturists are funding all aspects of the program, under the supervision of the Naretha Blue-bonnet Breeding Committee which is chaired by CALM and involves representatives from CALM's Research Division and the Perth Zoo. A total of 40 founder birds were captured from the wild in January under CALM supervision. All of these birds and 50% of any surviving offspring are to remain Crown property, with the aviculturists obtaining ownership of only the other 50% of surviving offspring they produce.

Naretha Blue-bonnets are listed as specially protected fauna in Western Australia because they are very poorly represented in aviculture and there has been a history of poaching from the wild, much of which has resulted in destruction of nest hollows. The breeding program is seen as an innovative means of CALM obtaining detailed breeding knowledge, while establishing a viable and secure genetic stock of the species, without the cost of a major research program.

DNA fingerprinting of the Blue-bonnets indicated that they were of surprisingly diverse genetic backgrounds providing a good base population for breeding. As at June 1991 all 40 Blue-bonnets remained healthy, with strong indications of initial breeding activity.

Noisy Scrub Bird

Implementation of the species Management Program continued with 11 birds captured and translocated to sites at Gull Rock and Quarrum Nature Reserve. A workshop on Noisy Scrub Bird management was held in May, involving local research and management officers, other researchers and volunteers. Don Merton, operations co-ordinator for the New Zealand Department of Conservation's Threatened Species Unit attended as a special guest. The workshop proved to be a timely opportunity to review the progress of the management program and will result in modifications to future operations.

Numbat

Protection of the Numbat population at Dryandra and the reintroduced population at Boyagin Nature Reserve through fox control, continued.

Chuditch

Work progressed throughout the year on development of a Wildlife Management Program for the Chuditch. Funds have been provided by the Australian National Parks and Wildlife Service for its publication as a Species Recovery Plan. This program aims to (a) ensure the Chuditch persists in its present range through the implementation of appropriate forestry management prescriptions and predator control programs, and (b) expand into its former range through reintroduction programs. A recovery team consisting of staff from CALM research and operations, and the Perth Zoo has been established to implement the program.

Field survey conducted throughout the south of the State revealed that Chuditch are still present in low numbers in the Wheatbelt Region in addition to the jarrah forests and other areas of the southwest.

The captive breeding program at the Perth Zoo had breakthrough success during the year with 12 young produced, bringing the colony to a total population of 18. The adult animals had been mated again by the end of the year. Plans have been developed for the trial translocation of the Chuditch to CALM managed lands.

Western Swamp Tortoise

A Wildlife Management Program for the Western Swamp Tortoise was published and launched by H.R.H. Prince Philip in November 1990.

A management program for this species was completed and implemented during the year. The management program provides guidance for habitat protection, research, captive breeding and education awareness initiatives and is overseen by a Recovery Team which includes CALM research and management staff, Perth Zoo and researchers from the University of Western Australia and Curtin University.

An electrified total exclusion fence was completed at the Ellen Brook Nature Reserve during the year. The fence was constructed to exclude foxes and other predators from the reserve and protect the last remaining confirmed wild habitat of the tortoise from other disturbances.

The Recovery Team met on three occasions throughout the year to review management and research progress and determine ongoing priorities. A program to survey former habitat areas was begun and progress of the captive animals and breeding monitored. The Perth Zoo continued the breeding success of previous years, with 16 young tortoises hatched, bringing the total successfully bred to 32.

Greater Stick-nest Rat

The Greater Stick-nest Rat (presumed extinct in Western Australia) was re-introduced to the State in 1990 by the release of 40 captive-bred animals on Salutation Island, Shark Bay, from a population in South Australia. The project was carried out in association with the South Australian National Parks and Wildlife Service. Monitoring the new colony has shown that the surviving rodents are in good condition and are breeding in spite of a dry summer. All indications at this stage are that a viable population has been established.

Ringtail Possum

This species appears to have suffered a significant decline in recent years and is now common in only two areas at Busselton and Albany. The WA Museum has initiated a study on the species which will result in a Recovery Plan. In addition CALM staff have investigated coastal sites which may provide suitable habitats for future re-establishment projects.

Boodie and Golden Bandicoot

CALM has developed a major ecological research program on the Gibson Desert Nature Reserve. Studies of the interaction of the environment and its fauna and in particular the impacts of fires have been progressing in recent years. One key aspect of the overall program is the plan to re-introduce the Boodie (or Burrowing Bettong) and the Golden Bandicoot to the desert reserve. These two species are now restricted to only a few islands off the WA coast, but formerly ranged widely across central and western Australia. Progress was made during the year in determining the most appropriate release sites for the Boodies.

CSIRO Wildlife Division is currently working on a project on Heirison Prong in Shark Bay with an aim to re-establish the Boodie on the mainland in that area, using animals from the Bernier and Dorre

Nature Reserves. This project is in collaboration with CALM, the APB and the Useless Loop community.

Threatened Flora

During 1990/91 one meeting of the Endangered Flora Consultative Committee was held. This meeting considered proposals for changes to the schedule of declared rare flora, which resulted in eleven taxa being added and four removed. With the separate listing of subspecies and varieties, the schedule now contains 260 taxa. In addition, 53 taxa presumed to be extinct have been added to the schedule to give rediscoveries automatic protection as declared rare flora.

During the year nine species of presumed extinct flora were rediscovered, due largely to the interest generated by the publication, *Western Australia's Endangered Flora*.

In addition to the declared rare flora, 1,200 taxa are listed as Priority Flora. These are either poorly known and require further survey, or are rare and are being monitored.

A total of 1,513 flora taxa are thus listed by the Department as threatened, rare or poorly known.

Approved Wildlife Management Programs exist for one species (*Eucalyptus rhodantha*) and the 23 species of declared rare flora of the Northern Forest Region. Field work has been completed and programs produced for the rare flora of the Metropolitan Region and Merredin District. Work is currently underway on management programs for Moora District and *Diuris purdiei*, and recovery plans for *Banksia cuneata*, *Eucalyptus rhodantha*, *Acacia anomala* and *Stylidium coroniforme*.

Upgrading of the rare flora database is being undertaken on a full time basis by a position funded by the Nature Conservation and National Parks Trust Account. During the year the database was used to provide rare flora information to 63 enquiries, principally relating to mining and other developments. From the commencement of the 1991/92 financial year, a charging system will be implemented for the provision of this data to commercial users.

Funds totalling \$6,800 were provided to Moora, Mundaring, Narrogin and Exmouth Districts for fencing and other management of rare flora populations.

A total of 498 rare flora roadside markers were provided to 14 Districts in the south-west.

A rare flora volunteer scheme has been initiated. Training days were held at Moora, Mukinbudin, Narrogin and Manjimup for a pilot group of 30 volunteers. The objective of the scheme is to use volunteers to inspect and monitor rare flora populations in their districts.

Marine Mammals

Whale Watching

Commercial whale watching expanded in Western Australia during the 1990/91 financial year. The industry is based largely on the southward migration of Humpback Whales in Perth waters, however this species is observed from a number of centres between Shark Bay and Dunsborough. The Southern Right Whale is observed from a number of points along the south coast and boat charters are conducted from Albany.

The number of whale watching licences issued for 1990/91 and their centre of operations are as follows:

Boats

Perth	-	19 (NB 6 of these licences relate to 3 vessels only)
Albany	-	3 (NB 2 of these licences relate to 1 vessel)
Denham	-	3
Jurien	-	1

Aircraft

Perth	-	1 Helicopter
Denham	-	1 Fixed Wing

In addition to the whale watching licences, five licences to study Humpback Whales for scientific purposes and two licences for news media companies to obtain footage of migrating animals were issued.

Patrols by Wildlife Officers were maintained through the migration period to monitor the activities of commercial and private craft. Contact was made with 276 private vessels and 1380 people were provided with information on whale watching guidelines as well as information on the biology and natural history of the two whale species. No major incidents were evident.

Dolphins

Monitoring of the dolphin - human interaction sites at Monkey Mia, Rockingham and Bunbury was maintained throughout the year. Problems were experienced at Bunbury when dolphins began disrupting amateur fishing and crabbing. Dolphins allegedly removed and swallowed bait from crab nets and one dolphin was hooked on a fishing line and cut free. Dolphin feeding was subsequently terminated. The feeding regime at Monkey Mia was monitored, without incident. The Rockingham dolphins are not fed.

The Atlantis dolphin release program is continuing. Delays in the construction of a suitable enclosure have set the program back, however the dolphins' progress and accompanying wild dolphin population research program are progressing well. One adult female dolphin "Lulu" died during the year.

Strandings

Wildlife Officers attended 34 whale and dolphin stranding events involving 89 animals, both live and dead, during the year. Data were recorded from 11 species, one of which, a Pygmy Right Whale, was an unusual and rarely recorded occurrence. A yearling Humpback Whale 9 metres long with a weight of 10 tonnes live stranded at Koombana Bay, Bunbury on 9 October, 1990. This animal was euthanased by implosion as rescue was not possible.

Three mass strandings of cetaceans occurred during the year. In October 1990, 10 stranded Bottlenose Dolphins were rescued from Lake Goegrup, near Mandurah and successfully transported and released in Peel Inlet. All animals were freeze branded and a record of subsequent sightings was maintained. In April 1991, 9 Short-finned Pilot Whales stranded near Lombardina, north of Broome, followed three days later by another 38 Pilot Whales which stranded at Sandy Point, 70 kilometres to the south. All animals died very soon after stranding.

Cetacean tissue samples are routinely collected for heavy metal, organochlorine and PCB analysis.

Twenty-eight pinnipeds stranded on south-west beaches during 1990/91, apparently suffering illness, injury or exhaustion. They included 16 Australian Sea-lions (two of which exhibited gunshot wounds), 7 Leopard Seals, 2 Elephant Seals, 2 New Zealand Fur-seals and 1 Sub-Antarctic Fur-seal. Over 150 New Zealand Fur-seal Pups were treated for oil contamination on islands off Esperance as a result of the sinking of the Sanko Harvest.

Flora Licensing

A total of 862 licences were issued authorising wildflowers and seed to be taken for sale from Crown and private land. A further 1189 licences were issued to pick flora for scientific, educational and other specific reasons. Refer to Appendix 15 for more detail.

Approval was given to issue 31 permits to take declared rare flora, in accordance with Section 23F of the Wildlife Conservation Act. The majority were issued to CALM staff, and 12 to visiting botanists.

Wildflower Industry

Further progress has been made in establishing more effective administration and management of commercial wildflower picking. Licence fees for the commercial taking of flora from Crown land had been increased from \$5 to \$100, and from private land from \$5 to \$25, on 1 June 1990. This has had the effect of reducing the number of pickers from 1387 to 578 for Crown land, and 307 to 284 for private land.

Flora licence fees are credited to the Nature Conservation and National Parks Trust Account. The increase in fees has permitted the commissioning of several research projects related to the wildflower industry. These were:

- . Impact of commercial picking of *Banksia hookeriana* on fruit quantity, nutrient status and plant form.
- . Conservation status of *Banksia coccinea* and *B. baxteri* on the south coast.
- . Effect of picking on *Verticordia brownii*.

In addition to these projects, two University studies on two species of kangaroo paw (yellow and black) have been completed and are being developed into a management program for these species.

It was decided that Trust Account funds would be used to employ a botanist in the coming financial year to further develop management strategies for the wildflower industry.

Wildlife Protection

A high public profile and level of contact with members of the public, industry, government and community groups was maintained during the 1990/91 financial year. Officers promoted community awareness of the value of nature conservation and the need to observe wildlife conservation and protection laws, sought an acceptable level of compliance with wildlife conservation and protection laws, and provided information and feedback to the Department on wildlife management and nature conservation issues. In addition, assistance was provided to a wide range of people by collecting biological samples and data and assisting in emergency situations.

In seeking an appropriate level of compliance with wildlife conservation and protection legislation, over 2,000 contacts were initiated with members of the public for offence related matters. In most instances, advice or guidance was provided and where appropriate verbal warnings were given; 215 offences were the subject of written reports. A summary of action for 1990/91 reported offences below is accompanied by the outcome of 1989/90 reported offences to date.

Total Offences Reported	286	Total Offences Reported	215
Convictions	81	Convictions	23
Dismissals	11	Dismissals	-
Letters of Warning	108	Letters of Warning	60
No. further Action	76	No. further Action	24
Prosecution Pending	10	Prosecution Pending	108
Total Fines	\$25,000.00	Fines 90/91	\$31,600.00
Total Costs	\$ 6,850.00	Costs 90/91	\$1,195.40

1989/90 Reported Offences

1990/91 Reported Offences

Details of 1990/91 offences appear in Appendix 17.

For 1990/91, 19.0% of offences reported involved the unlawful taking of protected fauna and 27.0% involved the unlawful taking of protected flora. The unlawful possession of fauna represented 8.8% of cases. Offences involving fauna declared to be rare or in need of special protection and declared rare flora represented 8.8% and 6.0% of cases respectively. Compared with 1989/90 these figures represent a 5% decline in the unlawful taking of fauna and a 3% increase in the unlawful taking of protected flora. Other figures are unchanged except for the taking of declared rare flora which experienced a 4% increase in reported offences.

Fauna smuggling continues at a level which is of concern. Two cases during 1990/91 involved the attempted export of reptiles and one case involved the import of exotic parrots. Wildlife Officers continued liaising closely with Australian National Parks and Wildlife Service, Customs and other State and Federal agencies in an effort to maximise effectiveness to detect and deter such activities.

Two people were apprehended and prosecuted for cutting 56 tonnes of Sandalwood which was destined for the south-east Asian market. The illegal export racket involved approximately 100 tonnes of Sandalwood valued at approximately \$500,000.

The taking of highly valued cockatoos from the wild has been a continuing problem. As a result of an increasing trend in claimed breeding results for Black Cockatoos in particular, detection and investigation methods have become increasingly sophisticated and target specific. In conjunction with Curtin University of Technology and with ANPWS States Assistance Program funding, a DNA database for the species of greatest concern was established and developed. Subsequent investigations have resulted in seven apprehensions for offences involving false claims of breeding. Prosecutions are pending. Expansion and development of the DNA database is ongoing.

A computerised database for breach report processing and offence records is under development. The system is being developed to manage offence reports produced subject to all legislation administered by the Department.

There continues to be a high wildlife based industry and community expectation that appropriate enforcement measures will be pursued for offences against wildlife conservation and protection laws.

A wide range of matters which were of concern to the public were dealt with during the twelve months. Over 5,000 telephone enquiries were received during office hours and the after hours service offered was highly utilised by the public, seeking advice on wildlife related matters, including sick, derelict and injured fauna, species identification, nuisance fauna and dangerous fauna. A total of 113 complaints regarding magpie attacks were received and 60 licences were issued. Seven dangerous magpies were destroyed.

Damage licences were issued after investigation, in response to complaints of fauna causing damage to property or primary production. See the following table.

Summary of Damage Licences Issued for 1990/91

	No of Licences Issued	Total No. of Each Species Authorised to be Taken
<i>Waterfowl</i>		
Black Duck	1	5
Magpie Geese	1	30
Mountain Duck	10	155
Swamp Hen	1	Scare Only
Wood Duck	40	945
<i>Avian Fauna Other Than Waterfowl & Emus</i>		
Coot	1	Scare or relocate
Raven	5	32
Fork-tailed Kite	1	1
Galah	7	570
Little Corella	23	805
Long-billed Corella	1	15
Port Lincoln Parrot	27	1,685
Red-capped Parrot	8	170
Silver Gull	1	50
Regent Parrot	2	80
Wedge-tailed Eagle	1	1
Welcome Swallow	6	Scare; remove nests
Western Rosella	7	110
White-tailed Black Cockatoo	3	30
<i>Emus</i>	22	1,180
<i>Seals</i>		
Australian Sea-lion	9	Scare Only
<i>Mammals</i> <i>(other than seals and kangaroos)</i>		
Agile Wallaby	2	15
Black Flying Fox	1	25

The patrol vessel "Pseudorca" was used for overseeing the whale watching industry off the Perth metropolitan coast, investigating reports of unusual whales and seals and retrieving specimens, assisting in gathering research data on Australian Sea-lions and New Zealand Fur-seals, rescuing fauna entangled in fishing nets and debris, and patrolling the off-shore islands to protect populations of seabirds, sea-lions and other fauna. Assistance was provided to wildlife rehabilitation volunteers by releasing recovered seabirds well off-shore.

During the year there were four investigations of entangled animals, which involved two Humpback Whales entangled in ropes, one off Cervantes and another off Dongara, a Southern Right Whale entangled in rope in Princess Royal Harbour, Albany and a mature Leatherly Turtle entangled in a net in the Swan River.

In the north of the State, 28 reports of problem crocodiles were attended. One crocodile attack occurred on a couple boating in the Chamberlain River at El Questo Station. Eight troublesome crocodiles were captured from sites throughout the Kimberly and relocated. Two sightings of crocodiles in Pilbara waters were reported and investigated, however no animals were captured. Regular inspections of crocodile farms in Wyndham, Broome and Fremantle were undertaken to ensure compliance with licence conditions.

Involvement of Aborigines

CALM participated as a member of an interdepartmental committee looking at Aboriginal and conservation interests in the West Kimberley. The Gamali Committee also comprises members from AAPA, EPA, DAS, and the Gulingi Nangga Aboriginal Corporation, representing various Aboriginal language groups of the West Kimberley. The Committee discussed issues relating to existing and proposed conservation reserves and also Aboriginal reserves having nature conservation values. A comprehensive submission was prepared for consideration by Government concerning future vesting and management of the Buccaneer Archipelago.

Forty eight (48) hectares of the Badjaling Nature Reserve near Quairading, was excised and added to Reserve 20999 for the purpose of "Use and Benefit of Aborigines". CALM and the Badjaling Wanderers Aboriginal Association are to cooperate in the ongoing rehabilitation and management of the conservation values of the two reserves.

Community Involvement

The community involvement program is a major vehicle by which the Department can involve the community in its operations and in doing so develop a greater public awareness, understanding and support for CALM programs and objectives. Some 980 people are registered as volunteers.

Over 250 volunteers assisted CALM to save oil contaminated wildlife, particularly New Zealand Fur-seals as a result of the sinking of the Sanko Harvest. Their involvement was critical to the success of the emergency operation.

The Department initiated a Friends of the Herbarium to assist in collecting, identifying, mounting and databasing plants for the WA Herbarium. The Friends of the Herbarium have over 60 registered members.

Implementation of the Rare Flora Volunteer Program: Forty volunteers throughout the South West Land Division have been assigned species of Declared Rare Flora and report regularly on their status, health and distribution.

A number of volunteers have assisted in wildlife surveys and inventories. Two volunteers have made substantial contributions, one in the area of rare flora inventory and the other a weed and flora list for Millstream-Chichester National Park.

The Wildlife Carers, a group of over 100 volunteers who care for sick and injured fauna have forged closer links with the Department.

Volunteers also assisted in important wildlife research and management programs relating to marine turtles, macropods, Noisy Scrub Bird and the Numbat.

A small group of volunteers are assisting CALM Research Officers in the study of *Drupella* snail at Ningaloo Marine Park.

Despite having a relatively quiet year, whale rescue groups continued to provide a critical service to cetacean strandings throughout the State.

CALM received excellent cooperation and support throughout the fire season from rural volunteer fire brigades.

Public Affairs and Community Education

The Department's public relations and communications activities are designed to strengthen links between the Department and the public through community education, public input, community based initiatives and the distribution of information. The broad goal, in the Nature Conservation and Wildlife Management Program, is improved public awareness, understanding and support for CALM's nature conservation and wildlife management programs, services and policies, combined with wider public cooperation in the prevention and solution of nature conservation and wildlife management problems.

Many of these activities cross program boundaries - between the Nature Conservation and Wildlife Management Program, the Forest Resources Management Program, and the Recreation Management Program - in the true spirit of the integrated management philosophy that underpins the operation of CALM. For example, four issues of *Landscape*, WA's conservation, forests and wildlife magazine, were prepared for sale by subscription and through newsagencies to households, schools and businesses throughout Western Australia. During the year, improvements to the design and presentation of the magazine were made, and the number of subscribers increased to the point where *Landscape* was fully supported by its subscribers.

During 1990-91, other public affairs and community education activities integrating CALM's three major programs included the preparation and release of more than 110 news releases and information bulletins. Ninety three new publications aimed at a general audience were put into production, a number of popular publications were reprinted, and some 42 technical/research orientated publications were produced (see Appendix 14).

Northwest Bound, a guide to the natural environment and significant places of northern Western Australia, and the third release in CALM's best selling series of nature guide books, was launched in August. Available from major bookstores or direct from CALM, it is selling well.

A significantly increased sales volume was posted by CALM's saleable publications program during the year.

CALM News, the Department's monthly newspaper was distributed to a State-wide media and interest group audience, resulting in improved awareness of departmental activities in all program areas.

Displays and other promotions were mounted throughout the State to celebrate such events as Arbor Day, Environment Day, Sea Week, WA's Wildflower Festival, Save the Bush Week, Children's Week, and a variety of local community festivals. Almost 8,000 primary school students from over 150 schools throughout the State entered a CALM sponsored Arbor Day poster competition concerning the importance of trees in our lives.

CALM coordinated the State's multi-media presentation to the IUCN Congress in Perth in November. The presentation outlined significant conservation issues in Western Australia and how they are being dealt with, and drew an enthusiastic response from the more than 1,000 international delegates

to the Congress. In addition, a static display presented IUCN delegates with an understanding of CALM's approach to integrated management.

Public Affairs and community education activities relating primarily to the Nature Conservation and Wildlife Management Program included the following:

The first phase of a broad based community education and information program concerning the nature of dieback disease and what people can do to restrict its spread, was prepared. A cooperative public awareness campaign on this subject with Rotary International District 946 was begun.

A public awareness program concerning dolphins and whales that strand, and what can be done, was prepared and launched.

Two saleable publications on nature conservation were released during the year. Leaf and Branch, a definitive guide to Perth's trees and tall shrubs, was launched in September, and a comprehensive illustrated catalogue of important Kimberley ecosystems and scenic areas, entitled Nature Conservation Reserves in the Kimberley, was launched in March. The latter publication provides a blueprint for establishing several new national parks, nature reserves, and marine parks and reserves.

School activities included the Earth Caretakers program for 10-12 year olds, Earth Education workshops, participation in the Environment 2000 schools resource package prepared by WA Newspapers, and in the Greening Australia resource package, and involvement in the Enviro-Link information service coordinated by Perth Zoo. Continued support was provided to teachers and school groups by talks and resource materials.

Interpretative displays and brochures were supplied for Lake Dumbleyung, Sandford Rock and Two Peoples Bay Nature Reserve. At Totadgin Rock Nature Reserve, picnic areas were upgraded and a 600 metre interpretative walk trail has been sited. Degraded areas and disused roads were rehabilitated.

Development of the education role conducted by Wildlife Officers is continuing. Planned lectures to school students, wildlife interest groups and other community groups were presented. Resources to enable more effective presentation of lectures and talks are being acquired as funds permit. Talks are very popular, with staff unable to meet the demand. In addition, Wildlife Officers appeared on popular day-time television programs discussing wildlife topics of interest and represented the Department in regard to news media interest in a wide range of wildlife matters.

Scientific Publications

During 1990/91 64 papers were approved. In addition, 113 papers and reports were published by Research Division staff during the year. Most of these appeared in journals published by organizations independent of CALM; this helps ensure that the research done receives national and international exposure, thereby maintaining the high scientific profile enjoyed by CALM.

For details of publications see Appendix 14.

Vegetation Management On Non-CALM Lands

The Department received two grants under the Save the Bush Remnant Native Vegetation Program 1990/91. These were \$15,000 to the South Coast Region to undertake a study into river corridors, and \$7,969 to the Kimberley Region to fence off rainforest remnants on the Mitchell Plateau.

In addition, the Wheatbelt Region received a grant of \$49,000 under the strategic category of the Save the Bush Program for the production of a guide for landowners to manage remnant native vegetation on farms.

Departmental staff again carried out the assessment of nominations for grants from the Western Australian Government's Vegetation Protection Scheme. The initial 3-year period of the scheme is now complete. There has been a very positive response from private landholders to the scheme. During the 1990/91 round 174 heritage agreements were formalized and 6421 hectares of remnant vegetation on private land were fenced with assistance provided under this scheme. It has proved very effective in providing protection for remnant vegetation and associated nature conservation, soil conservation and aesthetic values.

The Roadside Vegetation Conservation Committee is responsible for liaison with the Main Roads Department and Local Authorities and to provide technical advice to these bodies relating to management of road verges to protect natural vegetation as much as possible. Vegetated road verges provide useful corridors for flora and fauna between conservation reserves and other remnant vegetation. The Annual Report of the Committee follows this CALM report.

Vegetation and Tree Planting Advisory Service

A new specialist section was created to increase assistance to the rural community to retain and restore tree and shrub cover in rural areas. The section, called the Vegetation and Tree Planting Advisory Service, aims to develop the full range of nature conservation, landcare and economic benefits that could be gained from better management of remnant vegetation and new tree planting.

A primary task of the Service relates to establishment of eucalypt pulpwood as a farm crop, thereby providing economic incentive for soil conservation and other aspects of farm environmental management (see also Forest Resources Program, Timberbelt Sharefarms). In addition, the Service has assumed responsibility for the Department's rural advisory function and provides technical advice to farmers and other private landholders on revegetation with non-commercial native species and management of remnant vegetation.

In June a Workshop on "Improving Vegetation Cover in Rural South-western Australia" was conducted by Research Division, attended by 60 staff. The aim of the workshop was to bring operations and specialist staff up to date with the philosophy, problems and achievements in this important field.

Performance Evaluation

Program Objective: To conserve the indigenous plant and animal species and environmental processes in natural habitats throughout the State.

Indicator:

The extent to which the survival of endangered species is assured.

Measures:

The endangered species program comprises gazettal of threatened species, research on the causes of their condition, and the development and implementation of species "recovery plans" or management programs. It would be desirable to have a recovery plan for every threatened species but this is an impossible goal because there are so many. Interim management prescriptions are being developed for all the species in districts or regions as a group as well as individually for a few in dire danger of extinction.

In addition to the gazetted species there are many which are categorized as 'priority' species which the Department attempts to monitor in case their status in the wild deteriorates to the 'threatened' category. The total number of threatened and priority plants in the state is 1513.

Number of gazetted animals - 110 threatened plus 15 specially protected;

Number of gazetted plants - 260 threatened plus 53 presumed extinct.

	Completed previously	Completed 1990/91	In prep
Number of management programs for threatened plants	1	-	5
Number of management programs for threatened animals	1	2	6
Regional or district management programs for threatened plants	NFR	-	Metro Moora Merredin

Indicator:

The extent to which ecosystems are protected from the adverse impacts of fire, disease, noxious weeds, feral animals and mining.

Measure:

It is not possible to quantify this indicator. Remedial action is taken as problems in planning and field operations are discovered.

Mining

Mining tenements of public land managed by CALM and referred under section 24 of the Mining Act for the year ending 30 June, 1991.

	Processed		Pending	
	Exploration Prospecting	Mining	Exploration Prospecting	Mining
National Parks & Nature Reserves	12		52	16
State forest	12	14	24	32
Goldfields Timber Reserves			34	8
Totals	38			166

Fire

Prescribed burns over 355,240 ha of public land managed by CALM were completed, in order to protect plants and animals from occasional severe damage by wildfire.

465 wildfires were attended by Departmental fire-fighting forces. Most of these were successfully suppressed but 486,003 ha of national park and 396,859 ha of nature reserve was burnt by wildfire.

Disease

Strict hygiene conditions are imposed on operations on dieback-free forests and are being imposed on other reserved lands considered to be at risk of die-back infection. The dieback policy was revised.

Feral animal control

Over 48,500 poison baits were prepared and deployed in the fox control program, mainly in the Wheatbelt Region.

Noxious weed control

Weed control programs continued on land managed by CALM as resources permitted.

Planning and Research Objective: To provide the planning and research necessary to achieve the wildlife management objective, giving priority to those areas or species in greatest need of conservation, protection or rehabilitation.

Indicator:

The extent to which the biology and management requirements of native species are understood.

Measure:

It is not yet possible to quantify this indicator. However, the Department has nine internal research programs working towards achievement of this objective. They are the Biogeography, Fauna Conservation, Fire, Flora Collections, Flora Conservation, Flora Information, Plant Diseases (part; includes dieback), Research Techniques (part), Wetlands and Water Birds Research Programs. CALM also has good liaison with external research organisations engaged in the same fields.

Emphasis is placed on converting research findings into management techniques, ensuring that current research is relevant to conservation and land management priorities, and that research knowledge is disseminated. To this end targets for the coming year are set and achievements for the closing year are recorded for every project in each of the research programs enumerated above. These details are published annually in the Research Plan.

In 1990-91, 50 scientific papers were approved for publication and 16 seminars were organised and presented (seminars are open to all CALM staff, tertiary institutions, other research organisations and interested members of the public).

Indicator:

The extent to which management plans exist and are implemented for nature conservation.

Measure:

Two area management plans were completed and approved for implementation by the Hon Minister during the year, three others were released for public input.

Implementation of nature conservation strategies from 17 other approved management plans continued. Twenty-four plans are in preparation.

Management Objective: To manage wildlife in a manner consistent with research findings and the most effective use of available resources.

Indicator:

The extent to which illegal exploitation of native flora and fauna is eliminated.

Measure:

The elimination of illegal exploitation is unlikely to ever be realised. It is also difficult to quantify the extent of effectiveness because of the number of variables which have to be considered. For example, statistics quoting fewer apprehensions of wrong-doers do not necessarily mean resources are being more effectively used. These resources may have been

directed to perform functions in other areas less likely to produce apprehensions, and the level of illegal exploitation may be just as bad as it was previously. It may even have worsened in the absence of a visible deterrent.

Total offences reported	215
Convictions	23
Dismissals	-
Letters of warning	60
No. further action	24
Prosecution pending	108
Fines 1990/91	\$31,600.00
Costs 1990/91	\$1,194.40

1990/91 Reported offences

Indicator:

The extent to which the status of exploited resources is managed within desired conservation parameters.

Measures:

Kangaroos

Management of the three large kangaroo species involves monitoring population numbers and culling those where there is damage to rangelands or agricultural property. The Kangaroo Management Program, which receives Commonwealth approval, sets quotas for the numbers of animals which may be taken.

Species	1990 Census	1990 Quota	1990 Harvest
Red Kangaroo	2,178,000	290,000	224,000
Grey Kangaroo	1,070,000	45,000	37,000
Euro	-	10,000	5,000

Emu farming

The number of licensed farms increased from 17 to 24. The total emu farm stock at December 1990 was approximately 12,000 birds. Monitoring of the industry ensured that emu farm stock originated from captive sources.

Crocodile farming

The number of licensed farms increased from 1 to 3. A survey was conducted of the Saltwater Crocodile population in the West Arm river systems of Cambridge Gulf and capture of wild animals for farm purposes was regulated.

Wildflower picking

The licence fee for picking native flora on Crown land increased from \$5 to \$100 and the number of licences decreased from 1387 to 578. Activities of the pickers were subject to supervision.

Indicator:

The extent to which public awareness, understanding and support for wildlife management and nature conservation programs, services and policies have been developed.

Measure:

The Department's activities in this field include publications, lectures and guided nature walks, liaison through advisory and consultative committees, and public workshops. An example of the recent increase in such activities is whale-watching. The number of vessels licensed for this activity increased from 18 in 1989/90 to 26 in 1990/91 (Perth 19; Albany 3; Denham 3; Jurien 1).

Dieback public awareness campaign, which included a cooperative public education project with District 946 of Rotary International, plus public displays, media activities and publications, was developed and launched.

Communication programs concerning reintroduction of the endangered Sticknest Rat to WA, the reintroduction of endangered mammals to the Gibson Desert, and the protection of native fauna on Barrow Island were prepared and implemented.

School and community-based education activities and displays were conducted concerning endangered wildlife, saving native bush, World Environment Day, and the life and management of saltwater and freshwater crocodiles.

More than 100 reports, articles and brochures aimed at a general audience and dealing with wildlife protection and nature conservation were produced - see appendix 14.

RECREATION MANAGEMENT PROGRAM

Objective: To facilitate the public enjoyment of the natural attributes of public lands and reserved waters in a manner that does not compromise conservation and other management objectives.

Program Description: This Program includes responsibility for recreation planning and management on all lands and waters entrusted to CALM; training of Aboriginal people to assist with management of parks; providing recreation opportunities on CALM lands and waters; and providing public education and information programs to increase community understanding and support for nature conservation and natural land management.

Operating Expenditure

\$14 535 032

Planning and Research

Objective: To investigate the value of future demands for recreation, determine priorities for development and the extent to which recreation may compromise conservation or other management objectives.

Description: This Sub Program includes responsibility for recreation planning and of all lands and waters entrusted to CALM; providing public education and information programs to increase community understanding and support for nature conservation and natural land management; and research into recreation use by visitors to the CALM estate.

Operating Expenditure

\$2 744 586

Management Plans Under Part V of the CALM Act

The great majority of plans completed and in preparation involve national parks, recreation reserves and marine parks, all of which include recreation as a major component.

A final management plan for Lane Poole Reserve was completed and released by the Minister for the Environment in December 1990. The Reserve presents numerous opportunities for river and forest based recreation; including canoeing, swimming, marroning, fishing, picnicking, bushwalking, painting, nature study and vehicle based sightseeing. The plan and a summary of public submissions are available from CALM offices.

The Fitzgerald River National Park (FRNP) management plan will be released by the Hon Minister for the Environment in July 1991. The key issues identified in the planning process were dieback, fire and recreation. An Advisory Committee assisted in all stages of the plan's preparation resulting in 'local ownership' of the plan.

A range of recreational opportunities based on natural settings are provided in the park including sightseeing, bushwalking, swimming, camping, fishing and nature study. The future use of the park was considered within the constraints imposed by dieback disease risk. A range of access is provided, including for 2WD and 4WD vehicles, and backpackers. The plan provides for 100 percent increase in camping facilities over the next 10 years. Eventually there will be capacity for about 80 groups over 18 sites.

Marmion Marine Park draft management plan was release for public submissions in October 1990 and 22 submissions were received. The Marine Park is a popular destination for fishing, SCUBA diving, snorkelling and surface water sports such as sailing and windsurfing. A management zoning scheme proposes areas for recreational and commercial fishing which will be managed on a sustainable basis. There is also a range of education and interpretation opportunities, including whale watching. All activities will be managed in liaison with the Fisheries Department, the Department of Marine and Harbours and Local Government Authorities. Encouraging the development of conservation ethics in users will be an important component of management.

The management plan for Purnululu (Bungle Bungle) National Park is being finalised. Apart from the major destinations of Echidna Chasm and Piccaninny Gorge, further recreational opportunities may include interpretation of woodlands and grasslands, and parts of the Conservation Reserve. Aboriginal custodians will be given the opportunity to operate compatible commercial ventures, including the interpretation of culture and landscape. Monitoring of visitor and management impact on the Park will play an important role in implementation of the plan.

The draft management plan for Shoalwater Islands was released for public submissions in November 1990 and about 50 submissions were received. Proposals for the Penguin Island recreation reserve include boardwalks, penguin viewing facilities, interpretation facilities, new toilets and realigned walk tracks and lookouts. The plan proposes to promote recreational experiences on Penguin Island, based on an appreciation of the natural resource, which enhance the visitors' enjoyment, and which are of a passive nature. Penguin Island is a destination for overseas and interstate tourists. The Island's diversity of natural resources has education value which is enhanced by its proximity to the population of the metropolitan region.

Responses to the Walpole-Nornalup National Park draft management plan have been analysed and a final management plan is near completion. Proposals to progressively redesign most of the existing recreation sites and expand recreational opportunities within the Park were supported by the public.

The West Cape Howe National Park draft management plan is nearing completion. Park values include extremely popular recreational fishing areas, and sites rated among the best in Australia for rock climbing and hang-gliding.

Plans for the Department's South Coast Region (final) and Goldfields Region (draft) are close to completion, as is the plan for the Leschenault Peninsula.

A draft management plan is being prepared for John Forrest National Park. The Park is valued by visitors for its attractive natural environment and associated peaceful qualities. A goal of the plan is to maintain these natural qualities.

The new draft management plan currently in preparation recognises the outstanding recreational values of Karijini (Hamersley Range) National Park, including the very popular gorges. The opportunities for recreating in less well known areas are also recognised. These include, for example, visiting Sliding Mountain, Mount Meharry and Mount Bruce, the highest peaks in the State. Further opportunities will derive from arrangements with Aboriginal people to engage in compatible commercial ventures, including interpretation of culture and landscape.

A draft management plan for Matilda Bay Reserve was initiated in March 1991. Issues such as recreational opportunities, parking and appreciation of the values of the reserve will be addressed in the plan. It is expected that it will be released for public comment later in 1991.

Plans commenced within the year include those for the:

- Stirling Range National Park
- Porongurup National Park
- Monkey Mia Reserve
- Shark Bay Marine Park
- Serpentine National Park

Monitoring of Visitor Use

The program for monitoring visitor use of CALM lands continued. This program, designated as the Visitor Information Statistics (VISTAT), included more than 80 traffic counter devices operating in 23 parks, 15 reserves and 9 forest areas throughout the State. Data was centrally processed and summarised using microcomputers. Visitor surveys and observation studies were also carried out as part of this program.

Comment card surveys to ascertain the level of visitor satisfaction were carried out in the John Forrest and Leeuwin-Naturaliste National Parks. Ninety-nine and one hundred percent of respondents for the two parks respectively, greatly enjoyed their visit. Further surveys of this type are planned for other national parks, forests and reserves.

There were a total of 3,637,000 recorded visits for the 47 parks, reserves and forests monitored during last year. Combined with other observations, the estimate for visits to all CALM managed areas is 4,500,000.

As data builds up, trends and growth will emerge and detailed reports for each park, reserve and forest will be made available.

Other Planning

The policy statement on Recreation, Tourism and Visitor Services was completed and distributed. Part I dealing with issues related to all categories of land managed, was revised, and Part II dealing with specific activities, was finalised after extensive consultation and approved by the Hon Minister, the National Parks and Nature Conservation Authority and Lands and Forest Commission.

In addition to the preparation of management plans under Part V of the CALM Act, other levels of management planning are pursued by the Department.

A draft recreation framework plan for the Northern Forest Region has been advanced and is to be assessed in relation to future regional park management.

Planning has commenced for the redevelopment and rehabilitation of Langford Park, the site of the first Jarrahdale bauxite mine, within State forest.

Site plans were prepared for the Boyinaboat dive trail and Little Island snorkel trail, both in the Marmion Marine Park.

Interim guidelines are prepared for national parks without management plans, based upon necessary operations specified in the CALM Act. The fire protection components of interim guidelines for the Waychinicup and William Bay National Parks have been prepared. Draft interim guidelines have been completed for the Eucla National Park.

A draft recreation development plan has been prepared for the Goldfields Region.

An information plan for the Kalbarri National Park has been completed, detailing the level of information required by visitors to the park.

In association with other Government agencies and other bodies, CALM has produced a visitors' guide for the Abrolhos Islands.

In a joint arrangement with the Department of Land Administration maps for tourism are being prepared which provide details of recreation opportunities available on CALM managed areas.

Recreation Facilities Planning

West Cape Howe National Park management plan: Landscape, recreation and visual resource management input was provided for the plan. Recreation facility master plans were also prepared for Cosy Corner.

Sites were selected for the Norseman and Kimberley gateways, which will provide interstate visitors with information on Western Australia's parks, forests and reserves.

Matilda Bay Reserve management plan: Proposed management zoning and recreation development concept plans were prepared for inclusion in the draft management plan.

Walyunga National Park: Plans were prepared for a new interpretative trail system within the park.

Garden Island: Plans were prepared for a flight of steps and a lookout at Gilbert Point Beach. The degraded access point is to be rehabilitated.

Langford Park: Zoning and recreation concept plans were prepared for the rehabilitation of the original Jarrahdale bauxite minesite within State forest. Detail plans are to be prepared for works to commence in late 1991.

Yanchep National Park: A site development plan was prepared outlining the development of roads and parking, pedestrian access and interpretative trails, buildings and recreation facilities in the McNess recreation area. A new access road was designed and the contract let. Works are scheduled to commence in July 1991.

Cape Range National Park: Plans were finalised for the development of Yardie Creek recreation area which provide relocated access and parking, improved picnic facilities and the rehabilitation of degraded areas.

Marrinup POW Camp: A design for a new entry structure to this historic site was prepared.

Shelter design and contract preparation: Design specifications and bills of quantities for various information shelters throughout the State were prepared along with contract documents.

Donation and fee collection pillars: A standard design for a donation and fee collection unit was prepared. A contract was let for the initial supply of 20 units and these were subsequently installed in various locations around the State.

Boardwalk for Leschenault Peninsula: Plans and construction drawings were provided for a boardwalk.

Karijini (Hamersley Range) National Park: A master development plan for the construction of a major new campground at Fortescue Falls was completed and construction of this facility is currently underway.

Leeuwin-Naturaliste National Park: The access road to Ellensbrook Homestead was realigned and resurfaced and a major new toilet block constructed. Access and parking facilities at Cape Naturaliste and Redgate were also upgraded.

Visual Resource Management

Visual resource management studies for the John Forrest and Walpole-Nornalup National Park management plans were prepared.

Aboriginal Policy and Programs

A research program was undertaken to investigate and document the human and natural values of the Buccaneer Archipelago located at the north end of King Sound, Kimberley Region. This document records the various groups having interests in this area and relates these interests to the known nature conservation values. The most obvious interest group in the Buccaneer Archipelago are the local Aboriginal people who have a long tradition of use of the islands and waters. More recent patterns of use have been established by non-Aborigines pursuing recreational and commercial activities in the area.

A report was produced on Aboriginal activities and conservation in the South West of Western Australia. The major activities involved are hunting, gathering and camping with particular enjoyment for family group excursions which combine social and cultural interests. Approximately 117 people were interviewed to gather the information for this report. These people came from a total of 18 different towns and their activities ranged over about 33 conservation reserves.

Negotiations commenced in the West Kimberley regarding the development of a new Aboriginal ranger training initiative to be based in the Devonian Reef parks; the Geikie Gorge, Windjana and Tunnel Creek National Parks. CALM's training officer escorted a group of Aboriginal people to the Karijini (Hamersley Range) National Park to meet Aboriginal rangers there and discuss park management issues.

A report was prepared for publication summarising CALM's programs involving Aborigines. This report is intended to raise public awareness and support for CALM's initiatives in the area of Aboriginal involvement in conservation management.

An agreement was reached between the Burringurrah Aboriginal Community and CALM to provide cultural information on the Mount Augustus National Park. The agreement will also assist in the development of recreation facilities. A significant amount of heritage and cultural information has been obtained from the traditional custodians.

Management

Objective: To facilitate public enjoyment on land entrusted to CALM in a manner consistent with maintenance and restoration of the natural environment, protection of indigenous flora and fauna, preservation of features of special interest and cost effective use of resources including facilities for revenue collection.

Description: This Sub Program includes responsibility for the management of national parks; training of Aboriginal people to assist with the management of parks; and providing recreation opportunities on CALM lands and waters.

Operating Expenditure

\$11 790 446

An ongoing program of progressively improving and/or rehabilitating existing recreation areas and updating visitor information facilities was carried out in a number of national parks throughout the State. At the same time, several new areas and facilities were constructed in those parks with an approved management plan. The impetus for much of this work has come from a Parks Improvement Program funded through a \$5 million capital works grant spread over a three year period. 1990-91 is the third year of the program during which \$1 041 916 was spent. Works commenced and/or completed during the year follow.

Implementation of the Yanchep National Park management plan was commenced. The contract for the realignment of Entrance Road under a Main Roads Department grant, has been let. Restoration of McNess House and its conversion into an information centre for the park are underway. Much of the structure is being rebuilt, and the foundations re-grouted, as part of the restoration process.

Action and works have been undertaken to implement the recommendations of the Ningaloo Marine Park and the Cape Range National Park. In particular, sanctuary areas, general use areas and recreational areas under section 62 of the CALM Act, have been gazetted. These classified areas or management zones determine what pursuits can be conducted in these areas. Signs indicating the management zones have been installed. Major works undertaken in accord with the Cape Range National Park management plan include sealing of a portion of the Yardie Creek Road and redevelopment of the Yardie Creek area.

Improvements were also carried out in the D'Entrecasteaux and Shannon National Parks in accord with the management plan, including a picnic and camping site at Lake Jasper and the Donnelly boat landing.

Progress has continued with implementing recommendations of the Shark Bay Region Plan prepared jointly by the Department of Planning and Urban Development and CALM. This has involved ongoing consultation with the communities and private industries of Shark Bay and Carnarvon. See also Key Issues.

Gooralong recreation areas within the Serpentine National Park: New access roads were completed for the Gooralong recreation area. A group camping area was established and the existing toilet block re-roofed and upgraded. A new toilet block was constructed in the upgraded camping area.

John Forrest National Park: The main car parking area was upgraded, together with reshaping and revegetation, drainage control, traffic control and landscaping. Concept plans were developed for additional picnic areas for disabled visitors. Two new style picnic tables, designed to cater for disabled visitors, were constructed and erected.

Jurien Bay: Plans, construction details, fabrication notes and a bill of quantities were prepared for an information display shelter at Jurien Bay for CALM reserves in the area. This facility has subsequently been erected.

A two volume field guide containing design and construction standards for recreation facilities has been produced. The booklet is intended for use by the Department's field officers, rangers, recreation specialists and construction crews.

Two in-service training courses on recreation, planning and management and a design workshop were conducted during the year. Site supervision was provided for the recreation component of the Department's cadets' syllabus, with redevelopment of the recreation facilities at Sharp Point in Torndirrup National Park included as a project.

Other projects commenced and/or completed are:

Windjana Gorge and Tunnel Creek National Parks - visitor facilities.

Geikie Gorge National Park - information display shelter, day use facilities and an entry booth.

Purnululu (Bungle Bungle) National Park - construction of an airstrip, further works on the park headquarters and the provision of eight toilets.

Millstream National Park - construction of ablutions, an upgrade of equipment in the visitor centre, and new access arrangements.

Karijini (Hamersley Range) National Park - improvements to the Fortescue camping area and gorge lookouts.

Kalbarri National Park - development of walk trails at the Loop and Z Bend, information shelters and displays.

Nambung National Park - information displays and commencement of work on a new park entry and partial realignment of the Pinnacles Desert access road.

Avon Valley National Park - replacement of signs and provision of toilets.

Walyunga National Park - further improvements to the Walyunga Pool carpark day use area and provision of new signs.

Yalgorup National Park - provision of new toilets at Martin's Tank.

Lane Poole Reserve - construction of toilet block and completion of walk trail at Ellensbrook.

Walpole-Nornalup National Park - power improvements and signs.

Warren National Park - relocation of lookout.

Torndirrup and Cape Le Grand National Parks - path reconstruction and repairs.

Stirling Range National Park - Bluff Knoll path reconstruction and provision of interpretative information.

Matilda Bay Reserve - toilet design and replacement and construction of information gazebo.

Penguin Island Reserve - replacement of toilets, building demolition and construction of boardwalk.

As well, arrangements are being made for use of the Wellington Dam and environs for recreation use once the Harris River Dam is fully functional.

In the Dryandra forest interpretative facilities have been completed for the Ochre Trail.

At Scotsdale Creek, a walktrail and bridge were completed and the Fernlook Falls recreation site was redeveloped. Both sites are on State forest.

Four wheel drive tracks in the Walpole-Nornalup National Park were rehabilitated and upgraded and basic toilets provided at Crystal Springs and Mt Frankland.

The picnic and camping site at Lake Jasper within the D'Entrecasteaux National Park was completed.

Fishing platforms, shelters and a trail for disabled visitors have been constructed at Big Brook Dam in State forest outside Pemberton.

Paths were constructed or upgraded at Sharp Point, Torndirrup National Park and Greens Pool, William Bay National Park.

New gas barbecues were provided at recreation locations within the Fitzgerald River National Park and Nambung National Park.

A substantial program of improving road access to the Department's recreation areas and sites has also been carried out.

Fire Management

Detection of fires in or near to recreational sites within and adjoining forest areas and national parks between Denmark and Moore River was provided by the departmental aerial/tower detection network. Areas remote from this surveillance system relied on neighbours, the general public, the aviation industries and CALM patrols to report fires.

Fire weather forecasts provided through the departmental contract agency cover national parks and recreation land located within and adjoining forest areas. Recreation estate remote from forest areas was covered by the Statewide fire weather forecasts provided by the Bureau of Meteorology.

The Department uses fire as a management tool in part to provide wildlife habitat and reduce fuels within strategically located areas for the protection of conservation, recreation and community values on or near CALM lands.

A total of 77,719 hectares of national park lands were prescribed burned throughout the State in 1990-91. Prescribed burning on other land managed by CALM, such as State forest also provides protection to recreational facilities and landscape values.

Approximately 486,003 hectares in national parks were burned as a result of wildfires. Appendix 11 provides details of the numbers, areas, categories of CALM land and causes of wildfires.

Significant fires threatened recreational values during the year. In the Yanchep fire of 30 January 1991, approximately 1,260 hectares of the Yanchep National Park burnt as part of a 5,821 hectare fire that caused severe damage to community, recreation, conservation and timber values. This fire was contained by the combined efforts of volunteer bush fire fighters, WA Fire Brigades, CALM forces, SES, police and other support groups.

Two separate fires occurred on 19 December 1990 and 5 April 1991 in the Kalbarri National Park. These fires burnt out 48,500 hectares and 10,000 hectares of national parks and adjoining private lands respectively. The December 1990 fire posed a serious threat to the Kalbarri townsite.

Involvement of Aborigines

Aboriginal contractors have completed the installation of signs around the Mount Augustus National Park following a familiarisation of national park management.

Training in recreation management was provided for Aboriginal workers employed at the Millstream-Chichester National Park, under grants provided by the Australian National Parks and Wildlife Service.

Action has been taken to protect sites of significance in Geikie Gorge and Windjana Gorge National Parks, following expressions of concern by traditional Aboriginal custodians. Interpretative material relating to Aboriginal culture is currently being cleared by traditional custodians prior to use in those parks.

CALM is negotiating with the Bunaba people from Fitzroy Crossing on a proposal to train Aboriginal rangers at Geikie Gorge and Windjana Gorge National Parks.

Career options and training for existing Aboriginal staff employed at the Department's Broome nursery are also under review.

Local Aboriginal traditional custodians have become increasingly involved with cultural matters in the Hidden Valley (Mirima) National Park.

Two Aboriginal rangers from Pumululu National Park completed post-secondary studies in national park management. They have been engaged in a training program combining a mix of practical work

experience based in the park, CALM in-service training courses and formal studies at Katherine Open College, NT. They are both now fully accredited rangers.

CALM's West Kimberley district has hosted work experience for students enrolled in an Associate Diploma Land Management course at Batchelor College in the Northern Territory. This contact will continue as the course progresses.

Community Involvement

An integral part of the community involvement program is the Department's two tier training structure. Training is provided for CALM staff in volunteer management and this is translated into training for all volunteers involved in CALM volunteer programs. The second introductory course on volunteer management attracted 30 participants.

The campground host program continued to provide an important service to park visitors. Public support for the volunteer program has been outstanding.

The Friends of Marmion Marine Park provide a weekend information and education service from the foyer of the Department's Hillarys office.

The Penguin Island volunteers also provide an information, education and interpretation service to visitors to Penguin Island.

A similar service is provided by small groups of volunteers at the Milyering visitors centre within the Cape Range National Park, and for the Canning River Regional Park.

Earth Carers are a group of volunteers who take earth education programs to schools. The group also assists in staffing interactive displays at shopping centres throughout the Perth metropolitan area.

Holiday interpretation programs implemented with volunteers for the first time last summer gained outstanding community support. They were implemented in Northern, Southern and Central Forest Regions.

Of 980 registered CALM volunteers, nearly 50 percent were engaged in recreation projects.

Public Affairs and Community Education

The Department's public relations and communications activities are designed to strengthen links between the Department and the public through community education, public input, community based initiatives and the distribution of information. The broad goal in the Recreation Management Program is improved public awareness, understanding and support for CALM's recreation management programs, services and policies, combined with wider public cooperation in the prevention and solution of recreation management problems.

Many public affairs and community activities cross program boundaries - between the Nature Conservation and Wildlife Management Program, the Forest Resources Management Program, and the Recreation Management Program - in the true spirit of the integrated management philosophy that underpins the operation of CALM. For a brief summary of these, see "Public Affairs and Community Education" in the Nature Conservation and Wildlife Management portion of this report.

Public affairs and community education activities relating primarily to the Recreation Management Program included the following:

Pre-visit information materials were prepared for a number of recreation and conservation areas including Yanchep, Hamersley Range, Nambung and Kalbarri National Parks, Marmion Marine Park, Houtman Abrolhos and Lane-Poole Reserve.

Interpretative displays and brochures were prepared for a large number of parks, reserves and forest areas including:

- . Cape Arid National Park
- . Fitzgerald River National Park
- . Stirling Range National Park
- . Porongurup National Park
- . Dryandra State Forest
- . Millstream-Chichester National Park
- . Purnululu National Park
- . Geikie Gorge National Park
- . Broome vine thicket
- . Karijini (Hamersley Range) National Park.

The preparation of display panels and audio visual material is nearing completion and soon to be installed in the Millstream homestead visitor centre. This project has been done in consultation with the local Yinjibandi people and previous station owners.

CALM continued to respond to requests and delivered numerous lectures and talks to educational and community groups.

A full list of publications produced during the year is provided as Appendix 14.

Offences

One person was prosecuted for a firearm offence in a national park and received a fine of \$100.

One person was prosecuted for unauthorised use of a vehicle on a reserve. The charge was dismissed.

Twenty people were sent warning letters for various offences in national parks.

Performance Evaluation

Program Objective: To facilitate the public enjoyment of the natural attributes of public lands and reserved waters in a manner which does not compromise conservation and other management objectives.

Indicator:

The extent to which public expectations of opportunity and experience are satisfied.

Measures:

Written feedback from the public is usually obtained following long weekends or Easter public holidays. In 1990-91 it has been expressed as 75% positive (satisfaction and congratulatory letters) and 25% negative (dissatisfaction letters) experiences: a significant proportion of the negative accounts incorrectly identify CALM as the managing agency for particular lands or waters.

Comments written on visitor books in camping and recreation sites indicate a high degree of satisfaction, as they are complimentary of CALM's provision of facilities and services and specific attention by Rangers.

Survey results from specific satisfaction surveys such as the "How are we going?" card, carried out in two national parks (John Forrest and Leeuwin Naturaliste) showed a high level of satisfaction from respondents - 99 and 100% respectively.

Indicator:

The extent to which public demand for nature based recreation opportunities is met through facilities and programs.

Measures:

Number of users: Based on recorded visitor use (VISTAT Program), total visits to CALM managed lands and waters in 1990-91 is estimated to be 4.5 million.

Number of facilities: There are over 200 developed recreation areas on CALM managed lands and waters state wide, providing a wide variety of visitor facilities including campgrounds, picnic areas, parking areas, toilets, walking paths, interpretive displays, underwater dive trails, etc.

Indicator:

The extent to which recreation resource values are maintained and protected.

Measures:

The protection of recreation resource values is a key objective of all CALM recreation management and area maintenance programs, which are conducted in every Region/District throughout the State (200 sites).

In 1990-91 redevelopment occurred at 34 sites/areas.

The management planning process (with mandatory public input) ensures there are not inappropriate uses. There are 13 approved area management plans with recreation as a major component. Two new plans were approved in 1990-91.

Planning and Research Objective: To investigate the value of future demands for recreation, determine priorities for development and the extent to which recreation may compromise conservation or other management objectives.

Indicator:

The extent to which future demands for nature based recreation and their priorities for development have been identified and assessed.

Measures:

Visitor and observation surveys were undertaken as part of the management planning process in five areas.

Counts of vehicle traffic were made at 76 sites.

Based on the VISTAT program the number of visitors to CALM managed lands and waters for 1990-91 is estimated as 4.5 million. As information is acquired over time, the trend is increasing visitation, eg. for Bungle Bungle (Purnululu) National Park, 43% and for Nambung 17%.

Management Objective: To facilitate public enjoyment on land entrusted to CALM in a manner consistent with maintenance and restoration of the natural environment, protection of indigenous flora and fauna, preservation of features of special interest and cost effective use of resources including facilities for revenue collection.

Indicator:

The extent to which the demand for nature based recreation opportunities is met by existing resources.

Measures:

Number of sites and facilities redeveloped/upgraded: 34 areas.

Level of activity in maintenance: over 200 separate recreation areas/facilities actively maintained.

Level of use sustained as recorded by VISTAT and other studies: 4.5 million visitor days of activity.

Indicator:

The extent to which additional resources have been acquired to sustain and manage recreational opportunities.

Measures:

Number of volunteers: Nearly 50% of the 980 registered CALM volunteers were involved for 11,000 hours in delivery of recreation services. These figures represent a substantial increase on the previous year. This is the first full year of operation of the Community Involvement Program. In future years a measure of growth will be possible.

Increase in revenue: Revenue from visitor and tour operator fees has increased from \$1.043 million to \$1.235 million in 1990-91.

New measures to obtain revenue: Fees for entry to parks were increased in November 1990; an additional gatekeeper was employed at Nambung National Park in April 1991, substantially increasing the revenue take; 20 donation boxes were designed and installed at scenic sites throughout the CALM managed estate; a self administered camping fee registration system was designed; regulations were developed and gazetted to provide for the collection of camping and entrance fees in marine parks, State forests and 5(g) reserves.

Level of funding support: Initiatives have been developed to increase external funding support. Funds were received for resource protection programs which incorporated provision for community recreation needs.

Indicator:

The extent to which there is public awareness, understanding and support for recreation programs, services and policies.

Measures:

The number of activity programs conducted - 17.

The number of interpretive displays installed - 18.

Numbers of visitors to specific and/or maintained activity programs - 5,175. As well, there were 23,996 people who joined the Geikie Gorge boat tour.

FOREST RESOURCES MANAGEMENT PROGRAM

Objective: To manage the forest designated for multiple use on a sustained yield basis, and to provide and regulate the supply of forest resources for the satisfaction of long term social and economic needs in a manner that minimises impact on other values and provides maximum returns to the State on assets employed.

Program Description: This Program includes responsibility for management of State hardwood forests for multiple use purposes, including protection from fire and disease; management and development of softwood plantations and hardwood sharefarming; management of sandalwood on crown land and the sandalwood industry; supply of log products to the timber industry from CALM lands; and planning, research and advice to Government on timber production in the State.

Operating Expenditure

\$72 409 583

Planning and Research

Objective: To forecast the most cost effective way of maintaining the native forest environment, to forecast optimal levels of sustainable production, and to indicate economically viable opportunities for improving forest utilisation and developing alternative forest resources.

Description: This Sub Program includes responsibility for planning, research and advice to Government on timber production in the State, including research in wood utilisation and value added processing of wood; and research into silviculture of native forests, diseases and predators.

Operating Expenditure

\$6 524 046

Management Plans

A final management plan for Lane Poole Reserve was completed. The recreation zone is being assessed for its current and potential recreation landscape values. Visually prominent areas are being delineated to protect water values and the aesthetic value of roadside vegetation. Appropriate management will be prescribed to rehabilitate fire degraded or dieback damaged jarrah stands.

The public submissions to the draft South Coast Regional Management Plan have been analysed and a revised plan prepared. This has been endorsed by the NPNCA and LFC and will be released as a final plan of management (with a summary of the public submissions) once signed by the Minister.

Forest Inventory

The Jarrah Forest Inventory Project is now 95 percent complete, and will be finalised 6 months ahead of schedule. During the year a total of 13 000 photos have been interpreted and measured. These cover 650 000 ha of the jarrah forest. A total of 1 400 ground plots were assessed, and a further 3 700 photo pairs were captured to complete the photography phase. Reassessment of timber values in those areas that have been cut-over since the project commenced is currently in progress. These updates will help to validate the accuracy of the data and allow testing of the techniques on a more intensive scale.

350 ha of private property were assessed as part of evaluation for potential land exchange.

84 pine plots were remeasured for resource estimates, silvicultural and site suitability studies.

525 plots were established and measured for monitoring early growth of *E. globulus* plantations as part of hardwood sharefarming schemes. These plots provide critical monitoring data for 5 790 ha of sharefarms. This represents about 70 percent of the current total program.

A computer program to allow local processing of early growth data for plantations and sharefarms is nearing completion for use by district staff responsible for managing these plantations. Aerial photos were used to determine pine stocking over 1 000 ha of pine plantations in the Sunklands.

2 150 ha of forest previously cut-over has been aerial-photographed to test the success of dieback hygiene measures included in logging operations.

Insect infestations of jarrah leafminer and gumleaf skeletonizer were routinely monitored and mapped by aerial surveillance aircraft.

Inventory Branch continued to support forest regional requirements in logging planning.

For the Northern Forest Region, two and five year logging plans for hardwood and softwood were created. The 15 year hardwood plan was reviewed but required no changes.

For the Central Forest Region, two year logging plans for hardwood and softwood operations were completed, whilst updating of medium term and long term plans has nearly been completed.

The two and four year hardwood logging plans for the Southern Forest Region were revised.

Information Systems

Significant development of computing programs and procedures to manage and analyse data collected for the Jarrah Inventory Project has been undertaken. The data has been integrated into the Department's database.

Continued maintenance and enhancement of the Forest Management Information System (FMIS) together with the input of additional map themes such as Churchward's South West Landforms has been achieved.

Support for resource management has continued with the preparation and maintenance of plantation maps, sharefarm agreements and associated area information.

Production of Disease Risk Maps for a total of 13,900 hectares have been completed.

Continental level coverage of forest type and land tenure within the three forest regions was assembled and provided to the National Forest Inventory Project.

Development of the Forest Operation and Control Information System (FOCIS) has continued. Modules of this system designed for processing area statements for plantations and sharefarming are now in use. Processing of sharefarm pre-signing details have also been completed. Work has commenced on integrating financial costing information with the new General Ledger and Accounts Payable modules of the Financial System.

Visual Resource Planning

Visual resource assessment studies were undertaken for planning of logging of pine plantations at Mungilup, Myalup, Ludlow, Folly, Harvey Weir and Murray Valley.

A visual resource inventory and classification program was commenced in the Central Forest and Northern Forest Regions.

The integration of visual resource management considerations with logging plans and silvicultural specifications has been achieved in a number of programs, including:

- Working Group on Integrated Logging Planning Strategy
- Forest Management Strategy Review
- Road, River and Stream Zone System Review
- Draft Jarrah and Karri Silviculture Specifications
- Pine Sharefarming Landscape Plans for private properties in Augusta-Margaret River areas

Community Education Planning

A draft Forests and Forestry Community Education Plan has been prepared.

Community education staff have provided support for the development of several forest resource education programs including the Hills Forest Program and the proposed Wellington Demonstration Forest Program.

Forest Inventory Research

A system of stratification of karri regrowth using aerial photography is in an advanced stage of development and likely to be operational before the end of 1991.

26 karri growth plots were remeasured on schedule as part of the contribution to the data base required for the development of a karri forest growth model.

Updating of the operational research model to test and compare alternative silvicultural strategies in pine plantations is underway.

An aerial photography technique was developed for site quality mapping in the Blackwood Valley pine plantations.

The Task Force on Logging Planning has prepared a draft manual to cover procedures for logging planning.

Entomology Research

Re-monitoring density of jarrah leafminer 18 months after an experimental autumn fire near Collie has shown that this type of fire is ineffective in reducing density for longer than 12 months.

In Collie and Manjimup Districts surveys of adjacent jarrah stands logged at different times showed that recent logging did not encourage the development of leafminer.

An extensive survey of gumleaf skeletonizer distribution in the central and southern forest revealed a patchy distribution of the insect.

The existence of two gumleaf skeletonizer populations in the South West and South Coast of Western Australia was verified. A univoltine (one generation per year) population is confined to the jarrah

forest, whereas a bivoltine (2 generations per year) population occurs in the Wheatbelt and isolated locations in the jarrah forest.

A further parasitoid of gumleaf skeletonizer has been identified as the Tachinid fly *Winthemia lateralis*.

The psyllid infesting Flat-topped Yate, formerly thought to be *Cardiaspina brunnea*, is now confirmed as a new species endemic to the Lower Great Southern.

Flat-topped Yate trees possibly resistant to *Cardiaspina* sp. n. have been located near Fitzgerald River National Park.

A considerable backlog of data on insect herbivory and abundance of foliage arthropods has been written up.

A paper on the composition, distribution and economic impact of the termite fauna of metropolitan Perth was published.

A computerised data base for the Manjimup insect collection was established.

Monitoring of caged billets of radiata pine from the Ferndale and Pinjar plantations has proven that only one species of the three biocontrol agents for *Ips grandicollis* has established. This species the Torymid wasp *Roptocerus zylophagorum*.

A concise synopsis of biological data for the 19 insect species so far recorded infesting trees in plantations was provided for CALM's insect manual.

An insect manual was developed to provide managers with ready access to the best available information on insect management and control. Effective procedures were developed for monitoring the movement and development of insect populations in plantations and forest areas.

Native Forest Silvicultural Research

The program was reviewed in April 1991 and increased emphasis has been placed on forest and woodland conservation, disturbance ecology and silvicultural systems.

Karri (*Eucalyptus diversicolor*) silvicultural and ecological knowledge was summarised for publication as the Karri Bulletin. This will complement the Jarrah Bulletin produced in 1986 by Abbott and Loneragan and the book "The Jarrah Forest" edited by Dell, Havel and Malajczuk. Karri growth and survival trials have been remeasured and new trials are being established to complete coverage of karri's natural range.

Three methods of measuring water use by forest trees (sap flux by automated heat pulse logging, leaf transpiration by meteorological and stomatal conductance measurements, soil water extraction by neutron probe) have been compared. Reliable measurement of tree water use will be of assistance in determining likelihood of water stress and efficiency of water use in both native forests and plantations. This is a major collaborative project involving CALM, CSIRO, Water Authority of WA and Alcoa.

The effects of firewood collection and of logging on the number of tree hollows suitable for faunal habitat were studied. Data collected are being analysed.

A survey of bushland remnants nominated for the Remnant Vegetation Protection Scheme was completed.

Demonstration trials (27 ha) for regeneration of brown mallet (*Eucalyptus astringens*) were initiated during the year. Furthermore, thinning trials for brown mallet were remeasured as part of the development of a logging plan for the management of brown mallet.

Sandalwood silviculture and plantation research projects were initiated as part of the Sandalwood Conservation and Regeneration Program (SCARP). These projects include:

- a plantation of Indian sandalwood in the Ord;
- 20 ha of trial plots in Narrogin and Katanning districts on cleared farmlands to assess the commercial value of sandalwood;
- fencing and seeding remnant sandalwood stands in the north-east section of the Wheatbelt;
- publication of sandalwood research papers including CALM Research Bulletin No. 4 "*Historical Review of Sandalwood Research in WA*".

Silvicultural, dieback and vegetation type surveys were completed on the Yarragil 9A experimental catchment.

Plantation Silviculture Research

Growth of *P. pinaster* on Bassendean and Spearwood sand dunes can be reliably predicted based on extensive silvicultural and tree breeding trials. Using this information and a management regime to optimise water production, growth rates using a variety of seed sources have been determined. An economic study showed that it is profitable to replant *P. pinaster* on Bassendean and Spearwood sites using the genetically improved seed now available.

Large scale *E. globulus* and *E. botryoides* provenance trails were established.

Forty experiments investigating *E. globulus* establishment were set up in the 1990 planting season. Measurement and data analysis were completed for 43 experiments currently in the ground. Research has resulted in the West Manjimup Plant Propagation Centre adopting the 64 Kwipot as the new seeding container. Recommendations about the timing of fertiliser application in relation to site, and benefits of continued weed control have been disseminated to operations staff.

Substantial progress was made in analysing and writing up improvement and thinning data for *Pinus pinaster*.

A system for selecting suitable sites for *E. globulus* plantings on cleared farmlands has been developed. This system also predicts growth and yield of the existing *E. globulus* forest.

During the development phase, over 6 000 individual trees were measured and environmental attributes measured in 75 forest plots.

The system has already been used resulting in the establishment of 600 permanent plots on sharefarms throughout the south west.

Wood Utilisation Research

Research into the VALWOOD process continued with assessment of different adhesives and of stability in panels under different environmental conditions. Timber from 9 year old Tasmanian bluegum was successfully converted into VALWOOD®, and other eucalypt species from the Eastern States are being assessed.

The CALM dryers were shown to have considerable commercial potential, and drying schedules for different species and thickness of timber were developed. Other drying research assessed ultrasonic methods for determining moisture content and treatment of timber before drying to increase the rate of drying. A major study of brown wood in karri includes identifying fungi which subsequently decay the wood and adversely affect the utilisation.

Research findings are being taken up by industry and put into commercial practice. Wood Utilisation staff delivered lectures to students in the TAFE Certificate in Timber Technology and to WA Forest Industries Training Committee trainees. Six WURC Reports and nine Technical Reports were published.

Forest Fire Management Research

Four experimental fires were conducted in unthinned stands of 22 year old *Pinus pinaster* to investigate the factors controlling crown fire initiation. This study was undertaken jointly with a visiting fire researcher from Forestry Canada. Preliminary results from the study indicate that fire intensity and crowning potential are considerably reduced by low pruning.

Research is ongoing to develop management systems which integrate fire behaviour, suppression, fire effects and relevant resource information for a range of forest types. This will provide information to determine appropriate fire regimes and prescriptions for inclusion in management plans.

Development of computer systems to support the management of wildfire suppression has continued. A Wildlife Fire Threat Analysis System has been developed and partially implemented. This facilitates allocation of diminishing resources to protecting the highest priority values on or near CALM lands on a rational basis. The full implementation of this system requires further (ongoing) Geographical Information System (GIS) development.

Joint investigations into the development of fuel moisture meters were undertaken with Curtin University.

Investigation and development of new fire suppression equipment and the evaluation of chemical fire retardants and foam is ongoing.

Forest Management

Objective: To manage native forests for the long term maintenance of each ecosystem, to develop and manage alternative sources of forest resource and to improve productivity and resource utilisation.

Description: This Sub Program includes responsibility for management of State hardwood forests, including protection from fire and disease and regeneration of cut over areas; management and development of softwood plantations and hardwood sharefarming; and management of sandalwood on crown land and the sandalwood industry.

Operating Expenditure

\$21 897 394

Clearing Operations in Native Forests

Areas of native forests are cleared to facilitate mining and the construction of public utilities (eg, reservoirs, power lines). Such areas are not regenerated immediately but where possible are rehabilitated later.

Clearing Operations	Northern Forest Region	Central Forest Region	Southern Forest Region	1990 Total ha	1989
Jarrah Forest cleared for					
- mining	310	110		420	520
- other	70			70	90

Regeneration Operations in Native Forests

Forests are harvested to provide log products identified in the Timber Strategy. Regeneration of these areas begins immediately after harvesting.

Karri forests are regenerated either by natural seed fall, sown with seed or replanted with nursery produced seedlings. In the case of the first method, regeneration is carried out in stages. This involves retaining a number of seed trees which are removed in a subsequent operation after seedlings have germinated. Karri regeneration operations are recorded as completed after a ground survey confirms the successful establishment of seedlings. During this period seed trees were removed from 1 070 ha of karri forest previously cut to seed trees.

Regeneration Operations	Northern Forest Region	Central Forest Region	Southern Forest Region	1990 Total ha	1989
Jarrah					
- selection cut and regenerated	2 570	6 710	3 190	12 470	14 520
Jarrah/Wandoo					
- selection cut and regenerated	100			100	200
Karri					
- regeneration commenced					
clear felled or cut to seed tree			1 560	1 560	1 510
- regeneration completed					
hand planted			810	810	680
sown with seed			20	20	30
natural seed fall			600	600	510

Tending Operations in Native Forests

Tending operations involving the removal of some components of a forest stand are carried out to improve the characteristics of an existing stand to increase the growth rate, or, in water catchments, to increase the water yield.

Tending operations are not carried out specifically to meet log supply commitments but may yield marketable material.

Tending Operations	Northern Forest Region	Central Forest Region	Southern Forest Region	1990 Total ha	1989
Jarrah					
- stand improvement	710	1 960	1 130	3 800	4 130
- F.I.R.S. *	2 400	230	-	2 630	510
Jarrah/Wandoo					
- stand improvement					780
Karri					
- thinned regrowth			340	340	910

Stand improvement involves thinning of regrowth forests, or if necessary, preparation of degraded sites for regeneration.

- * The Forest Improvement and Rehabilitation Scheme (FIRS), which is funded by Alcoa, aims to rehabilitate areas of jarrah forest adjacent to bauxite mining areas to increase the capacity of the land to support long term land uses and to minimise the effects of dieback.

Establishment and Tending of Pine Forests

At 31 December 1990 the areas of State owned pine forests were 39 861 ha of *Pinus radiata*, and 28 936 ha of *Pinus pinaster* and other species, totalling 68 797 ha. Of this 3 237 ha is radiata pine planted on private property under sharefarm agreements.

For the calendar year 1990 planting details were as follows:

	1990 (ha)	1989 * (ha)
<i>P. radiata</i>	1 137	1 622
<i>P. pinaster</i> and other species	-	92
Total	1 137	1 714

* Interim figures as reported in 1990 report. The actual areas after remapping and exclusion of failed areas are 1 546 ha radiata and 92 ha pinaster, totalling 1 638 ha.

AREA OF PINE PLANTED BY DISTRICTS 1990

District	New planting	RADIATA		TOTAL ha
			Planting of harvested areas	
Mundaring			17.5	17.5
Harvey			130.1	130.1
Collie	78.3			78.3
Kirup	108.0		36.5	144.5
Busselton	32.7		114.2	146.9
Nannup	54.2		64.3	118.5
Manjimup	203.3			203.3
Pemberton	48.1			48.1
Albany	250.0			250.0
Total	774.6		362.6	1137.2

The longer term trend in pine planting is shown in Appendix 3.

The following pine forest tending work was carried out:

Prior to Planting	- Clearing	929 ha
	Scrub Control	8 ha
	Ripping	913 ha
	Ploughing	197 ha
	Furrowlining/Mounding	998 ha
	Draining	215 ha
	Weed Control	1 064 ha
	Roading	2 km
Post Planting	- Weed control	912 ha
	Scrub control	1 572 ha
	Insect control	130 ha
	Wildling control	80 ha
	Fertilising	5 896 ha
	Low pruning	1 972 ha
	High pruning	1 932 ha
	Road maintenance	352 km
	Firebreak maintenance	511 km

The following areas of pine forests were thinned or clearfelled:

**PINE FOREST THINNING AND CLEARFELLING
1990/91**

Operation	Northern Forest Region	Central Forest Region	Southern Forest Region	Total ha
Thinned	852	1 675	53	2 580
Clearfelled:				
- mature stands		130	8	138
- Xmas trees	5	-	-	5
- damaged stands *	231	236	-	467

* Salvaged after wildfires.

Establishment and Tending of Hardwood Forests

During the winter of 1990 a total of 267 ha of *Eucalyptus globulus* were planted on private property under sharefarming agreements. This included some replanting of failed areas from previous plantings. The total area of *Eucalyptus globulus* at 31 December 1990 is 5 970 ha.

The following tending operations were carried out in *Eucalyptus globulus* plantations during 1990/91.

Operation	Area
Ripping	2 ha
Ploughing	64 ha
Furrowlining	21 ha
Mounding	64 ha
Draining	210 ha
Weed control	244 ha
Infill planting	8 ha
Fertilising	1 196 ha
Firebreak maintenance	1 km

Following is a summary of thinning and clearfelling of hardwood plantations for 1990/91.

Operation	Northern Forest Region	Wheatbelt Region	Total ha
Mixed Euc species * - thinned	227		227
Mallet - clearfelled		20	20
- thinned		210	210

* Established following bauxite mining.

Commercial Planting and Woodlots on Private Property

Private afforestation companies reported on the establishment of a further 2 223 ha of eucalypts (mainly *E. globulus*) and 468 ha of softwood plantation on private land during 1990. This is a 33% increase on 1989 plantings of eucalypts and a 20% decrease for softwood plantings in the private plantation category.

Records provided by owners to the Department show that as at 31 December 1990 the total area of private plantation in WA is 7 090 ha of eucalypt and 17 560 ha of softwood.

CALM carried out the following tending operations of *Eucalyptus globulus* plantation under contract to Bunnings Tree Farms.

Operation	Area
Furrowlining	125 ha
Mounding	5 ha
Grass control	146 ha

Timberbelt Sharefarms

During 1990 CALM continued its development of Timberbelt Sharefarming under a Commonwealth National Afforestation Program project. Timberbelt Sharefarming is designed to be a commercial tree cropping joint venture between investors, who provide the money, and farmers who provide the land and management input. An extra incentive is provided for the farmer by arranging the tree planting to also provide other benefits such as shade and shelter and the treatment of waterlogging and salinity. Some 10% of tree planting is on degraded land and/or with non commercial species.

Technical aspects of tree planting distribution and incorporation of tree planting into farm planning were carried out by CALM's Vegetation and Tree Planting Advisory Service (VATPAS). See also Wildlife Management Program, Vegetation Management on Non-CALM Lands.

About 820 ha of Timberbelts were planted on 70 sites from Albany to Pinjarra, mostly in the 600-900mm rainfall zone. Approximately 90 percent of the areas were planted with *Eucalyptus globulus*, whilst the remaining 10 percent were planted with salt-tolerant tree species.

Rehabilitation of Forests

During 1990/91 the following areas were rehabilitated to be compatible with the prescribed land use for the area. Private property rehabilitated under the Timberbelt Sharefarming Scheme is reported in the previous section and is not included in this table.

	Northern Forest Region	Central Forest Region	Southern Forest Region	Total ha
Bauxite Mining	255	164		419
Basic raw materials *1	16	14	7	37
Catchments		384		384
Other		31		31

*1 Includes gravel, sand, clay

Operational Planning and Control

Commercial harvesting of native forests is controlled using approved Silvicultural Prescriptions designed to ensure the forest meets long term wildlife, landscape and production needs. Integrated commercial harvesting is funded directly by log sales and aims at achieving all the Silvicultural Prescriptions. Areas which cannot be serviced wholly by integrated harvesting require a stand improvement operation.

Markets for small diameter thinnings from over crowded stands and other forest residues are being progressively developed so that separate stand improvement operations will no longer be required. This is already covered in the Stand Improvement Table.

The regeneration of cut-over stands and the thinning of intermediate stands are essential to achieve sustainable production.

All log harvesting activity is managed in accordance with a "Code of Logging Practice", "Manual of Logging Specifications", "Silvicultural Specifications" (for hardwood operations) and a "Pine Management Guide" (for softwood operations). Each document is regularly reviewed and updated to

ensure all harvesting activity is carried out in the most efficient and environmentally sensitive way possible. All harvesting is conducted by contractors employed directly by CALM.

A new Silvicultural Specification dealing with the use of fire as a silvicultural tool was introduced during the year and work commenced on a further specification, designed to integrate visual resource management principles with jarrah silviculture.

A recording system involving use of fire detection aircraft for photography of cut-over forest, silviculturally treated and other treatment areas has now become fully operational. This system provides for the integrity of mapped data and reduces the time required to maintain records.

The Hardwood Operations Control System (HOCS) and Pine Operations Control System (POCS) were maintained. The data bases for the Forest Management Information System (FMIS) and Geographic Information System (GIS) were increased during the year.

Dieback Management

Strict dieback hygiene measures were applied to all operations likely to result in soil disturbance or possible transfer of infected soil by machinery and vehicles.

27 800 ha of forest has been photographed from the air for subsequent dieback interpretation prior to logging operations.

23 200 ha of photographed hardwood forest was interpreted for dieback. Associated vegetation and hygiene maps were also produced for use by field staff in the control of dieback management during roading and logging operations.

An accredited training course to develop basic dieback interpretation skills in forest areas was developed and implemented for new interpreters, operations staff and Alcoa field managers.

Forest Fire Management

Technical advice and services are provided by the Fire Protection Branch. Fire management programs are implemented by regional and district staff.

Fire Emergency Plans detailing response and preparedness action were reviewed and approved for all forest districts and regions.

Detection

Nine aircraft were employed on fire surveillance over forest areas in the south west of the State, including nature conservation, national park and recreation land within and adjoining the forest estate.

The aircraft operated out of 6 bases flying 6 414 hours at a cost of \$107.53 per hour.

Four fire lookout towers were operational, while a further twenty towers were maintained in readiness to provide emergency back up to the aircraft.

The structural safety of lookout towers continues to be monitored. Vandalism still continues to be a very serious problem.

Two tree towers (Diamond and Boorara Trees) that are of significant importance to the State's tourist industry have been given a prolonged life. Both towers have been condemned for many years due to serious decay in the upper bole and support limbs, serious consideration having been given to felling the trees for public safety.

Following detailed measurements and calculations the entire cabin and upper timber structure of Diamond Tree tower was lowered to the ground and then replaced after a 3 metre decayed section was removed. A mobile crane with a four tonne capacity to lift at 60 metres height was hired to carry out the work.

In the case of Boorara Tree, the upper levels were found to be extensively decayed. The top 7 metres including the cabin were removed and placed upright in concrete near the base of the tree for the benefit of tourists to view from the ground.

Weather Forecasts

A comprehensive fire weather forecasting service was provided by a private meteorological company during the fire season at a cost of \$63,595.00. This service includes regular daily forecasts for forest areas including nature conservation and recreation lands within and adjoining.

Daily weather forecasts and weather data are distributed via the departmental computer network to assist operational staff during the fire season.

Prescribed Burning

The Department uses fire as a management tool to provide wildlife habitat, regenerate cut-over areas and reduce fuels within strategically located areas for the protection of conservation and community values on or near CALM managed lands.

A total of 335 240 ha was prescribed burned throughout the State in 1990/91.

197 796 ha of prescribed burning were undertaken on multiple use State forest, of which 168 480 ha were burnt using aerial ignition from two fixed wing aircraft and 29 316 ha were burnt using hand ignition. (See Appendix 9 for details)

Fire Suppression

465 wildfires were attended by departmental forces throughout the State during 1990/191. These fires burnt out a total area of 1 221 102 ha of which 897 314 ha were on CALM lands.

Approximately 14 452 ha burned in State forest, 486 003 ha in national parks, 396 859 ha burned in nature reserves.

Appendix 11 provides details of the numbers, areas, tenure and causes of wildfires.

A total of 230 fires were deliberately lit by unauthorised persons. This represents 49 percent of the total number of wildfires attended and continues the alarming increase in this source of fires.

191 fires were attended by the Department in the south west forest regions during the 1990/91 fire season. Of these 133 fires occurred in hardwood forest covering a total of 13 640 ha, and 58 fires occurred in softwood plantations covering 812 ha.

Extreme fire weather conditions were experienced on a number of occasions throughout the south west forest regions.

Most notable fires affecting forest values Included

- During a very hot period from 29 January to 4 February in which record temperatures were recorded, 68 serious wildfires affecting forest lands were attended by CALM forces, and other fire fighting organisations.
- 36 fires were fanned by high winds resulting from the passage of ex-tropical cyclone "Fifi" near the south west on 21 April 1991.

In both emergencies described above, the departmental fire fighting resources were extended beyond capacity. Without the major contributions by the Volunteer Bush Fire Brigades, the forest industry, and many other support agencies, the fires could have caused far greater damage. It is estimated that in excess of 20 000 hours were worked by the members of the Volunteer Bush Fire organisation during these emergency periods.

Pine Plantation Fires

A record total of 811 ha of softwood plantations were burned as a result of 58 fires during the 1990/91 fire season. The main commercial timber losses occurred in the Yanchep fire of January 1991 (250 ha) and the Myalup plantation fire on 21 April 1991 (224 ha).

Fire Equipment

Some 85% of the departmental fire fighting fleet (see Appendix 10) is directly involved with fire management operations on forest lands.

A further four ex CALM heavy duty pumper units were handed over to the Shire Volunteer Brigade system for the protection of Sharefarm plantations. This now makes a total of five units which are located at Many Peaks, Rocky Gully, Unicup, Waroona and Scott River.

Fire Training

Several Fire Management, Spotter Pilot and Aerial ignition training courses were conducted by Fire Protection Branch for staff throughout the forest regions. Representatives from other fire combat authorities, including interstate forest services, also attended these courses.

Departmental staff work closely with the Bush Fires Board to provide training for local bush fire brigades in fire suppression and fire management operations associated with sharefarms. Similar training has been provided by the Department to forest industry personnel as a means of providing additional fire fighting capacity in forest areas.

Regional and district staff provide routine training to their personnel on fire management and fire suppression in forest lands.

Fire Emergency Planning

Detailed fire emergency response plans were maintained for all forest areas, plantations and adjoining areas by each forest region and district. In addition, fire protection plans were prepared and approved for all new softwood and hardwood sharefarms.

Tree Nurseries

The Department operates three nurseries offering seedlings both for sale to the public and for departmental planting programs.

The fourth stage of development at the Manjimup Plant Propagation Centre was completed. This involved the final development of the pine nursery site, irrigation infrastructure and concentration of all departmental pine nurseries at the Centre.

The bulk of the pine seedlings were grown for CALM's plantation and pine sharefarm program, with stock also produced for private sale. A total of 4 358 150 pine seedlings were raised on beds (open-rooted) for departmental use (4 164 850) and public sale (193 300).

The hardwood nursery produced 3 581 672 seedlings for departmental use and 1 366 390 seedlings for private sales.

A research facility is being established to also consolidate the Genetics and Tree Improvement Group for tree breeding functions. It will be completed in late 1991.

Seed orchards and seed production areas of various species including pine, karri, marri and bluegum were expanded during the year. Clonal archives for *E. globulus* were also expanded in 1991.

Broome and Narrogin nurseries, primarily commercial nurseries, continued to grow plants suitable for rural revegetation, roadside and mine rehabilitation, community projects and amenity purposes. For details see Services to the Community Program.

**MANJIMUP NURSERY PRODUCTION
1990/91**

Plant Type	For Public Use	For Dept. Use	Total
Container Stock			
Mixed species	230 000	753 732	983 732
Karri	14 900	1 347 000	1 361 900
Jarrah and marri	500	137 740	138 240
Bluegum	1 120 990	1 170 000	2 290 990
Mixed spp. for timberbelts		173 200	173 200
Total			4 948 062
Open Rooted Stock			
<i>Pinus radiata</i>	179 800	4 059 550	4 239 350
<i>Pinus pinaster</i>	13 500	105 300	118 800
Total			4 358 150

Seed Centre

Seeds of the principal species needed for departmental forest plantings, rehabilitation and conservation projects, as well as for public sales were acquired, processed and stored at the Manjimup Plant Propagation Seed Centre.

Other than seed orders within Australia, seed was exported to Argentina, India, France, Japan and New Zealand.

A total of 650kg was acquired:

Karri	81.5kg
Pine	388.6kg
Other species	179.9kg

Seed disbursement totalled 608kg. Of this total, 106kg of seed of 180 native species and 10 exotics were sold mainly to commercial nurseries.

Receipts from public sales totalled \$21,812.00.

Forest Offences

Four offenders were prosecuted for various breaches of the Forest Diseases Regulations, resulting in fines totalling \$1,250 being imposed.

Five offenders were prosecuted for illegal removal of forest produce. Four received fines totalling \$1,300, the fifth charge was dismissed under Section 669 of the Criminal Code.

Three individuals were prosecuted for firearm offences in State forest. Two received fines totalling \$180, the third charge was not proved.

Eleven offenders received letters of warning for various forest offences.

Public Affairs and Community Education

The Department's public relations and communications activities are designed to strengthen links between the Department and the public through community education, public input, community based initiatives and the distribution of information. The broad goal in the Forest Resources Management Program, is improved public awareness, understanding and support for CALM's forest resources management programs, services and policies, combined with wider public cooperation in the prevention and solution of forest resources management problems.

Many public affairs and community activities cross program boundaries - between the Nature Conservation and Wildlife Management Program, the Forest Resources Management Program, and the Recreation Management Program - in the true spirit of the integrated management philosophy that underpins the operation of CALM. For a brief summary of these, see "Public Affairs and Community Education" in the Nature Conservation and Wildlife Management portion of this report.

Public affairs and community education activities relating primarily to the Forest Resources Management Program included the following:

Considerable research and development concerning the preparation of a Forests and Forestry Community Education Plan was undertaken.

Public seminars, field days and workshops concerning a variety of issues related to forest management were conducted in conjunction with the National Parks and Nature Conservation Authority, and the Lands and Forest Commission.

A series of Go Bush activities were conducted in the northern jarrah forest during school holiday periods (October 1990 and April 1991) to introduce people of all ages to recreation and learning experiences in the forest.

Public relations and public information activities were conducted in response to the ABC TV Four Corners program entitled "The Wood for the Trees".

Communication programs for CALM's agroforestry activities, VALWOOD and the Timber Congress were conducted.

A full list of publications produced during the year is provided at Appendix 14.

Timber Supply

Objective: To ensure a negotiated and even flow of log products to the timber industry while recovering costs for the service supplied, establishment and growth of the replacement resource, and to maximise profit to the State.

Description: This Sub Program includes responsibility for supply of log products to the timber industry from CALM lands; and the employment and supervision of private contractors to carry out the harvesting of forest produce.

Operating Expenditure

\$43 988 143

Timber Strategy

Regional Management Plans for the three Forest Regions and a timber strategy for the State entitled "Timber Production in Western Australia" were adopted by the Government in February 1988. Together the documents provided a blue print for the State's forestry operations based on a commitment to manage the forest on a sustained yield basis, to increase its productivity, to increase the value added component of timber processing and to improve utilisation. At the same time there was a commitment to provide security for forest areas reserved for conservation and for areas to be managed for multiple use including the growth of the timber resource on which the timber industry is based.

During the year the major achievements of the implementation of the Timber Strategy included:

The supply of timber to the forest industry during 1990/91 was characterised by a deep recession which resulted in a low demand for housing and in turn a reduced demand for sawn timber. The Government undertook measures to assist the industry to provide relief to sawmilling companies under difficulty. Part of this assistance included the deferment of the annual indexation of hardwood and softwood sawlog royalties and stumpages due on 1 January 1991. The recession reduced the demand by a number of mills and resulted in the closure of a major mill at Dwellingup.

Demand for residue log timber was not adversely affected by the recession and assisted CALM to more fully integrate the harvesting operations.

During 1990/91 20 different logging contractors were employed by CALM under contract. Some of these contractors were allocated three year Contracts under the

"Timber Strategy". These three year Contracts are now expiring, hence seven logging tenders were called in early 1991, resulting in eight new logging Contracts. The number of different logging contractors employed by CALM is 18.

The move to train CALM's contractor personnel in certain aspects of logging management, which began in 1990, has progressed rapidly following the appointment of a full-time training officer to Forest Resources Division. A system of accreditation is being developed which should enable CALM to reduce its costs of logging supervision by delegating some traditional Forest Officer responsibilities to contractor personnel.

In addition, moves will soon be made to accredit CALM's logging contractor personnel to fire control activities, particularly wild fire suppression.

Four Tenders, one Auction and one Offer to Purchase were finalised for the sale of various log products ranging from firewood to first grade sawlogs which resulted in 30 new contracts of Sale between CALM and the log buyers.

Approximately 200 Contracts of Sale were operating as at 30 June 1991.

During 1990/91 16 700 m³ of various softwood and hardwood log products were harvested by CALM on behalf of private property owners. This is a relatively new initiative, whereby CALM enters into a Contract agreement with the private forest owner. CALM arranges for the thinning of the landowner's forest using CALM employed contractors, then sells the logs to CALM's Contract of Sale customers on a fees for services basis. Under these "Thinning Agreements" the landholder is assured of receiving the correct royalty or stumpage rate. This initiative ensures that the harvesting activity is carried out in accordance with the code of logging practices applied to logging on State forests. Priority for thinning softwood plantations is being given to those in most need of silvicultural treatment.

A revised edition of the "Code of Logging Practice" and a revised edition of the "Manual of Logging Specifications" were published, combining all hardwood and softwood harvesting operations.

These documents provide guidelines and set standards for all aspects of timber harvesting operations managed by CALM.

CALM let tenders for the construction of 55 km of major new roads for log haulage purposes in the Southern Supply Area. This was a major step towards integrating log road construction and maintenance on the State's native forests into "Timber Strategy" principles.

A major review of all royalties and stumpages was carried out.

The delivery of pine thinning commenced from plantations in the Northern Forest Area to the new Wesfi medium density fibreboard (MDF) plant.

Two pine plantation wildfires required salvage harvesting operations and log stockpiling. All merchantable material was recovered except from approximately 30 ha of severely burnt unthinned plantation at Yanchep.

Pine sawlogs were delivered to Whittakers' new Greenbushes milling complex.

Investment in upgraded milling and drying facilities as a key part of the Timber Strategy by the private sector continued. This will result in both the increased utilisation of log timber and increased quantities of dry high quality value added material.

A large increase in the amount of marri logs processed by sawmills occurred early in 1991. One major mill at Collie processed mostly marri logs, while another mill in the Southern Forest Region also cut increased amounts of marri. This important resource is now accepted in the market for a range of building purposes, as well as for pallets and railway sleepers.

Log Production

The production of hardwood sawlogs in 1990/91 is summarised in the following table, and can be compared with the intake projected in the Timber Strategy.

HARDWOOD SAWLOG PRODUCTION FROM CROWN LAND 1990/91

(cubic metres)

	Premium	1st Grade		Marri Sawlogs and 2nd and 3rd Grade		Regrowth Thinnings		Veneer Logs	Total	
	Actual	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Actual	Projected
Jarrah	257	303 485	459 000	74 274	64 500	316 *	18 000		378 331	541 500
Karri		94 487	153 000	41 763	18 000	16 948	50 000	828	154 026	221 000
Marri				122 581	30 000	122			122 703	30 000
Wandoo		51		74					125	
Blackbutt		901		417					1 318	
Sheoak		626							626	
Mallet						565			565	
	257	399 550	612 000	239 108	112 500	17 951	68 000	828	657 694	792 500

N.B. Projected intakes are the average for 1990 and 1991 as set out in the Timber Strategy, Tables 14, 15 and 17.

* Small jarrah sawlogs.

**LOG PRODUCTION FROM CROWN LAND AND PRIVATE PROPERTY
1990/91**

Type	Crown Land	Private Property	Total
	(m3)	(m3)	(m3)
Sawlog Timber *			
Jarrah	378 331	14 986	393 317
Karri	154 026	7 279	161 305
Marri	122 703	3 748	126 451
Blackbutt	1 318	404	1 722
Wandoo	125	1 453	1 578
Sheoak	626	0	626
Other	565	2 920	3 485
Total Hardwood	657 694	30 790	688 484
Pine	93 195	10 539	103 734
Total Sawlogs	750 889	41 329	792 218
Other Log Material **			
Hardwood	512 533	85 789	598 322
Softwood	208 056	75 101	283 157
Total Log Timber	1 471 478	202 219	1 673 697

* Sawlog timber from all sources, including veneer, but not including chiplogs, firewood, piles and poles.

** Includes chiplogs, pine particleboard material, pine rounds and pine industrial (MDF) material.

Compared with the previous year the volume of all log materials decreased 144 495 m³ to 1 673 697 m³. Pine logs decreased by 31 494 m³ (7.5%) to 386 891 m³ and hardwood logs decreased by 113 001 (8.1%) to 1 286 806 m³.

Longer term trends are shown in Appendices 4, 5 and 6.

**SAWN PRODUCTION FROM CROWN LAND AND PRIVATE PROPERTY
1990/91**

	1988/89 (m3)	1989/90 (m3)	1990 (m3) *
Sawn Timber Production			
Crown Land	302 523	278 354	245 737
Private Property	17 991	12 099	14 419
Sawn Sleeper Production			
Crown Land	20 311	29 836	32 558
Private Property	2 080	2 260	1 523
Total	342 905	322 549	294 237

* Figures for 1990/91 are not yet available. The sawn production for the 1990 calendar year is shown to indicate trends; final figures covering the period July 1990 to June 1991 will be published in the next report.

VENEER LOG PRODUCTION

	1989/90 (m3)	1990/91 (m3)
Karri	1 885	828
Marri	35	
Pine	5 392	3 583
Total	7 312	4 411

The supply of high quality karri logs for production of veneer decreased by 1 057 cubic metres to 828 cubic metres.

HARDWOOD CHIPLOG PRODUCTION FROM CROWN LAND AND PRIVATE PROPERTY

	1989/90 (m3)	%	1990/91 (m3)	%	Variations with previous year
Crown Land					
Old Growth Forest *		86.01		83.37	
Marri	376 067	70.36	349 820	68.25	-6.98%
Karri	83 603	15.64	77 465	15.11	-7.34%
Regrowth Forest (thinnings)		13.99		16.63	
Marri	5 161	0.97	25 379	4.95	391.75%
Karri	69 442	12.99	59 869	11.68	-13.79%
Globulus	181	0.03	0	0.00	
Sub-total Crown Land	534 454	100	512 533	100	-4.10%
Private Property					
Marri	45 632		75 688		65.87%
Karri	5 389		10 101		87.44%
Sub-total Private Property	51 021		85 789		68.14%
Total C.L. & P.P.	585 475		598 322		2.19%

* includes forest residue.

The supply of marri, karri chiplogs from Crown land decreased by 21 921 cubic metres (4.1%) to 512 533 cubic metres.

There was a continued trend in a relative decline of chiplogs from 'old growth' Crown land forest. In 1990/91 approximately 83.37 percent came from this type of forest and 16.63 percent from regrowth forest thinnings (86.0% and 14.0% respectively in 1989/90).

The Diamond Mill also obtained 85 789 cubic metres from private property; an increase of 34 768 cubic metres from 1989/90. Sawmill residues contributed 36 373 tonnes to woodchip production.

Longer term trends for hardwood chiplog production are shown in Appendix 6.

**SANDALWOOD PRODUCTION
1990/91**

	1989/90 tonnes	1990/91 tonnes
From Crown Land		
Green Sandalwood	853	775
Dead Sandalwood	940	833
From Private Property	187	214
Total	1 980	1 822

Licences to obtain sandalwood were issued to 29 contractors (12 full-time, 5 part-time, 1 pastoralist and 11 private property).

Exports for 1990/91 totalled 2004 tonnes, compared with 1960 tonnes for the previous year.

**FIREWOOD PRODUCTION AND CONSUMPTION
1990/91**

Log Source	Type	1989/90	1990/91
		(tonnes)	(tonnes)
Firewood contractors	Local firewood permit	0	456
	Contracts of Sale	24 343	29 597
	Forest Produce Licences	6 894	3 698
Industrial use	Charcoal logs	33 834	61 989
Total Log Residue		65 071	95 740

Mill Source	Type	1989/90	1990/91
		(tonnes)	(tonnes)
Crown land sawmills	For sale	82 355	39 616*
	For own use	6 777	4 212*
Private Property sawmills	For sale	930	910
	For own use	81	143
Total Mill Residue		90 143	44 881*

* July-December 1990 figures only, January-June data not yet available. Sawmill figures for 6 months July-December 1989 published in the 1989/90 Annual Report have been updated to include January to June 1990 amounts.

Above data includes solid wood, sawdust shavings, chips and edgings sold as fuel and for own use.

Firewood is obtained as a by-product of sawmilling, from forest thinning operations, and from dead trees fallen in the forest. These figures do not take into account the private collection of firewood from the forest by members of the public for their own use.

**OTHER FOREST PRODUCE
1990/91**

			1989/90	1990/91
South West Land Division Agricultural Areas				
Mining timber	(m3)	Crown land	666	569
		Private property	N/A	N/A
Piles, poles and bridge timbers	(m)	Crown land:		
		Hardwood	214 987	105 305
		Softwood	15 440	nil
		Private Property	3 219	N/A
Fence posts and rails	(nos.)	Crown land	124 136	67 076
		Private property	21 244	22 380
General fencing material	(tonnes)	Crown land (Contracts of Sale)	5 142	5 316
Strainer posts	(nos.)	Crown land	6 710	5 272
		Private property	N/A	N/A
Goldfields Area				
Mining timber	(tonnes)	Crown land	974	723
Fence posts and rails	(nos.)	Crown land	6 465	5 935
Strainer posts	(nos.)	Crown land	780	100

Mining timber production in the Goldfields decreased by 251 tonnes to 723 tonnes.

Thinning operations in the mallet forest at Narrogin yielded 935 tonnes of fence post material and 700 tonnes for tool handles.

Performance Evaluation

Program Objective: To manage the forest designated for multiple use on a sustained yield basis, and to provide and regulate the supply of forest resources for the satisfaction of long term social and economic needs in a manner that minimises impact on other values and provides maximum returns to the State on assets employed.

Indicator:

The extent to which the rate of utilisation meets the projected volumes in the approved State Timber Strategy.

Measures:

The quantities projected in the publicly endorsed Timber Strategy (1987) were based on sustainable first grade sawlog production from the hardwood native forests designated for multiple use (which includes timber production).

The projected hardwood first grade sawlog production from Crown land for 1990-91 is 612,000 cubic metres.

The actual hardwood first grade sawlog production from Crown land for 1990-91 is 399,550 cubic metres.

Planning and Research Objective: To forecast the most cost effective ways of maintaining the native forest environment, to forecast optimal levels of sustainable production and to indicate economically viable opportunities for improving forest utilisation and developing alternative forest resources.

Indicator:

The extent to which the total amount of jarrah, marri forest resource available for utilisation has been identified.

Measure:

The jarrah inventory has been brought to 95% completion and will be completed six months ahead of schedule.

Indicator:

The extent to which low grade and small sized log timber may be utilised for higher value products has been identified through research and integrated planning.

Measures:

Several opportunities have been realised. Successes are:

- the use of marri sawlogs has increased from 34,998 cubic metres in 1989-90 to 122,703 cubic metres in 1990-91;*
- a new market has been developed for re-constituted board using marri and jarrah thinnings;*
- areas of karri regrowth (20-25 years old) suitable for commercial thinning have been identified and programmed for treatment. 340 hectares of regrowth was thinned on a commercial basis.*

The Department has six internal research programs working towards achievement of this objective. They are Economic Entomology, Native Forest Silviculture, Plantation Silviculture, Research Techniques (part), Plant Diseases (part; includes dieback), Wood Utilisation, Research Programs. CALM also has good liaison with external research organisations in the same fields.

Emphasis is placed on converting research findings into management techniques, ensuring that current research is relevant to and prioritised for managing forest resources, and that research

knowledge is disseminated. To this end targets for the coming year are set and achievements for the closing year are recorded for every project in each of the research programs enumerated above. These details are published annually in the Research Plan.

During 1990-91, 14 scientific papers were approved for publication and three seminars were organised and presented (seminars are open to all CALM staff, tertiary institutions, other research organisations and interested members of the public).

Indicator:

The extent to which wood utilisation research has improved the use of small and low grade logs to produce high grade seasoned products.

Measures:

The commercial production of Valwood products commenced during the period.

Construction of two CALM patented timber drying units by private companies has commenced.

Forest Management Objective: To manage native forests for the long term maintenance of each ecosystem, to develop and manage alternative sources of forest resource and to improve productivity and resource utilisation.

Indicator:

The extent to which native forests have been managed for the long term maintenance of each ecosystem.

Measures:

Regeneration: All cut over areas of native forest are regenerated.

Silviculture: Approved silvicultural prescriptions were applied to 7,550 ha of native forests.

Dieback: 23,200 ha of forest ecosystem were photo interpreted and mapped for the presence of dieback. Another 27,800 ha of forest has been photographed for dieback interpretation.

Fire Protection: 99% of multiple use forest was successfully protected from damage by fire.

98.8% of plantations was successfully protected from damage by fire.

Field Practice: A complete review of forest management practice has been initiated during the period.

Indicator:

The extent to which alternative forest resources have been developed and managed.

Measures:

820 ha of timberbelt, and 268 ha of hardwood sharefarming on agricultural land was established in 1990-91.

Techniques were developed for extensive timberbelt sharefarming activities on cleared farmland.

594 ha of pine plantation sharefarming on agricultural land was established in 1990-91.

An evaluation model has been developed to identify site suitability and predict productivity for establishment of E.globulus (bluegum) plantations on agricultural land.

Timber Supply Objective: To ensure a negotiated and even flow of log products to the timber industry while recovering costs for the service supplied, establishment and growth of the replacement resource, and to maximise profit to the State.

Indicator:

The extent to which the supply of logs to the industry is equitable according to capacity and has kept pace in quantity and quality with commitments.

Measures:

In 1990-91 the timber industry suffered a downturn similar to the rest of the economy. Consequently the usual supply of logs was not required. All demands were met in quantity and quality with many mills operating a stock-pile. The quantities supplied compared to predicted quantities approved in the State Timber Strategy are:-

		SUPPLIED	PREDICTED
First grade	Jarrah	303,485 m ³	459,000 m ³
	Karri	94,487 m ³	153,000 m ³
Second grade	Jarrah	74,274 m ³	68,000 m ³
	Karri	41,763 m ³	18,000 m ³
Other	Marri	122,581 m ³	30,000 m ³
	Pine (sawlogs)	93,195 m ³	117,000 m ³

Four tenders, one Auction and one Offer to Purchase were finalised for the sale of various log products ranging from firewood to first grade sawlogs which resulted in 30 new Contracts of Sale between CALM and the log buyers.

The number of operative Contracts of Sale as at June 1991 was approximately 200.

Indicator:

The extent to which revenue exceeds service, re-establishment and growing costs.

Measures:

The costs of establishment and growing are recouped through log sales in the form of royalties and stumpages. Reviews were conducted in 1989 and 1990 to ensure target revenues will recoup the growing costs. Service costs are recouped through log sales in the form of components of log prices. These include administration, in-forest, roading, log production, and delivery charges.

Legally binding Contracts of Sale ensure all service costs are recouped as part of the contract log price schedules. Eight new logging contracts were initiated during the year.

A complete review of forest management practice has been initiated during the period.

SERVICES TO THE COMMUNITY PROGRAM

Objective: The objective of the Services to the Community Program is to satisfy those demands on CALM lands, assets and skills that do not relate to CALM's primary objectives.

Program Description: This Program includes responsibility for emergency assistance to land holders, particularly in fighting fires adjacent to CALM lands; making CALM expertise available to the community where consistent with Government objectives; making CALM resources available to the community for a commercial fee where compatible with CALM and Government objectives; and the management of Government grants to non-Government conservation agencies and groups.

Operating Expenditure \$7 293 830

Emergency Services

Objective: To provide emergency services with CALM's expertise and available resources, particularly fire fighting on adjacent land, in a way that does not effect CALM's budget for primary programs.

Description: This Sub Program includes responsibility for emergency assistance to land holders, particularly in fighting fires, adjacent to CALM lands.

Operating Expenditure \$253 622

The Department's aerial surveillance continued to provide an invaluable fire detection service to land holders in the forest areas of the south west.

Representation on the Bush Fires Board and State Counter Disaster Advisory Committee was maintained, and CALM staff provided fire suppression training sessions at a number of courses convened by these bodies.

CALM staff attended 121 fires on private property adjacent to lands managed by CALM, and provided assistance in their control.

The Department maintains rescue equipment and staff trained in rescue techniques in the State's more remote and rugged national parks.

Park rangers conducted two cliff rescues in Hamersley Range National Park, and three in Kalbarri National Park.

Departmental staff also took a primary role in excess of 12 sea search and rescue operations in marine parks, and in cave rescues in the south west forest area.

CALM staff were extensively involved in emergency measures to control an oil spill from the "Sanko Harvest" which sank in the Recherche Archipelago.

Advisory and Management Services

Objective: To provide advisory services within CALM's expertise and capacity to respond, and manage CALM's lands to improve water quality and yield for public water supplies.

Description: This Sub Program includes responsibility for making CALM expertise available to the community where consistent with Government objectives; and catchment management and management of aquifers to increase water yield to the Water Authority from CALM lands.

Operating Expenditure

\$1 879 752

Control of Dieback:

CALM was represented on the North Sandplains Working Party for dieback control. The Working Party, consisting of local mining companies, Main Roads Department and Department of Mines, has initiated a regional dieback survey and held information sessions and field days on dieback control for shires, beekeepers, farmers, wildflower pickers and local interest groups.

CALM staff have also provided dieback control information sessions and advice elsewhere to 4WD clubs, motor cycle clubs, educational institutions, tour guides, Main Roads Department personnel, logging contractors, the mining industry, conservation groups and local government authorities.

Crocodile Control:

A total of 10 estuarine crocodiles threatening public safety were captured in the Kimberley Region and relocated.

Seed Centre:

The Seed Centre, located at Manjimup made 1500 despatches of seed, totalling 106 kilograms to orders from mainly commercial nurseries. The sales include seed of 180 native species and 10 exotics.

Nurseries:

CALM nurseries at Broome, Manjimup and Narrogin raised 1,859,000 seedlings for sale to the public for land conservation and landscaping purposes.

An additional 18,000 seedlings were issued free from Broome Nursery as a contribution to the Government's Northwest Tree Scheme. The free issues were plants suited to the arid environment of the north west.

Rural Advisory Service:

CALM staff continued to provide advice on revegetation and land conservation in rural areas throughout the State.

Advisory staff were involved in talks, field days, and in demonstrations of the use of trees in land care.

Services to Other Organisations:

Departmental staff provided professional support and expertise to numerous inter-agency groups and other organisations in the fields of landscape planning and management, visual resource management and in recreation matters.

Assistance was also provided to the Department of Marine and Harbours in the production of a hydrographic chart for the Coral Bay area, and with topographical mapping for the determination of a suitable boat launching site in the area.

Central Forest Region staff provided input and expertise to the South West Development Authority for their "Islands of Green" committee, and in their development of a future management structure for the Blackwood River Catchment.

Recoupable Works and Services

Objective: To recover to the highest possible extent the full cost, including a return to Government, of the services provided to other agencies, private enterprise and the public.

Description: This Sub Program includes responsibility for making CALM resources available to the community for a commercial fee where compatible with CALM and Government objectives.

Operating Expenditure \$5 010 521

CALM provided services to industries, local government and State Government departments on a cost recoupable basis, where CALM expertise was the most suited to provide the particular service.

Goldfields Region staff provided a management service for the annual sandalwood harvest on behalf of the Australian Sandalwood Company.

Goldfields staff also provided management services, including tree planting, dust monitoring, the establishment and operation of regeneration zones, and the administration of finance on behalf of the Goldfields Dust Abatement Committee.

In the Pilbara Region, CALM staff undertook regular environmental inspections of oil bases on north west islands on behalf of the petroleum industry.

A dieback interpretation and mapping service was provided to the mining industry in the south west forest area. 20,000 hectares was flown for shadowless aerial photography, and 5000 hectares was mapped for the presence of dieback disease to assist the planning of mining operations.

109 hectares of degraded jarrah forest adjacent to mine pits was rehabilitated by CALM on behalf of the bauxite industry.

CALM continued tree replanting in the Wellington Catchment area on behalf of the Water Authority. 464 hectares of mixed eucalypt species were planted, bringing the total area of plantation in the catchment to over 6,500 hectares.

Timber Industry Regulation and Employment:

At 30 June 1991 a total of 125 sawmills was registered under the provisions of the Timber Industry Regulation Act. 43 of these mills received their supplies from Crown land, 38 from both Crown land and private property, and 44 received logs solely from private property.

The number of people employed in all timber mills at their time of registration was 1,777.

The overall employment in forest based industries at 30 June 1991 was estimated to be:

Mill and bush workers of registered sawmills	*2107
Other wood processing industries	3000
Sandalwood workers	65
Apiarists	144
	—
Total (approximate)	5316
	—

*Also includes firewood, mining timber and pole cutters working under licence or control.

As from 1 July 1990 the control of the industry under the Timber Industry Regulations Act transferred from CALM to the Department of Occupational Health, Safety and Welfare.

International Advisory Services

During the year CALM continued to manage a forest research project in the Nusa Tenggara Timor province of Indonesia under contract to the Australian Centre for International Agricultural Research (ACIAR). Good progress has been made in defining a group of multipurpose tree species which can tolerate the alkaline soils and arid climate of the province yet produce fuelwood, fodder and other products which can be easily integrated into local farming systems. A paper outlining preliminary results was presented to an ACIAR seminar on tropical Acacias in Bangkok early in 1991.

Part of this project is concerned with development of systems for regeneration of sandalwood species in Indonesia and some Pacific countries. CALM organised a session dealing with the conservation of sandalwood germplasm and management of sandalwood resources at the XVII Pacific Science Congress in Hawaii in May 1991.

Total expenditure under this project in 1990-91 was \$86,901.36.

In addition to the ACIAR project CALM staff arranged an in-service training course in forestry research administration at the Australian National University for officers from the Indonesian Ministry of Forestry. A CALM officer also took part in a design study for a proposed watershed rehabilitation project in West Timor and provided advice to an Indonesian company on a planned plantation project in Kalimantan.

Grants to Non-Government Agencies

Objective: To provide grants to non-Government agencies assisting in achieving CALM objectives.

Description: This Sub Program includes responsibility for management of Government grants to non-Government conservation agencies and groups.

Operating Expenditure	\$149 935
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The Department made financial grants totalling \$149,935 to five outside bodies working on conservation related projects.

The largest grant of \$120,000 was provided to Greening Australia (WA) Inc, and the Department was represented on its Board of Directors.

Performance Evaluation:

Indicator:

(Emergency Assistance) - the extent to which community values on and near lands managed by CALM are protected from harm.

Measures:

Park rangers conducted two cliff rescues in Hamersley Range National Park, and three in Kalbarri National Park.

Departmental staff also took a primary role in excess of 12 sea search and rescue operations in marine parks, and in cave rescues in the south west forest area.

121 wildfires on private property adjacent to lands managed by CALM were contained to a total area of 17,750 hectares. Without CALM assistance the area burned would most likely have been greatly increased.

CORPORATE SERVICES PROGRAM

Operating Expenditure

\$13 590 338

Human Resources Management

Objective: To recruit and maintain well motivated and competent staff; to provide programs for staff health, safety, development and training.

Staff

The approved staff establishment figure for the Department as at 30 June 1991, expressed in full-time equivalents, was 1432.12. The average staffing level over the whole year was 1423.96.

On 30 June 1991 the number of personnel employed, expressed in full-time equivalents, was 1447.96. This was made up of the following categories:

. Salaries (includes Public Service Act and CALM Act)	931.67
. National Park Rangers	90.00
. Wages	426.29

During the year the following salaried staff movements occurred:

. 94	new appointments
. 4	appointments made permanent
. 10	retirements
. 36	resignations
. 19	cessations
. 17	reclassifications
. 34	promotions

As an outcome of the 4 percent Productivity Agreement in 1987 the Government required the backlog of accrued long service leave for salaried officers to be cleared by December 1990. At that time there were 77 officer-years of accrued leave involved. As at 30 June 1990 this had been reduced to 24 officer-years and by 30 June 1991 to 10 officer years. The clearing of this backlog, with the resulting absence of available staff, continued to place additional pressures on departmental operations during 1990/91, and as a result, the Public Service Commissioner approved an additional year in which to clear the remainder of leave outstanding.

Employment of the Aboriginal Employment and Training Co-ordinator was extended into 1991. Significant progress has been made in the areas of community liaison and in raising awareness in CALM staff regarding Aboriginal employment and training objectives.

Industrial Relations

Consultation regarding training, career paths, award restructuring and productivity continued during 1990/91. Management and employees met with representatives from the Australian Worker's Union, Miscellaneous Worker's Union and the Federation of Air Pilots. Substantial progress has been achieved. The Pilots were granted their second 3% wage increase on 8 May 1991, in accordance with the restructuring requirements of the wage case decision of August 1989.

Significant developments in relation to the Australian Worker's Union Award were the ratification by the Australian Industrial Relations Commission of the skill schedules, and the broadbanded wages

classification structure. These changes to the award were ratified on 4 February 1991 and the broadbanded wages classification was implemented in CALM on 6 June 1991.

Following discussion and negotiation, a training course for consultative committees was jointly developed by CALM, the Civil Service Association, the Australian Worker's Union, the Miscellaneous Workers Union and the Trade Union Training Authority. A course was conducted in May 1991, and other courses are planned for the coming year.

The objective of these courses is to provide union representatives and CALM management with the skills and knowledge necessary for them to make recommendations to senior management, following consultation between relevant parties. The consultative committees will discuss issues which impact on employment conditions or job satisfaction.

An award restructuring committee has been meeting to discuss issues relating to employees covered by the Civil Service Association. Negotiations are proceeding on the preparation of a revised fire provision agreement. A review of the Commuted Overtime Agreement is also under way.

Training and Development

The development of new training courses has continued this year as a result of ongoing changes brought about by the introduction of new equipment and procedures.

A feature of training course development is the involvement of training experts, management, and members of the work force representing various industrial groups, working together to provide responsive training packages.

A considerable number of staff have taken steps to set goals which will allow them to fulfil their career aspirations and are now undertaking various programs of tertiary study. The Department encourages this career development through the provision of study leave and support.

Training continues to be provided on a needs basis, which allows staff members to maintain or upgrade their skills to the level required in their work.

Field Cadet Training

Thirteen cadets who successfully completed their two years of study and training in December 1990, received their certificate of Conservation and Land Management at a graduation ceremony held on 3 May 1991. The ceremony was held at the Lord Forrest Hotel in Bunbury and the Certificates were presented by the Honourable Bob Pearce, Minister for the Environment.

Of the thirteen graduates:

- Ten were appointed as Forest Rangers of which three were posted to the Northern Forest Region, five were posted to the Central Forest Region, one to the Southern Forest Region and one to the Goldfields Region.

- Three were appointed as Park Rangers and were posted to the Lane Poole Reserve, Yanchep National Park and Leeuwin Naturalist National Park.

The Keynes Memorial Prize was awarded to Bill Cuthbert. The Executive Director's Prize was shared by Donna Green and Paul Blechynden.

Fourteen cadets successfully completed the first year of their training at the South West College of T.A.F.E., Bunbury in November 1990. They and the Executive Director's Scholarship Awardee, Keith Lillie, commenced the second year of the course at the Dwellingup Cadet Training Centre in January 1991.

Working periods within districts continue to provide opportunities for cadets to participate in activities as part of their development.

Occupational Health, Safety and Welfare

The introduction of new legislation relating to workers compensation and rehabilitation incorporates provision for noise induced hearing loss and will result in the re-introduction of compulsory audiometric testing for all personnel exposed to noise hazards at work.

A large number of Districts and Specialist groups participated in the Industrial Foundation for Accident Prevention/FAI Insurance Safe Way Awards. Many Government and private enterprise organisations throughout the State also participated. With 94 entries achieving their nominated targets, the Department was the most successful participant.

The number of lost time injury accidents rose from 37 to 49 but the total number of days lost was reduced by 41%. The 696 days lost (including 129 from 4 accidents in the previous year) was the second lowest total in the past 8 years.

Ten of the 25 listed groups on the monthly accident report completed the 1990/91 year with NIL lost time accidents and 3 of these also recorded NIL medical treatment accidents.

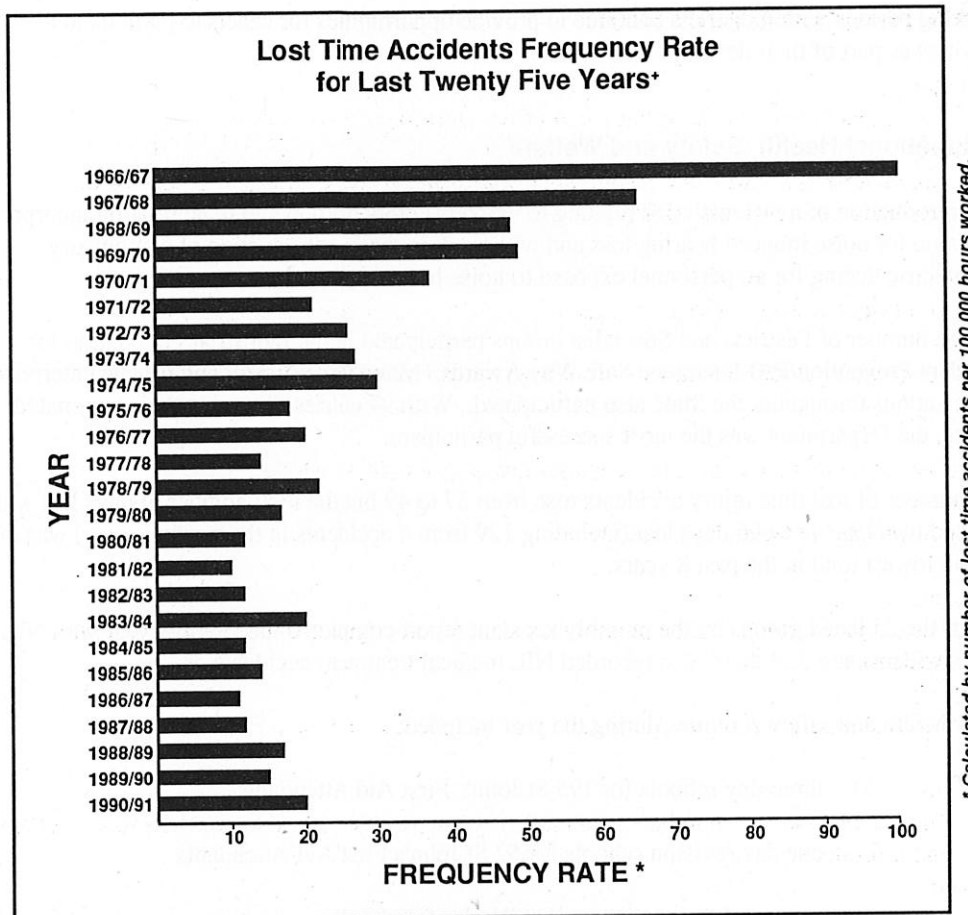
Other health and safety activities during the year included:

- 20 three-day schools for 195 St John's First Aid Attendants
- 7 one day revision schools for 52 St John's First Aid Attendants
- 63 personnel trained at two-day Worksafe schools
- 17 District personnel attended a four day chemical school.

The all injury frequency rate has increased from 63 to 71.

The average days lost rate decreased from 14 to 12.

Details are shown in Appendix 13.



+ Statistics prior to 1985-86 relate to the former Forests Department.

Workers' Compensation

The continuation of the case management program saw the annual workers' compensation insurance premium reduce from \$1.205 million for 1989/90 to \$572,421 for 1990/91. New claims for the same periods totalled 252 and 237 respectively.

Recent legislative changes have resulted in significant reforms to the workers' compensation system. The major components of that reform are:

- . retitling of the Act to the Workers' Compensation and Rehabilitation Act 1981;
- . increased medical expenses entitlements;
- . vocational rehabilitation services up to the value of \$5,927;
- . assessment for rehabilitation to be made after only four weeks on compensation instead of 12 weeks;
- . a maximum of three working days for employers to refer a compensation claim to insurers, and a further 14 days for insurers to accept or deny liability;
- . introduction of compensation for noise induced hearing loss.

Rehabilitation of injured employees will have a significantly more prominent role in the system than in the past.

Performance Evaluation

Indicator:

The extent to which CALM has a competent workforce.

Measure:

The number of satisfactory performance appraisals versus the number of unsatisfactory performance appraisals - 560:1.

Indicator:

The extent to which staff are retained.

Measure:

Separation rate versus number of salaried positions - 65:932.

Indicator:

The extent to which industrial relations disputes are avoided.

Measure:

The number of industrial disputes - 1.

Indicator:

The extent to which CALM personnel sustain Medical Treatment or Lost Time Injury Accidents.

Measure:

Safety statistics: all injury frequency rate - 71; average days lost rate - 12.

Indicator:

The extent to which appropriate training programs are developed to meet changing technology and procedures.

Measure

Number of new accredited departmental courses developed or existing courses modified to meet changing needs - 14.

Indicator:

The extent to which employees are prepared to meet ongoing and differing challenges in a competent and highly motivated way.

Measure:

Employee performance is reflected in performance appraisal - 5 unsatisfactory performance appraisals.

Indicator:

The extent to which graduates of the cadet training school are capable of carrying out the duties of junior field officers.

Measure:

Graduates are deemed capable on permanent appointment. A performance appraisal is conducted to determine permanency - 13 graduates were permanently appointed in 1990/91.

Efficiency Indicators:

The salary budget for officers in the staff section (\$113,000) divided by the number of transactions dealing with:

<i>higher duties</i>	631
<i>advertised vacancies</i>	41
<i>review of positions (creation, reclassification, abolition)</i>	65
<i>salary increments</i>	<u>560</u>
<i>Leave processed</i>	3871
	—
Total	5168

= \$21.86 per transaction.

The salary budget for officers in the Staff Section (\$113,000) divided by the number of staff (932) = \$121.24 per salaried staff member.

The number of hours worked (2,405,291) in relation to the number of hours lost due to industrial stoppages - Nil.

Workload Indicators:

Personnel:

The number of -

<i>leave applications processed</i>	3871
<i>salary variations initiated</i>	1053
<i>advertised vacancies</i>	41
<i>positions reviewed</i>	65

Industrial:

The number of -

<i>compulsory conferences</i>	4
<i>hearings attended</i>	3
<i>field visits</i>	4

Health and Safety:

The number of personnel attending health and safety training courses for-

<i>first aid</i>	247
<i>worksafe</i>	63
<i>chemical use</i>	17
<i>Managers & District Health & Safety Co-ordinators training</i>	22

The number of field visits by departmental health and safety staff - 152

Training and Development:

The number of new courses developed 14

Major projects relating to the achievement of the section's goals carried out by section staff -

- Performance Management System*
- Training and Development Manual*
- Continued progress with Career Development Model for employees under Australian Worker's Union Award*
- Induction procedure, including the development of an employee information booklet.*

Financial Services

Program Management

Program Management was implemented for the 1990-91 financial year, and annual financial statements have been prepared in program format. Program structures were reviewed in the light of the first year of experience, and modifications will be made to the programs for the 1991-92 year.

Financial Systems

Work proceeded throughout the year to implement a new Accounts Payable and General Ledger system. Features of the system include a new chart of accounts to collect the financial management information required by managers throughout CALM, and an automatic interface to the Treasury Department system to transfer financial information. Live operation of the system commenced on 1 July 1991.

Productivity Improvement

Finance Branch was re-organised during the year to reduce the number of supervisor levels and increase the span of control of supervising positions. Productivity improvement resulting from this and from other initiatives allowed a reduction of three staff in the sections responsible for processing of Accounts Payable.

Performance Evaluation

Indicator:

The extent to which expenditure outturn each year is below the approved estimate, taking into account amendments approved during the year and unbudgeted expenditure on natural disasters.

Measure:

For 1990-91 expenditure was below approved estimate and expenditure on natural disasters was absorbed within the estimate.

Indicator:

The extent to which revenue from the Forest Resources Management Program covers operating cost.

Measure:

Revenue from the Forest Resources Management Program was \$70.1 million, which is below operations expenditure of \$72.4 million. However, when accrued revenue of \$6.5 million due to the extended credit terms granted to the timber industry due to the recession is included, revenue exceeds operating cost of the program.

Information Services

Information Systems

System Development

Implementation of Finance Branch's integrated financial system continued to be a major undertaking during the year. This culminated in the full use of the system for the preparation of budget estimates in February and laid the foundation for full operation from 1 July 1991. Involvement by the Branch includes automatic nightly transfer of summary information to Treasury and generation of specialised reports for Cost Centre managers. Interfaces were developed to enable transfers between the old and new financial systems. Wages, Salary Allocations, Debtors, Sundry Revenue and Publications systems have also been addressed.

The Vehicle and Plant system was rewritten for the VAX computer using the software, Oracle Forms, and is interfaced with the new Financial system. The new system started production on 1 July 1991 with data being transferred from the existing system.

Standards for the use of the new relational Oracle Data Base and associated programming tools were developed during the year. These were used for the development of the Plant, Financial, FOCIS and IBIS systems.

Administration of the new relational database has been very challenging with staff increasing their skills with "hands on" exposure. A Data Base Administrator position was established with responsibility to develop a corporate data model and provide support in system development activities.

Development of the Forest Operations and Control Information System (FOCIS) continued (see also Forest Resources Management). A small system for recording investigations and breaches of the Wildlife Regulations (IBIS) has been completed.

Operations Management

Quality management techniques have been introduced into the computer operations area to improve the level of service to departmental users. Opportunities for improvement have been identified and procedures have been put in place to address these.

A major task this year has been the completion of procedures for operating and using the VAX cluster. The required systems programming task has been enormous and has stretched staff resources in the area.

Central Computers

The VAX computer used for commercial systems was upgraded significantly during the year. The new computer, a VAX 6520, has increased the computing power by 370 percent over the previous VAX 6410 machine.

Disk space on the VAX computers was increased to handle identified new systems and the development of work of a wide cross section of users throughout the Department. A further backup device was also installed to take care of the additional information held on these new disks.

Microcomputers

The Department purchased an additional 49 microcomputers and 16 printers in the 12 months up to January 1991. There are now over 340 microcomputers and 250 printers in the Department. These machines are greatly increasing staff efficiency and satisfaction in word processing, data storage, statistics, desk top publishing and several other specialised areas.

The demand for assistance from users of these microcomputers is high and increasing. It is an onerous task for the person supporting them.

Telecommunications Network

The computer data network has been extended to connect the Herbarium to all major computer facilities in the Department.

New printers have been installed in most district and regional offices and connected to the VAX central computers, providing local printing facilities for the Financial, Plant, FOCIS and future systems.

Land Information

Spatially related land information is a vital resource in managing land and its resources. During the year significant progress was achieved in expanding the Department's corporate digital geographic information database.

Acquisition of topographic and cadastral information to provide the reference framework for the Department's GIS has continued with the focus being in the Southern Forest Region. This has been facilitated through a successful project proposal by CALM to accelerate data acquisition through the State's Integrated Land Information Program.

Development of a Tenure Information System (TENIS) to enable spatial recording and maintenance of the estate managed by CALM has continued. Due to the degree of anomalies within the State's Land Information System (LIS), the source for TENIS, CALM instigated an interagency project team to facilitate validation. The tenure categories of State forest, timber reserves and Executive Director freehold lands are 75 percent completed with the total estate planned for finalisation in December 1991.

Preparation of maps required for marine park gazettal purposes have been undertaken using automated techniques that will enable digital transfer to the State's LIS.

Analysis and extraction of data for the preparation of maps and tabular reports from the GIS has continued to escalate with significant and complex outputs being required.

Involvement in the assessment of National Estate areas with the Australian Heritage Commission has enabled CALM to demonstrate leadership in the area of geographic information technology and its importance to conservation and land management.

Major enhancements have been provided to the aerial surveillance mapping system through the use of satellite imagery. This has assisted navigation and the resulting product has also proved useful in planning and operational activities.

CALM actively participated in a Treasury approved Notional Charging Project aimed at facilitating the exchange and acquisition of land related information. Specific emphasis from CALM was on data integration and standards.

The reports on the programs of Wildlife, Recreation and Forest Resources Management contain further information on the use of land information in supporting CALM's objectives and operations.

Library Services

Considerable achievements in the provision of library facilities have been realised during the year. The opening of the Como Branch Library on a full time basis has enabled the processing of 1088 enquiries, nearly a quarter of which were public enquiries. The Herbarium Library has been extended to allow for additional shelving and the provision of reading facilities, and the Bunbury Branch Library collection has been catalogued and its resources added to the Main Library catalogue, which has been copied on the Bunbury Library database.

Generous cooperation from the Department of Agriculture Library to allow access to its Commonwealth Agricultural Bureaux (CAB) CD-ROM facilities has contributed to a 63 percent reduction in DIALOG on-line user-paid searches done by the CALM Library.

Significant development of a CALM library software package for use in CALM offices has been achieved. The package is a sub-system of the CALM Administration System (ADMIN) package and is intended to become the standard local library system throughout CALM, with data being downloaded into the corporate INMAGIC database.

With reduced funds available for library purchases, negligible increase in our book library has been achieved. It has also been necessary during the year to introduce a user-pays system for inter-library loans. Consequently, statistics for book loans and inter-library loans have shown a marked decline. Journal usage is one area where library services have improved, and the "hands on" availability of recently published journals has been very well received.

Support to the other management programs has been as follows:

- . Services to the Community: The public use of the Como Library has resulted in the loan of 48 videos and response to 266 public enquiries. School teachers have been a major client.
- . 13 percent of the Woodvale Library book loans were overnight loans to Environmental Management students at the Joondalup Campus of Edith Cowan University.
- . Forest Resource Management: The journal loans system has been well utilised for this program and will further benefit upon implementation of the ADMIN information storage/retrieval system.
- . Corporate Services and Recreation Management: Both programs are better served by the existence of the Como Branch Library, though very little library work is involved in the latter program.
- . Wildlife Management: The greater part of Library participation continues to be in this program, as the Main Library is located at the Woodvale Research Centre. The WA Herbarium continues to be very well served by its Library.

Records Management

The commitment to a comprehensive and efficient records management service to all sections of the Department in the metropolitan area was maintained during the year. Databases were upgraded and validated to ensure data integrity. Use of Electronic Bar Coding equipment has enabled file audits and tracking to be routinely undertaken. Depletion of staff resources however, has contributed to a deficiency in maintenance of file archiving and disposal.

Engineering Services and Stores

Fleet Management and Workshops

The Department commissioned 221 new replacement vehicles.

Regional workshops at Manjimup, Collie and Mundaring carried out normal fleet maintenance, major plant repairs and specialised equipment development and fabrication. Ten small workshops in the forest areas undertook normal fleet maintenance. Considerable use was made of private business workshops.

Efficiency Measure:

The operating costs of the fleet declined in real terms. This continuing trend reflects the Department's sound fleet management practices.

Housing and Buildings

Extensions to the WA Herbarium were completed.

Stores

The Stores Management System was maintained throughout the financial year.

At the close of the year there were 1,772 stock lines which consisted of 856 publications, 379 stationery items and 537 forms.

An information and coordination service was maintained in relation to product source and supply, disposal matters, transport, materials handling and inventory control.

Workload Measure:

Transactions comprising 12,477 issues, 704 receipts and 115 credits went through the Stores Section during the year.

Consulting Services

A mechanical engineering consulting service continued for nursery operations.

Consultant work on buildings, telephones, accommodation and properties continued.

Radio Communications

The Department has an extensive radio communications network (1,225 radios) providing communication throughout the State between base stations, vehicles, marine craft and aircraft.

A radio service visit to the Kimberley, Pilbara, Gascoyne and Greenough Regions was carried out during July and August. At the same time improved High Frequency (HF) antennas were installed at five ranger's houses. A Very High Frequency (VHF) repeater station was installed to improve radio communications at Geikie Gorge National Park and Fitzroy Crossing. Associated radios were installed in six offices of local park rangers.

New installations of 138 VHF and 48 HF radios were completed in a range of vehicles, caravans and marine craft.

To improve radio communications at District offices five antenna towers were constructed at Esperance, Manjimup, Pemberton, Moora and Busselton.

The Radio Communication Section has been working to introduce a UHF command network for fire control. This network has been designed to supplement the existing radio channels and is now available at six locations for controllers and fire fighters. To make the system more efficient, the radios have been modified for data as well as voice. The data transmissions can be made by radio facsimile or radio linked computer terminals and printers. The UHF system was used extensively during the 1990-91 fire season.

To improve security for the radio and associated equipment such as solar panels alteration to buildings and towers were carried out at Mt Dale, Mt Burnside and East Kirup radio repeater sites.

Radio communications refresher courses were conducted throughout the Department with staff receiving training in radio procedure and operations. The training was extended to include the use of data equipment in large fire operations.

REGIONAL ACTIVITIES

CALM is committed to regionalisation. In 1990-91 approximately 70 percent of its employees and 64 percent and 81 percent respectively of its CRF and Capital budgets were spent in country and metropolitan regional activities.

There are 11 regions and according to the intensity of activity, regions are subdivided into districts. Accordingly, the Department is spread over many locations. Figure 1 shows CALM regional boundaries and the location of regional and district offices.

Management structures are in place at 10 regional, 21 district and 4 sub-district offices. Only Gascoyne Region has no regional office, although there is a CALM presence at Exmouth, Carnarvon and Denham. Regional functions for Gascoyne are shared by Greenough and Pilbara. Within the regions National Park Rangers are at 31 other locations, a District Wildlife Officer at one other.

With a general concern by the community for protection of the natural environment and an increasing desire to experience its values, the roles of Regional Managers and their staff are most important. Satisfactory experiences for the 4.5 million visitors (1990-91 figures) to CALM managed lands and waters, drawn from local, statewide, interstate and overseas sources, are largely in their hands. They also have responsibility for the conservation of indigenous flora and fauna within regional boundaries. In the three forest regions in the south-west of the State, there is also a large commitment to managing the production of wood resources and regeneration and protection of the forests for a wide range of other values.

Regional Managers have a great deal of autonomy. Each is responsible for developing the region's annual works program under general direction as to priority and for managing the budget allocation. Liaison with local groups, especially formal Aboriginal communities, other Government agencies and the community in general, is extensive. There are often advisory committees established with a focus on part of CALM managed lands and waters. The committees make input to preparation of management plans and, after their approval, advise on management. It is mostly the Regional Manager who has responsibility for this important interface with the local community.

The general responsibilities allocated to regions are listed earlier in this report in General Information.

For 1990-91, the resources applied by CALM's regions were as follows:

REGION	FTE's	EXPENDITURE 1990-91	
		CRF \$'000	CAPITAL \$'000
Northern Forest	242	14,073	1,521
Central Forest	299	24,554	6,435
Southern Forest	236	28,379	3,387
South Coast	52	3,023	1,225
Kimberley	27	1,533	165
Wheatbelt	35	1,567	51
Greenough	20	1,247	81
Pilbara	19	1,162	121
Goldfields	13	998	8
Gascoyne	10	560	158
Metropolitan	27	1,395	103
	980	78,491	13,255

As well, 14 research programs are being conducted throughout the State. All regions are involved to a greater or lesser degree. Some responsibility for program resources remains with research centres at Woodvale and Como.

Key activities/achievements in CALM Regions for 1990-91 are:

Kimberley Region

Annual surveys of crocodile populations and nesting sites were continued during the year. A total of 10 estuarine crocodiles posing a threat to human life were trapped and relocated.

Substantial developments of visitor facilities under the National Parks Improvement Program were completed in Windjana Gorge, Geikie Gorge, and Purnululu (Bungle Bungle) National Parks:-

- . At Purnululu an airstrip to Royal Flying Doctor Service standards was completed, and most internal tracks were upgraded to a standard allowing comfortable travel for park visitors.
- . At Geikie Gorge a large information shelter, which doubles as a shaded waiting area for boat trip clients, was completed.
- . Toilets and showers at Windjana Gorge National Park were rebuilt using designs that fitted attractively in the landscape while providing comfortable facilities.

Two Aboriginal trainee rangers, appointed from among the traditional owners of Purnululu National Park, completed the academic side of their ranger training at Katherine Open College during the year.

Pilbara Region

Karijini (Hamersley Range) National Park: A major reconstruction of visitor facilities at Fortescue Falls continued during the year, and safe lookouts were constructed at gorge sites.

Millstream-Chichester National Park: The refurbishing of the old Millstream homestead as a visitor centre was completed, and information and interpretation panels were designed and ordered. The centre is expected to open to the public in late 1991.

Greenough/Gascoyne Region

Shark Bay: Following the purchase of Peron Station for eventual declaration as a national park (see Key Issues), a major de-stocking operation was undertaken.

The Burringurrah Aboriginal Community, traditional owners of the Mt Augustus area, were contracted to document heritage and cultural information for the new park, Mt Augustus National Park. The Community also commenced contract work, under the supervision of a park ranger, for the construction of signs and visitor facilities in the park.

Phytophthora Dieback: Moora district staff established a working party of relevant Government departments, local Government authorities and mining companies to address the dieback disease problem on the sandplains between Lancelin and Dongara. The functions of the working party are to promote public awareness, provide funding and direction for research, and to provide on-the-ground assistance in the management of dieback.

Mt Lesueur Area: Pending the declaration of the Mount Lesueur area as a national park, signs were erected and some roads closed in order to prevent the spread of dieback disease.

Goldfields Region

Desert Burning Programs: 67,500 hectares of Neale Junction Nature Reserve was ignited from the air, achieving a patch burn of 15 percent of the area. The program aims to simulate Aboriginal burning practices which maintained populations of native animal species that have now become restricted or rare. In 1991 it is planned to reintroduce threatened fauna to similarly treated areas in the Gibson Desert Nature Reserve.

Nullarbor World Heritage Listing: The role of coordinating CALM's involvement rests with the Regional Manager. Initial liaison with the Commonwealth Department of Arts, Sport, the Environment, Tourism and Territories (DASETT) and the South Australian National Parks and Wildlife Service (SANPWS) has commenced with preliminary meetings and discussions on boundaries and criteria for inclusion in the assessment process.

A Wildlife Management Program for sandalwood was completed and is being printed. The program provides for the conservation of sandalwood as a species while accommodating an ongoing industry based on harvesting the species.

Several projects involving contract employment of Aboriginal people were undertaken, including ethnobotanical and site work in the Great Victoria Desert Nature Reserve with the Paupiyala Tjarutja community and Aboriginal interest and liaison work with the Nganganawili community, Wiluna. Liaison with communities, advisors, ATSIC and AAPA over location of the Tjuntjuntjattra outstation within the Great Victoria Desert Nature Reserve and Kariyara outstation within the Gibson Desert Nature Reserve continues.

Wheatbelt Region

A substantial program of feral animal control has been maintained with the main emphasis on fox control in Boyagin and Tutanning Nature Reserves and Dryandra State Forest. Narrogin district personnel laid 39,000 fox baits over a distance of some 5,600 kilometres.

The Region continued to be heavily involved in the State's Remnant Vegetation Protection Scheme. During 1990-91 some 6,400 hectares of remnants were protected under 174 heritage agreements.

Districts of the Region continued with reserve inspections, including monitoring of illegal usage of nature reserve. The pattern of illegal usage in the Katanning district was observed to be increasing.

Trial plots to assess the commercial value of sandalwood were established on cleared farm land in the Narrogin and Katanning districts. These trials are funded by the Sandalwood Conservation and Research Program (SCARP).

Northern Forest Region

The multi agency fire control procedure was fully tested with severe fires in the Wanneroo and Jarrahdale districts. The fires were contained without serious impact on the settlements at Yanchepp and Jarrahdale, both of which were under serious threat.

A firm program has been established to bring the "Hills Forest" concept in the Mundaring district to fruition by the summer of 1991-92, following a successful year of increased public contact and involvement.

Fifty-one new populations of declared rare flora, covering 16 species, were located in the Region during the year, including rediscovery of presumed extinct species *Eucalyptus mundijongensis* and *Verreauxia verreauxii*.

Approximately 250,000 people visited Lane Poole Reserve during the year. Facilities were significantly improved during the year by departmental personnel and by former mill workers who were given short term employment by the Government, following the closure of Bunnings mill in Dwellingup.

Wesfi's medium density fibre plant commenced during the year and as a consequence, the supply of pine logs from Northern Forest Region plantations increased from 30,000 cubic metres to 80,000 cubic metres.

Managing the production of wood resources, especially from forests in the Dwellingup area, continued as a major activity.

Metropolitan Region

Major wildlife programs included the construction of a vermin proof fence at the Ellen Brook Nature Reserve for the conservation and management of the rare western swamp tortoise and arum lily control on Garden Island.

Prescribed burning was conducted for declared rare flora (*Diuris purdeii*) at Canning Vale.

The Region conducted major fire suppression activities at The Spectacles (Beeliar Regional Park) in conjunction with other State agencies. Altogether, 20 wildfires were attended on a multi-agency command basis.

There was primary involvement in 11 search and rescues in the Region's marine parks.

Considerable effort was devoted to developing public awareness, understanding and support for State wildlife management, eg. at Seaweek 1991 at Underwater World and Penguin Island, a University extensions course at Penguin Island, whale watching seminars, shopping centre displays and a program for Earthcarers.

Central Forest Region

Approximately 650 hectares have been planted with trees by the Region in the Wellington Catchment area on behalf of the West Australian Water Authority, in a cooperative endeavour to reduce the salinity level of the catchment. The total area now planted for this purpose is approximately 6,650 hectares.

Managing the production of wood resources from forests continued as a major activity.

Excellent levels of utilisation of forest produce are being achieved by integrated logging operations in the Harvey area. Product types sold include first, second and third grade jarrah sawmill logs, logs for charcoal, marri sawmill logs, marri chiplogs and smaller log materials for Valwood production at the WURC in Harvey and for Wesfi Dardanup and fencing and mining timber products.

A major salvage operation took place in the Myalup pine forest following a severe fire associated with Cyclone Fifi. 24,000 cubic metres of *P pinaster* and *P radiata* were successfully salvaged from the burnt area.

Regional staff attended the stranding of a humpback whale at Koombana Bay, three scamperback whales at Smiths Beach, and over 20 loggerhead turtles. Although unable to save the whales, most of the turtles were successfully returned to north west waters.

The first year of a three year program has enable The Cut campsite on the Leschenault Peninsula to be developed and opened for use by the public. Additional work will be carried out on the Peninsula over the next two years and a management plan will be completed in 1991.

Southern Forest Region

A large program of declared species control was undertaken. Target species were declared plants such as cape tulip, pattersons curse and blackberry and declared animals, particularly fox and rabbit.

As special projects, the towers from both Diamond Tree lookout and Boorara Tree tower were removed in the interest of public safety. The cabin from Diamond Tree was replaced after repairs were carried out, however, the Boorara cabin could not be replaced because of the unsafe condition of the tree.

Managing the production of wood resources from forests continued as a major activity.

As a development of the "Timber Strategy", the Region constructed major logging roads to provide access for mill logs and chip logs to the various mills.

All districts with the Region were heavily involved in both karri and jarrah silvicultural work following logging. This is a major component of the Region's overall program.

South Coast Region

Implementation of the noisy scrub bird management program continued with the translocation of 11 birds. Monitoring work has confirmed the rapid expansion of the population translocated to Mount Many Peaks.

The Region was a major participant in the operations that followed the "Sanko Harvest" oil spill. Major tasks involved the rescue and rehabilitation of New Zealand fur seal pups on Hood Island and Seal Rock, and a clean up of oil-contaminated beaches in Cape Le Grand National Park.

Approximately 860 hectares of pine plantation sharefarming on agricultural land in Albany was established during the year and 2,000 hectares previously established was maintained according to silvicultural prescription and protected from fire by CALM staff and local authority rural brigades.

COMMONWEALTH GOVERNMENT ASSISTANCE

Commonwealth funds make an important contribution to conservation and land management in this State, are highly valued and carefully sought and managed. During 1990/91 the Department continued to enjoy a close liaison with Commonwealth agencies and was successful in attracting considerable assistance under a variety of funding programs.

The Australian National Parks and Wildlife Service (ANPWS) continued to provide considerable funds under its States Cooperative Assistance Program (SCAP), Endangered Species Program (ESP) and its Contract Employment Program for Aborigines in Natural and Cultural Resource Management (CEPANCRM). Examples of new and ongoing projects which received funding under the Endangered Species Program for the period included research on Red-tailed Phascogale, fox biology and control, and surveys for rare and threatened flora in the CALM Merredin District and the CALM Metropolitan Region. The preparation of ANPWS funded recovery plans for *Eucalyptus rhodantha*, *Acacia anomala*, *Banksia cuneata*, *Stylidium coroniforme*, the Tammar, Woylie, Black-flanked Rock Wallaby, Shark Bay Mouse and the endemic frogs *Geocrinia alba* and *G vitellina* are also underway. The Chuditch Wildlife Management Program was approved by Corporate Executive and funds have been provided by ANPWS for its publication as a Species Management Program.

Funding was once again received from the Commonwealth as a contribution to the National Soil Conservation Program. In addition, this year saw funds being made available through the National Forest Inventory to provide continental-scale forest cover and type data in digital form. These new datasets will greatly assist in improved decisions in the utilisation and conservation of forested lands. The Australian Biological Resource Study [administered by the Department of the Arts, Sports, the Environment, Tourism and Territories (DASETT)] once again provided funds for plant taxonomic research. DASETT also provided funds for the purchase of Peron Station, Shark Bay. The funds were provided on the basis of proposed listing of the Shark Bay area as World Heritage.

SUMMARY OF COMMONWEALTH FUNDING 1990/91

SOURCE	AMOUNT (\$)
ANPWS	
- CEPANCRM	150 953
- States Cooperative Assistance	132 300
- Recovery Plan	69 300
- Endangered Species Program	219 050
- Save the Bush	76 969
Australian Centre for International Agricultural Research (ACIAR)	76 200
Department of Employment, Education and Training (DEET)	17 984
Department of Primary Industry and Energy	
- National Forest Inventory	64 000
- National Soil Conservation Program (via WA Department of Agriculture)	30 500
- Wetlands of Swan Coastal Plain	40 000
Department of the Arts, Sport, the Environment, Tourism and Territories	
- National Rainforest Conservation Program	25 000
- ABRS (Juliflorae)	28 691
- Contribution to the purchase of Peron Station	550 000
- Environmental Resources Information Network (ABRS)	55 000
CSIRO	2 500
WA Heritage Committee	13 628
TOTAL	\$1 552 075

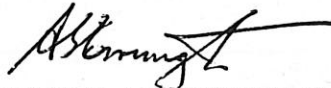
FINANCIAL STATEMENTS

The accompanying financial statements of the Department of Conservation and Land Management have been prepared in compliance with the provisions of the Financial Administration and Audit Act 1985 from proper accounts and records to present fairly the financial transactions for the financial year ending 30 June 1991 and the state of affairs as at 30 June 1991.

At the date of signing we are not aware of any circumstances which would render the particulars included in the financial statements misleading or inaccurate.



ACCOUNTABLE OFFICER



PRINCIPAL ACCOUNTING OFFICER

15 August 1991



DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

The accounts of the Department of Conservation and Land Management have been audited for the period July 1, 1990 to June 30, 1991 under the provisions of the Financial Administration and Audit Act 1985.

In my opinion

- (i) the controls exercised by the Department of Conservation and Land Management were sufficiently adequate to provide reasonable assurance that the receipt, expenditure and investment of moneys and the acquisition and disposal of property and the incurring of liabilities have been in accordance with legislative provisions; and
- (ii) the Statement of Receipts and Payments, together with the notes to and forming part of the financial statements, are based on proper accounts and present fairly the transactions for the period July 1, 1990 to June 30, 1991.

D D R PEARSON
AUDITOR GENERAL
October 15, 1991



Opinion of the Auditor General

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT PERFORMANCE INDICATORS 1990-91

The performance indicators of the Department of Conservation and Land Management have been submitted for audit under section 63 of the Financial Administration and Audit Act 1985, but have not been audited.

As detailed in the August 31, 1989 Report of the Auditor General to Parliament, the stage has yet to be reached where it is possible to conduct an audit of performance indicators as required by the legislation. I am therefore not in a position to, and do not, express an opinion on the performance indicators of the Department of Conservation and Land Management for the period July 1, 1990 to June 30, 1991.

A handwritten signature in black ink, appearing to read 'D D R Pearson'.

D D R PEARSON
AUDITOR GENERAL
October 15, 1991

**GOVERNMENTAL OPERATING & TRUST ACCOUNT
CONSERVATION AND LAND MANAGEMENT FUND
STATEMENT OF RECEIPTS AND PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90	DETAILS	1990/91
\$		\$
1 613 246	Balance as at 1 July	1 344 087
	This is represented by:	
218 839 DR	Operating Funds Account	4 647
1 696 833	Capital Works Account	1 099 906
135 252	Nature Cons & Nat Parks Trust A/C	168 370
-	Wood Utilisation Research A/C	57 574
-	Goldfields Dust Abatement A/C	3 590
-	Specific Purpose Grants A/C	<u>10 000</u>
	Receipts	
107 072 955	Operating Funds Account	120 977 178
15 397 504	Capital Works Account	17 193 435
90 851	Nature Cons & Nat Parks Trust A/C	145 157
57 574	Wood Utilisation Research A/C	294 689
84 265	Goldfields Dust Abatement A/C	95 195
10 000	Specific Purpose Grants A/C	341 390
<u>122 713 149</u>	World Wildlife Grants A/C	<u>44 327</u>
124 326 395		<u>139 091 371</u>
		140 435 458
	Payments	
106 849 469	Operating Funds Account	120 924 996
15 994 431	Capital Works Account	16 240 908
57 733	Nature Cons & Nat Parks Trust A/C	112 597
-	Wood Utilisation Research A/C	302 093
80 675	Goldfields Dust Abatement A/C	57 856
-	Specific Purpose Grants A/C	158 469
<u>122 982 308</u>	World Wildlife Grants A/C	<u>35 570</u>
1 344 087	Balance as at 30 June	<u>137 832 489</u>
		<u>2 602 969</u>
	This is represented by:	
4 647	Operating Funds Account	56 829
1 099 906	Capital Works Account	2 052 433
168 370	Nature Cons. & Nat Parks Trust A/C	200 930
57 574	Wood Utilisation Research A/C	50 170
3 590	Goldfields Dust Abatement A/C	40 929
10 000	Specific Purpose Grants A/C	192 921
-	World Wildlife Grants A/C	<u>8 757</u>

The purpose of the Fund is to hold moneys derived under Sections 64 and 68 of the Conservation and Land Management Act 1984.

Details of the various accounts are contained in the appropriate statements which follow.

The balance of this fund is held at and invested by Treasury with the interest from the investment being credited to the Fund.

**OPERATING FUNDS ACCOUNT
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		Estimate	1990/91 Actual	Variation
\$		\$	\$	\$
219 000 DR	Balance as at 1 July	5 000	4 647	(353)
 RECEIPTS (1)				
100 841 000	Consolidated Revenue Fund	118 210 000	113 000 000	(5 210 000)
3 237 000	Contributions from Industry & Other Sources	3 075 000	5 701 703	2 626 703
1 952 000	Commonwealth Recoups	665 000	1 040 912	375 912
<u>1 043 000</u>	Income from National Parks	<u>900 000</u>	<u>1 234 563</u>	<u>334 563</u>
106 854 000		122 855 000	120 981 825	(1 873 175)
 PAYMENTS (2)				
12 716 000	Corporate Services	12 958 000	13 590 338	632 338
10 835 000	Wildlife Management	10 457 000	13 096 213	2 639 213
11 612 000	Recreation Management	12 983 000	14 535 032	1 552 032
63 769 000	Forest Resources Management	79 882 000	72 409 583	(7 472 417)
<u>7 917 000</u>	Services to the Communtiy	<u>6 575 000</u>	<u>7 293 830</u>	<u>718 830</u>
106 849 000		122 855 000	120 924 996	(1 930 004)
 5 000	 Balance as at 30 June		 56 829	 56 829

NOTES TO OPERATING FUNDS STATEMENT

1. RECEIPTS

The Consolidated Revenue Fund Appropriation was paid into the Conservation and Land Management Trust Fund. Details of the appropriation are:

1989/90		Estimate	Actual	1990/91 Variation
\$		\$	\$	\$
100 841 000	Amount provided for Services for the year	116 971 000	112 100 000	4 871 000
	Contribution to Tree Planting Trust Fund	<u>1 239 000</u>	<u>900 000</u>	<u>339 000</u>
		118 210 000	113 000 000	5 210 000

The Treasurer's 1990/91 CRF Estimates of Revenue and Expenditure show a CRF contribution in 1989/90 of \$100,708,000 whereas the financial statements contained in the Department's 1989/90 Annual Report and this Annual Report show a figure of \$100,841,000. The difference of \$133,000 is due to the transfer of responsibility for the Timber Industry Regulation function to the Department of Occupational Health, Safety and Welfare from 1 July, 1990.

The CRF appropriation for 1990/91 was \$17,369,000 more than for 1989/90. The main reasons for this were:-

- (a) Commercial Operations - \$13,600,000 due primarily to the anticipated full year cost of the Department assuming responsibility for the payment of logging contractors from 1 January 1990.
- (b) Debt Servicing Costs - \$2,000,000 representing principal and interest payments relating to borrowings for the 1989/90 Capital Works Program.
- (c) Tree Planting Trust Fund - \$ 1,239,000. A new initiative, representing a proportion of revenues received from the sale of chip logs and 3rd grade sawlogs. The purpose of the account is to establish a blue gum resource, particularly on previously cleared land. The account is part of the Conservation and Land Management Trust Fund. Details of the Tree Planting Trust Fund account are:

	1990/91
	\$
Opening Cash Book Balance	-
CRF Contribution	900 000
Other Income	<u>8 586</u>
	908 586
Payments	<u>880 419</u>
Closing Cash Book Balance	<u>CR 28 167</u>

The CRF appropriation was underdrawn by \$5,210,000 due primarily to the recession in the timber industry, resulting in under expenditure on Commercial Operations.

The contributions from industry and other sources comprise the following:

	\$
Recoupable Projects	2 924 300
MRD Road Grants	859 731
Contract Salaries	665 889
Sundry Wildlife Recoups	12 834
Interest Receipts	834 743
Saleable Publications	<u>404 206</u>
	5 701 703

With the exception of saleable publications and interest receipts these moneys are for works of a recoupable nature. Commitments are not always known at the time the budget is framed and as a consequence large discrepancies can occur between the estimate and the actual amount received.

Commonwealth recoups are grants provided by the Commonwealth Government for wildlife and other research projects. Grants are for specific purposes and do not bear any comparison in dollar terms to grants in previous years. Grants are received usually as a result of an application for funds. Applications to the various funding authorities are made continuously throughout the year and the results of many applications are not known at the time the budget is framed. As a consequence large discrepancies can occur between the estimate and the actual amount received. As the grants are received on a recoup basis they do not affect the Department's call on funds from Consolidated Revenue.

2. PAYMENTS

Estimates and Expenditure by Programs and Sub-Programs in 1990/91 are as follows:

	Estimate		Actual		Variation
	\$	\$	\$	\$	\$
Corporate Services		12 958 000		13 590 338	632 338
Wildlife Management		10 457 000		13 096 213	2 639 213
Planning and Research	4 954 000		7 017 940		
Management	5 503 000		6 078 273		
Recreation Management		12 983 000		14 535 032	1 552 032
Planning and Research	1 643 000		2 744 586		
Management	11 340 000		11 790 446		
Forest Resources Management		79 882 000		72 409 583	(7 472 417)
Planning and Research	1 884 000		6 524 046		
Forest Management	25 770 000		21 897 394		
Timber Supply	52 228 000		43 988 143		
Services to the Community		6 575 000		7 293 830	718 830
Emergency Services	407 000		253 622		
Advisory and Management Services	4 039 000		1 879 752		
Recoupable Works and Services	1 960 000		5 010 521		
Grants to Non-Government Agencies	169 000		149 935		
		122 855 000		120 924 996	(1 930 004)

Estimates were prepared in a new program format for the first time in 1990/91. As there was no reliable historical data available, the estimates were prepared using the best information available at the time. As the year progressed it became apparent that there were several areas in which the actual level of activity differed from the original estimates.

As a result of the shift to program budgeting, outturns for 1989/90 have been rounded. The dissection by programs was not submitted for audit in 1989/90.

Expenditure for 1990/91 was \$14,075,527 greater than for 1989/90. A significant proportion of this increase was due to the full year cost of the Department assuming responsibility for the payment of logging contractors from 1 January 1990.

Other significant increases were:

- a) Salaries and Allowances - \$3,054,906. Fire related overtime and allowances were \$2,000,000 greater than for 1989/90 due to the long and severe fire season. The full year flow on cost of increases of 3% in September 1989 and April 1990 was the other major contributor to this increase (approx \$1,000,000).
- b) Debt Servicing Costs - \$1,673,628.
- c) Natural Disasters - \$1,302,150 due mainly to the long and severe fire season, however, the grounding of the "Sanko Harvest" off Esperance in February incurred direct costs of \$300,000 which have yet to be recovered.

The single line appropriation enables the Department to rearrange expenditure priorities to meet changes in priorities during the year.

The following table lists payments dissected by standard groups.

1989/90		1990/91	
Actual		Estimate	Actual
\$		\$	\$
38 334 000	Salaries, Wages and Allowances	37 637 000	41 617 000
5 163 000	Other Staffing Costs	4 741 000	4 236 000
1 318 000	Communications	1 381 000	1 340 000
38 938 000	Services and Contracts	55 705 000	47 693 000
4 179 000	Consumable Supplies	4 483 000	4 519 000
546 000	Maintenance of Assets	590 000	1 715 000
792 000	Purchase of Assets	181 000	836 000
17 579 000	Grants, Subsidies and Transfer Payments	18 137 000	18 969 000
106 849 000	TOTAL GROSS EXPENDITURE	122 855 000	120 925 000

Operating expenditure claims on hand but unpaid at 30 June 1991 amounted to \$352,158.

**CAPITAL WORKS ACCOUNT
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		Estimate	1990/91 Actual	Variation
\$		\$	\$	\$
1 696 833	Balance as at 1 July	1 100 000	1 099 906	(94)
RECEIPTS				
13 777 000	Borrowings (1)	14 200 000	14 200 000	-
108 000	Contribution Main Roads Dept	115 000	-	(115 000)
1 550 377	Mining Compensation	1 500 000	1 461 519	(38 481)
226 898 DR	Cash Order Balance	-	786 325	786 325
-	Plant Purchase A/C - Surplus (2)	-	15 929	15 929
188 925	Plant W/Shop-Operating Costs (3)	-	12 938 DR	(12 938)
-	Commonwealth Grant			
-	- World Heritage Assistance	550 000	550 000	-
<u>100</u>	Other (4)	<u>-</u>	<u>192 600</u>	<u>192 600</u>
17 094 337		17 465 000	18 293 341	828 341
PAYMENTS (5) (6)				
3 513 132	Estab & Tending H/W Forests	3 610 000	3 097 587	(512 413)
4 978 385	Estab & Tending S/W Forests	5 870 000	5 358 620	(511 380)
1 146 980	Access Road - Construction	1 060 000	1 382 998	322 998
712 301	Land Purchase	2 040 000	1 254 101	(785 899)
138 796	Plant & Equipment (2)	390 000	757 361	367 361
242 930	Buildings	285 000	198 738	(86 262)
1 123 888	Softwood Sharefarming	1 600 000	1 469 822	(130 178)
2 397 039	Hardwood Sharefarming	1 230 000	1 679 767	449 767
<u>1 740 980</u>	Nat Pks Develop & Improvement	<u>1 380 000</u>	<u>1 041 914</u>	<u>(338 086)</u>
15 994 431		17 465 000	16 240 908	(1 224 092)
1 099 906	Balance as at 30 June		2 052 433	2 052 433

NOTES TO CAPITAL STATEMENT

owings

The outstanding principal at 30 June 1990 was \$86,853,264. During the year, loans to the value of \$14,200,000 were raised. Principal and interest payments during the year amounted to \$3,121,418 and \$12,086,733 respectively. The outstanding principal at 30 June 1991 was \$97,931,846.

Between the years 1966/67 and 1982/83, the Commonwealth Government provided Softwood Forestry Agreement loans amounting to \$10,078,510 for the purpose of establishing and tending softwood plantations. The outstanding principal at 30 June 1990 was \$8,374,125. During the year principal and interest payments amounted to \$242,547 and \$812,201 respectively. The outstanding principal at 30 June 1991 was \$8,131,598.

The level of indebtedness is a matter of increasing concern. The Department is unable, under existing legislation, to use proceeds from the sale of timber to extinguish debt.

(2) Plant and Equipment

The Department finances the replacement of plant and equipment from the sale of existing plant and equipment and by the levy of a plant replacement surcharge which is included in the operating costs levied for usage.

1990/91 costs of \$4,468,075 were financed from sales of \$2,514,003 and plant replacement surcharge of \$1,970,000. The surplus of \$15,929 was transferred to the Capital Works Account as a source of funds.

The expenditure exceeded budget by \$367,361 due primarily to the requirement to upgrade the Department's mainframe computer to accommodate the new General Ledger system to be introduced from 1 July 1991.

(3) Plant Workshop - Operating Costs

The Department operates a fleet management system which is designed to charge all items of expenditure on which plant is used with the cost of using the plant.

For 1990/91 total operating expenses including licensing, insurance and the plant replacement surcharge were \$6,223,591 whilst the plant hire charges and rebates on diesel fuel used for forestry purposes totalled \$6,210,653.

The balance \$12,938 DR reflects the shortfall in hire charges required to break even.

(4) The bulk of these funds were the Capital Works Account share of the receipts generated from the investment of the Conservation and Land Management Trust Fund.

(5) Some variation between estimated and actual expenditure occurred due to the long and severe fire season, requiring the diversion of personnel to fire fighting. Fire fighting is funded through the operating account.

(6) Capital expenditure claims on hand but unpaid at 30 June 1991 amounted to \$39,901.

**CONSOLIDATED REVENUE FUND
REVENUE COLLECTIONS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		Estimate	1990/91 Actual	Variation
\$		\$	\$	\$
TERRITORIAL REVENUE				
16 698 527	Sawlog Royalties	18 700 000	13 815 613	(4 884 387)
6 619 405	Sandalwood	6 100 000	5 182 994	(917 006)
4 644 965	Chip Logs	7 400 000	6 691 858	(708 142)
<u>481 065</u>	Other	<u>900 000</u>	<u>687 767</u>	<u>(212 233)</u>
28 443 962		33 100 000	26 378 232	(6 721 768)
DEPARTMENTAL REVENUE				
945 672	Fees	617 000	595 794	(21 206)
12 564 024	Pine Conversion Sales	16 700 000	11 056 542	(5 643 458)
27 883 018	Hardwood Conversion Sales	42 700 000	33 371 415	(9 328 585)
273 140	Recoupable Projects	280 000	174 125	(105 875)
139 413	Wildlife	153 000	164 937	11 937
<u>583 623</u>	Sale of Assets	<u>-</u>	<u>9 754</u>	<u>9 754</u>
42 388 890		60 450 000	45 372 567	(15 077 433)
<u>70 832 852</u>	GRAND TOTAL	<u>93 550 000</u>	<u>71 750 799</u>	<u>21 799 201</u>

Actual revenue collected was much lower than estimated due to the recession in the economy, in particular the housing industry.

SUPPLEMENTARY FINANCIAL INFORMATION

- * The financial statements have been prepared on a cash basis in that only collections received and payments made are reflected therein. The disbursements include a net payment of \$66,000 to the Treasury Departmental Receipts in Suspense Account for accrued salaries.

- * Losses of public moneys and public or other property:

	1989/90		1990/91	
Revenue	\$	\$	\$	\$
Irrecoverable amounts	26.29		3639.10	
Other	<u>137.00</u>	163.29	<u>9.34</u>	3648.44
 General (includes thefts reported to Police, lost property, stock-taking deficiencies etc)		<u>-</u> 163.29		<u>54813.00</u> 58461.44

Losses totalling \$54,738.00 included in the above for 1990/91 had not been processed for write off by the close of the financial year.

- * Public and other property, revenue and debts to the State written off in accordance with section 45 of the Financial Administration & Audit Act.

	1989/90	1990/91
	\$	\$
Approved by the Executive Director	163.29	594.44
Approved by the Hon. Minister	<u>-</u> 163.29	<u>3129.00</u> 3723.44

- * Revenue due, but not collected at 30 June 1991 was \$14,915,970. This is \$6,798,091 greater than the revenue due but not collected at 30 June 1990. Most of the increase is due to extended credit terms granted to the timber industry to assist the industry during the recession.

**NATURE CONSERVATION & NATIONAL PARKS
TRUST ACCOUNT
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
135 252	Balance as at 1 July	168 370
RECEIPTS		
50 635	Game Licenses	950
13 205	Flora Licenses	68 972
5 332	Bequests and Gifts	51 451
<u>21 679</u>	Interest on Investments	<u>23 784</u>
226 103		313 527
PAYMENTS		
5 100	Sea-lions and Fur-seals	9 950
19 000	Western Swamp Tortoise	21 000
20 000	Swan Coastal Plain Wetlands Study	22 500
332	Numbat Research	-
11 518	Duck Counting	14 323
1 783	Herdsmen Lake Argentine Ant Study	-
-	Flora Study - Banksia hookeriana	5 250
-	- Verticordia brownii	2 000
-	Rare Flora Database	8 932
-	Dieback/Wildflower Industry Study	4 750
-	Moora Flora Survey/Management Program	2 472
-	Herbarium Database	13 260
-	Coobidge Creek Wetlands Study	2 500
<u>-</u>	Stick Nest Rat Study	<u>5 660</u>
57 733		112 597
168 370	Balance as at 30 June	200 930

Section 68 of the Conservation and Land Management Act 1984 provides for the establishment of the Nature Conservation and National Parks Trust Account within the Conservation and Land Management Fund. The Account is credited with money derived under the Wildlife Conservation Act 1950 and income from investments, gifts, devises, bequest and donations. The funds may be applied to research or any other purpose relating to the conservation of fauna and flora, or the management of National Parks, Nature Reserves, Marine Nature Reserves or Marine Parks, subject to compliance with any conditions imposed in connection with any gifts or bequests.

**WOOD UTILISATION RESEARCH COMMITTEE
TRUST ACCOUNT
STATEMENT OF RECEIPTS AND PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
-	Balance as at 1 July	57 574
RECEIPTS		
-	Innovative Marketing Board	210 500
57 574	Proceeds from Sales	62 044
-	Pilot Plant	12 000
-	Interest	<u>10 145</u>
<u>57 574</u>		352 263
PAYMENTS		
-	Innovative marketing of value added timber products	200 000
-	Sales	40 000
-	Fire Recoup	31 700
-	Miscellaneous Processing	16 000
-	Pilot Plant	10 000
-	Technology Exchange	<u>4 393</u>
<u>-</u>		302 093
57 574	Balance as at 30 June	50 170

**GOLDFIELDS DUST ABATEMENT
COMMITTEE TRUST ACCOUNT
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
-	Balance as at 1 July	3 590
RECEIPTS		
6 765	Balance transferred from City of Kalgoorlie-Boulder	-
20 000	City of Kalgoorlie-Boulder Grant	21 500
20 000	Chamber of Mines Grant	21 500
30 000	Clearing Compensation	-
7 500	Recoups	-
-	State Government Grant	42 000
-	Greening Australia Grant	4 500
-	Other	2 580
-	Interest on Investments	<u>3 115</u>
<u>84 265</u>		98 785
PAYMENTS		
11 734	CALM Salary Recoup	28 156
29 999	Regeneration Zone 1E	-
16 911	GDAC Regeneration Zones	6 416
3 986	Tree Planting and Rehabilitation	1 250
4 000	CALM Administration Costs	4 000
170	Public Education	126
12 735	CALM Wages and Plant Recoup	17 292
1 140	Direct Seeding Trials	425
-	Dust Sampling	<u>191</u>
<u>80 675</u>		57 856
3 590	Balance as at 30 June	40 929

The Goldfields Dust Abatement Committee is a community based committee established in Kalgoorlie-Boulder in 1973.

Up until February 1990 the funds of the Committee were managed by the City of Kalgoorlie-Boulder. CALM received an approach from the Committee to assume the responsibility for management of the funds and the employment of the Dust Abatement Officer. This responsibility was assumed as from 1 February 1990.

**SPECIFIC PURPOSE GRANTS TRUST ACCOUNT
STATEMENTS, RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
-	Balance as at 1 July	10 000
	RECEIPTS	
10 000	Grant for Lake Goegrup	-
	Donations - Golden Valley Tree Park	3 820
	- Gloucester Tree	1 241
	- Leeuwin Naturaliste National Park	1 000
	- Shannon Donation Box	334
	- Lane Poole Reserve Honour Box	119
	Grants - Midge Control	102 268
	- Swan Coastal Plain Study	81 637
	- National Forest Inventory	64 000
	- Environmental Resources Info. Networks	34 247
	- Donkey Orchids	26 664
	- Banksia Woodlands	10 000
	- Kimberley Turtle Research	7 549
	- Red Sands	1 800
	- Seal Rescue Program	879
	- Recreation Site Mtce - Albany	51
	Interest on Investments	<u>5 781</u>
<u>10 000</u>		351 390
	PAYMENTS	
	Midge Control	94 000
	Swan Coastal Plain Study	46 030
	Donkey Orchids	16 720
	Red Sands	<u>1 719</u>
<u>-</u>		158 469
10 000	Balance as at 30 June	192 921

The Specific Purpose Grants Trust Account was established during 1989/90 to account for monies given to CALM for specific purposes.

**WORLD WILDLIFE TRUST ACCOUNT
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

	1990/91
	\$
RECEIPTS	
Fox Control	
- Transfer from Receipts in Suspense (1)	637
- Other	400
- Interest on Investments	46
Fire & Invertebrates	
- Transfer from Receipts in Suspense (1)	2 639
- Grant	16 400
- Interest on Investments	543
Western Mouse	
- Transfer from Receipts in Suspense (1)	3 033
- Grant	20 125
- Interest on Investments	<u>504</u>
	44 327
PAYMENTS	
Fox Control	
- Equipment	637
Fire & Invertebrates	
- Consultancies	10 650
Western Mouse	
- Salaries	22 345
- Equipment	299
- Travel	<u>1 639</u>
	35 570
Balance as at 30 June	8 757

(1) Until October 1990 these moneys were processed through the Receipts in Suspense Account. These amounts represent the balance at the time the Trust Account commenced

**PRIVATE TRUST ACCOUNT
KEYNES FORESTRY PRIZE
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
384	Balance as at 1 July	439
	RECEIPTS	
<u>55</u>	Interest on Investments	<u>59</u>
439		498
	PAYMENTS	
—		—
439	Balance as at 30 June	498

The purpose of this fund is to provide an award for the most outstanding achievement by a student at the Department's Cadet School.

The balance of this trust fund is held at and invested by Treasury. Proceeds from the investment are credited to the trust fund as the investments mature.

**PRIVATE TRUST ACCOUNT
C.E. LANE POOLE MEMORIAL TRUST
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
2 615	Balance as at 1 July	6 742
RECEIPTS		
6 100	Donations	5 008
<u>395</u>	Interest on Investments	<u>836</u>
9 110		12 586
PAYMENTS		
263	Printing and Associated Costs	325
<u>2 105</u>	Travel Costs Associated with Award	<u>3 358</u>
2 368		3 683
6 742	Balance as at 30 June	8 903

The purpose of this fund is to assist with extending the knowledge and experience of awardees by study and travel in Australia or overseas, on topics of value to the Department of Conservation and Land Management.

The balance of this trust fund is held at and invested by Treasury. Proceeds from the investments are credited to the trust fund as the investments mature.

**PRIVATE TRUST ACCOUNT
RESEARCH CO-ORDINATING COMMITTEE
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
10 188	Balance as at 1 July	12 321
	RECEIPTS	
<u>2 133</u>	Interest on Investments	<u>1 712</u>
12 321		14 033
	PAYMENTS	
<u>-</u>	Balance as at 30 June	<u>-</u>
12 321		14 033

The purpose of this fund is to hold funds for research projects as approved by the Research Co-ordinating Committee.

The balance of this trust fund is held at and invested by Treasury. Proceeds from the investments are credited to the trust fund as the investments mature.

**PRIVATE TRUST ACCOUNT
DIEBACK RESEARCH TRUST FUND
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
14 555	Balance as at 1 July	17 462
RECEIPTS		
<u>3 038</u>	Interest on Investments	<u>2 436</u>
17 593		19 898
PAYMENTS		
<u>131</u>	Sundries	<u>-</u>
131		-
17 462	Balance as at 30 June	19 898

The purpose of this fund is to hold funds for research projects as approved by the Dieback Research Fund Committee.

The balance of this trust fund is held at and invested by Treasury. Proceeds from the investments are credited to the trust fund as the investments mature.

**PRIVATE TRUST ACCOUNT
CALM - PAYROLL DEDUCTIONS
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
818 326	Balance as at 1 July	317 080
RECEIPTS		
<u>11 318 165</u>	Payroll Deductions	<u>12 364 213</u>
12 136 491		12 681 293
PAYMENTS		
<u>11 819 411</u>	Payments to relevant authorities	<u>12 480 080</u>
317 080	Balance as at 30 June	201 213

The purpose of this fund is to hold all Income Tax Deductions and other payroll deductions from Salaries and Wages until the end of the month in which the deductions were made. The deductions are paid to the Australian Taxation Office and relevant insurance companies, medical benefit funds etc at the beginning of the following month.

The balance of this fund is held at and invested by Treasury with the interest from the investment being credited to the Government of WA.

This account was previously known as CALM-Income Tax Deductions. However during the year its role was expanded to include all payroll deductions.

A copy of the Trust Statement appears elsewhere in this Report.

**PRIVATE TRUST ACCOUNT
WITHHOLDING TAX - CONTRACTORS
PRESCRIBED PAYMENTS
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
45	Balance as at 1 July	544
	RECEIPTS	
<u>544</u>	Withholding Tax	<u>21938</u>
589		22482
	PAYMENTS	
<u>45</u>	Payments to Taxation Office	<u>10500</u>
544	Balance as at 30 June	11982

The purpose of this fund is to hold funds deducted from contractors prescribed payments in accordance with the Income Tax Assessment Act 1936.

The deductions are paid to the Australian Taxation Office at the beginning of the month following the month in which deductions were made.

The balance of this fund is held at and invested by Treasury with the interest from the investment being credited to the Government of WA.

**PRIVATE TRUST ACCOUNT
CONTRACTOR'S DEPOSITS
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

1989/90		1990/91
\$		\$
497 543	Balance as at 1 July	727 274
RECEIPTS		
168 444	Deposits Lodged During Year	272 551
<u>96 018</u>	Interest from Investments	<u>78 388</u>
762 005		1 078 213
PAYMENTS		
<u>34 731</u>	Deposits Refunded During Year	<u>549 808</u>
727 274	Balance as at 30 June	528 405

The purpose of this fund is to hold deposits lodged by contractors to the Department of Conservation and Land Management.

The balance of this trust fund is held at and invested by Treasury. Proceeds from the investments are credited to the trust fund as the investments mature.

**SUSPENSE
RECEIPTS IN SUSPENSE
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1991**

	1990/91
	\$
Balance as at 1 July	337 479
RECEIPTS	
Employees Group Deductions	445 591
Stamp Duties	166
Pine Log Levy	23 195
Hardwood Log Levy	146 506
Declared Birds	2 605
Miscellaneous	<u>244 187</u>
	1 199 729
PAYMENTS	
Employees Group Deductions	521 208
Pine Log Levy	13 142
Hardwood Log Levy	146 836
Declared Birds	2 058
Miscellaneous	<u>84 250</u>
	767 494
Balance as at 30 June	432 235

The purpose of the Receipts in Suspense Account is to hold funds pending identification of the purpose for which those monies were received pursuant to Section 9(2)(c)(iv) of the Financial Administration and Audit Act.

The balance of this fund is held at and invested by Treasury with the interest from the investment being credited to the Government of WA.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

TRUST STATEMENT NO. 11

NAME An account called the C.A.L.M. - Payroll Deductions shall be maintained as a Private Trust Account at the Treasury.

PURPOSE To hold P.A.Y.E. income tax instalments and other deductions from salaries and wages of employees, on the Department of Conservation and Land Management payroll.

RECEIPTS Such moneys as are received by the Department of Conservation and Land Management being P.A.Y.E. income tax instalments in accordance with the Income Tax Assessment Act, and other deductions as authorised deducted from salaries and wages of employees on the Department of Conservation and Land Management payroll shall be paid into and placed to the credit of the Account.

PAYMENTS The funds in the Account shall be applied as payments to the Commonwealth Commissioner of Taxation and the various organizations as authorised by employees.

ADMINISTRATION OF ACCOUNTS The Account shall be administered by the Executive Director, Department of Conservation and Land Management in accordance with the Financial Administration and Audit Act, Financial Administration Regulations and the Treasurer's Instruction.

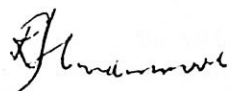
ACCOUNTING RECORDS There shall be maintained by the Executive Director a detailed record of transactions processed through the Account, together with such other accounting records and procedures as are prescribed in the accounting manual.

FINANCIAL STATEMENT The Executive Director shall cause to be prepared a statement of cash receipts and payments and such other supplementary information in accordance with the requirements of Treasurer's Instructions.

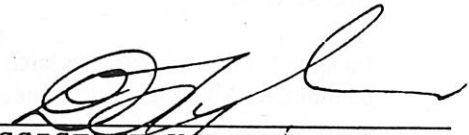
INVESTMENT OF FUNDS Moneys standing to the credit of the Account may be invested in accordance with Section 40(a) of the Financial Administration and Audit Act.

I have examined and agree to the provisions of this Trust Statement.

Approved



EXECUTIVE DIRECTOR



A/ASSISTANT UNDER TREASURER
(ACCOUNTING)
DATE 30-1-91

DATE _____

3009IF

ROADSIDE CONSERVATION COMMITTEE

Terms of Reference

The terms of reference of the Roadside Conservation Committee (RCC) are to coordinate and promote the conservation and effective management of rail and roadside vegetation for the benefit of the environment and the people of Western Australia.

Committee Membership

Mr J Blyth (Chairman)
Mr G Norwell
Mr P Bothwell
Mr G Hamilton
Mr B Loney
Mr C Morris (SECWA : represented on RCC since April 1991)
Cr J North
Cr I Purse
Mrs J Seabrook

Staff

Miss P Hussey (Executive Officer).

Miss Penny Hussey has been seconded to work on a 10 month project to write management guidelines for remnant vegetation on private land beginning 4 June 1991. Mr David Lamont will be Acting Executive Officer until March 1992.

Meetings

Six meetings were held during the year, including two country trips, ie. 11 August 1990, Boyup Brook; 8 October 1990, 10 December 1990, 11 February 1991, 16 April 1991, Darkan, and 10 June.

Research and Technical Investigations Sub-Committee

Chairman

Mr J Blyth

Date of Meetings

22 October 1990 and 20 May 1991.

Research

Funding for the following research projects during 1990/91 was on going as approved by sub committee. All projects were undertaken with the view of providing an immediate practical return to management.

- to continue a survey of the conservation value of roadsides and place the information gathered onto computerised database, (ongoing).

- the identification of *Phytophthora dieback* on roadside, (completed).
- the effect of log removal on ground fauna, (final report to be submitted).
- survey and management of *Banksia goodii* on roadsides (ongoing).
- further sections of Roadside Manual published, (ongoing).
- fire in Wheatbelt, (ongoing).
- Herbicide spraying of pest plants in roadside vegetation (ongoing).
- Wandoo decline in Pingelly region, (ongoing).

Publications

Several new sections of the loose-leaf Roadside Manual have been printed and are ready for distribution. They are:

Part number 10 Weed Control, 11 Clearance for Fencelines and Services, 14 Control of Plant and Animal Pests, 16 Flora Roads, 17 Development of Roadside Flora, 18 Regeneration and Replanting and 19 Legislation Applying to Roadside Vegetation.

The proceedings of the conference "Nature Conservation : the Role of Corridors" was launched in Canberra on 26 June 1991 by Dr John Stocker, Chief Executive of CSIRO. The proceedings and a summary version of the conference findings were launched separately in Perth by the Deputy Premier, Mr Ian Taylor. The summary booklet, with guidelines on the establishment and management of corridors, has been widely distributed to shire councils and other interested groups.

Other Publications

Coorow - Midwest Wildflowers Drive
 No Picking - leaflet
 Avon Valley Wildflower Drive

The Tourism Commission conducted a very successful promotion of RCC brochures.

Dieback Training Day

A trial of Dr R Hart's package, produced for the RCC, for the identification of *Phytophthora* was undertaken on 15 November 1990. Field work was conducted in Modong Nature Reserve with 15 course participants. Due to this training Dieback has been located by the City of Gosnells horticultural officer in native vegetation.

Herbicide Meeting

A meeting to discuss the choice and application of selective herbicides for controlling weeds in communities of native plants was held on 30 January 1991, and chaired by Mr J Blyth. Seventeen people with expertise in the use of herbicides attended.

From the proceedings of the meeting and with additional material supplied by attendees, a set of guidelines for use by road managers was developed and circulated to country Shire Councils.

Roadside Certificate of Merit

To raise public awareness of the value of roadside vegetation, the committee annually awards the "Roadside Certificate of Merit" (in cooperation with Greening Australia). 25 entries were received for 1990/91, with half of them from Shire Councils. This years winner was Mrs Ray Paynter, of Toodyay who has dedicated more than 20 years towards the preservation of the natural environment.

Save the Bush Grants Scheme

RCC has been awarded a Commonwealth Government "Save the Bush" Grant. The grant of \$5,000 will be used to combine the Roadside Conservation Value data with the State Geographical Information System Database.

Submission to Parliamentary Select Committee on Land Conservation

A submission to this Select Committee was made by the RCC.

General Activities

The Committee continued to have close liaison with the Country Shire Council's Association, individual Local Government Authorities, Government departments and conservation groups.

The Executive Officer gave a number of talks outlining the importance of roadside conservation and the role of the Committee.

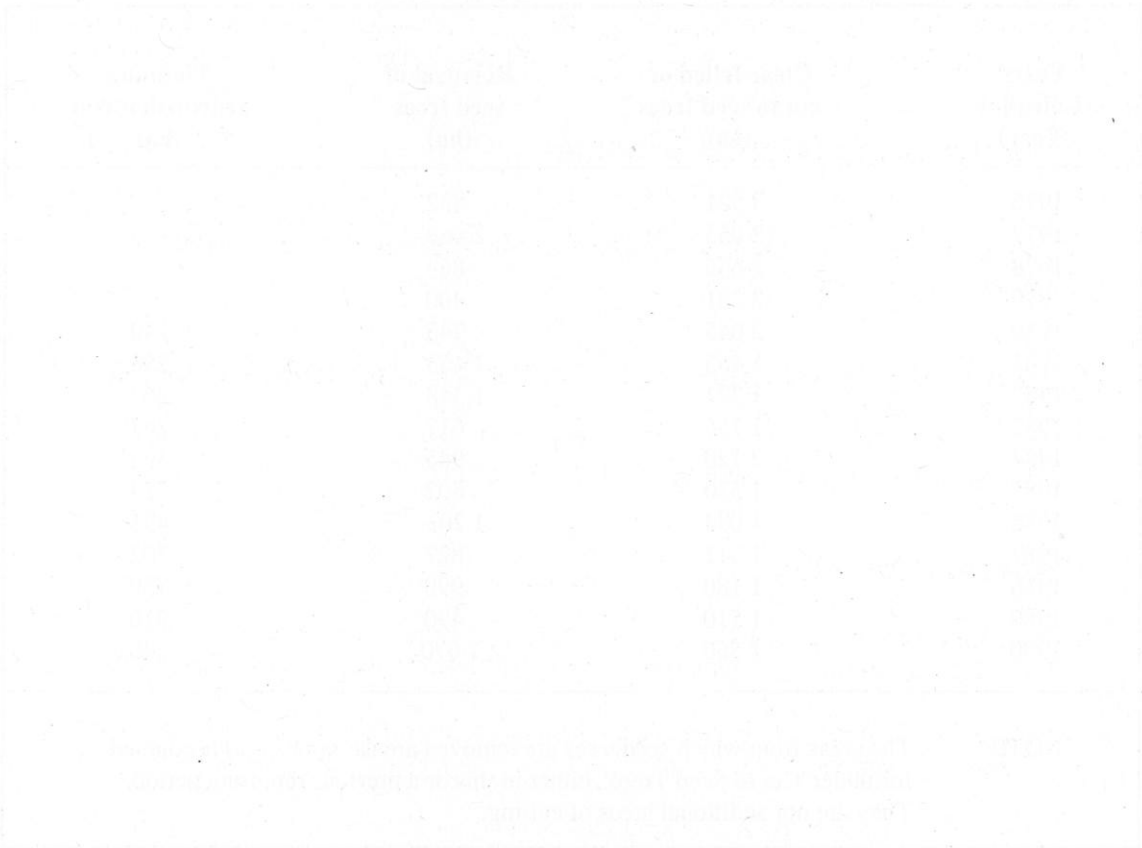
Displays were mounted at various public events including the Kings Park Wildflower Exhibition and several agricultural shows.

Finance

The Roadside Conservation Committee has no financial administration functions. The Department of Conservation and Land Management meets the cost of servicing the Committee and obtains contributions towards this cost from the Main Roads Department and Westrail. During the financial year 1990/91 expenditure to service the Committee was:

Salary	\$34 600 of which MRD contributed \$17 400.
Members Fees, Travel	\$10 000
Publications	\$ 4 500
Research	\$22 500 of which MRD contributed \$9 750 and Westrail contributed \$3 000.

Appendices



Appendix 1
Trend in Area of Karri Forest Cut Over and Regenerated

Years (Calendar Year)	Clear felled or cut to seed trees (ha)	Removal of seed trees (ha)	Thinning regrowth forest (ha)
1976	3 521	832	-
1977	2 053	2 460	-
1978	2 656	863	-
1979	2 281	400	-
1980	2 045	743	140
1981	1 455	1 463	256
1982	1 221	1 348	262
1983	1 735	617	267
1984	2 120	945	393
1985	1 530	802	324
1986	1 094	1 203	491
1987	1 311	827	702
1988	1 180	990	750
1989	1 510	490	910
1990	1 560	1 070	340

NOTE: The areas from which seed trees are removed are the same areas accounted for under 'Cut to Seed Trees', either in this or a previous reporting period. They are not additional areas of cutting.

Appendix 2 (a)
Trend in areas of Even-Aged Karri Regeneration

Year of Regeneration	Multiple Use Forest		Conservation Forest		TOTAL	
	Area (ha)	Cumulative Total (ha)	Area (ha)	Cumulative Total (ha)	Area (ha)	Cumulative Total (ha)
Before 1900	60	60	-	-	60	60
1900-09		60	-	-	-	60
1910-19	130	190	30	30	160	220
1920-29	160	350	60	90	220	440
1930-39	5 650	6 000	520	610	6 170	6 610
1940-49	720	6 720	520	1 130	1 240	7 850
1950-59	510	7 230	180	1 310	690	8 540
1960-65	220	7 450	-	1 310	220	8 760
1966	160	7 610	-	1 310	160	8 920
1967	220	7 830	80	1 390	300	9 220
1968	690	8 520	140	1 530	830	10 050
1969	1 300	9 820	300	1 830	1 600	11 650
1970	80	9 900	-	1 830	80	11 730
1971	80	9 980	10	1 840	90	11 820
1972	1 110	11 090	710	2 550	1 820	13 640
1973	190	11 280	-	2 550	190	13 830
1974	140	11 420	30	2 580	170	14 000
1975	630	12 050	430	3 010	1 060	15 060
1976	1 760	13 810	60	3 070	1 820	16 880
1977	1 630	15 440	250	3 320	1 880	18 760
1978	1 630	17 070	310	3 630	1 940	20 700
1979	1 930	19 000	300	3 930	2 230	22 930
1980	2 090	21 090	130	4 060	2 220	25 150
1981	2 980	24 070	310	4 370	3 290	28 440
1982	2 260	26 330	150	4 520	2 410	30 850
1983	1 930	28 260	370	4 890	2 300	33 150
1984	1 750	30 010	480	5 370	2 230	35 380
1985	2 330	32 340	-	5 370	2 330	37 710
1986	1 950	34 290	-	5 370	1 950	39 660
1987	1 180	35 470	-	5 370	1 180	40 840
1988	1 440	36 910	-	5 370	1 440	42 280
1989	1 230	38 140	-	5 370	1 230	43 510
1990	1 430	39 570	-	5 370	1 430	44 940

Appendix 2 (b)
Areas of State Managed
Hardwood Plantations as at 31.12.1990

Planting Year	ON PUBLIC LAND		ON PRIVATE LAND		
	Euc. Astringens (mallet)	Euc. Muellerana	Euc. Diversicolor Timberbelt Sharefarm	Euc. Globulus	
				Sharefarm	Timberbelt Sharefarm*
Prior to 1988	8 300	840	56	1 937	
1988				3 766	395
1989				267	820*
1990					
TOTAL	8 300	840	56	5 970	1 215

NOTE: Various small trial plots, gravel pit replantings and arboreta are not included in this table.

* Approximately 10 percent of area included *E. camaldulensis* and other salt-tolerant, non-commercial species.

Appendix 3
Areas of State Owned Plantations as at 31.12.90

Planting Year	P Radiata			P Pinaster and Other Species			Cumulative Total (ha)
	Net Area* (ha)	Second Rotation** (ha)	Cumulative Total (ha)	Net Area* (ha)	Second Rotation** (ha)	Cumulative Total (ha)	
<1959	1285		1 285	4 547		4 547	5 832
1959	308		1 593	360		4 907	6 500
1960	564		2 157	327		5 234	7 391
1961	384		2 541	515		5 749	8 290
1962	385		2 926	416		6 165	9 091
1963	600		3 526	304		6 469	9 995
1964	576		4 102	601	9	7 079	11 181
1965	505		4 607	566		7 645	12 252
1966	647		5 254	876		8 521	13 775
1967	806		6 060	1 308		9 829	15 889
1968	762		6 822	1 431		11 260	18 082
1969	977		7 799	1 786		13 046	20 845
1970	1 042		8 841	1 363		14 409	23 250
1971	1 096		9 937	1 300		15 709	25 646
1972	1 117		11 054	1 121		16 830	27 884
1973	1 274	32	12 360	959		17 789	30 149
1974	1 371		13 731	496		18 285	32 016
1975	1 241		14 972	1 262		19 547	34 519
1976	1 549		16 521	1 103		20 650	37 171
1977	1 391		17 912	865		21 515	39 427
1978	2 031	13	19 956	557		22 072	42 028
1979	1 874	8	21 838	562		22 634	44 472
1980	1 604		23 442	1 008		23 642	47 084
1981	1 597		25 039	994	13	24 649	49 688
1982	1 619	87	26 745	711	6	25 366	52 111
1983	1 338	43	28 126	815		26 181	54 307
1984	1 984		30 110	514	8	26 703	56 813
1985	1 775	160	32 045	517	2	27 222	59 267
1986	1 214		33 259	610		27 832	61 091
1987	1 563	160	34 982	777	78	28 687	63 669
1988	2 032	164	37 178	157		28 844	66 022
1989	1 097	449	38 724	64	28	28 936	67 660
1990	774	363	39 861			28 936	68 797

* The areas shown are the original areas planted, from which clear felled areas have been subtracted

** The areas shown are those areas which have been replanted following harvesting of the original plantation.

Appendix 4 Trend in Log Production

Year	Hardwood			Softwood			Total		
	Crown land (m ³)	Private property (m ³)	Total (m ³)	Crown land (m ³)	Private property (m ³)	Total (m ³)	Crown land (m ³)	Private property (m ³)	Total (m ³)
1986	1 331 831	127 006	1 458 837	247 637	29 121	276 758	1 579 468	156 127	1 735 595
1987	1 338 697	158 858	1 497 555	266 766	24 831	291 597	1 605 463	183 689	1 789 152
1988	1 427 624	174 519	1 602 143	302 447	31 161	333 068	1 730 071	205 630	1 935 751
1989	1 432 530	135 381	1 567 911	318 524	56 752	375 276	1 751 054	192 133	1 943 187
1990	1 319 246	80 561	1 399 807	312 520	105 865	418 385	1 631 766	186 426	1 818 192

Appendix 5

Trends in the Production and Use of Sawn Timber

Year Ended 30 June	Sawn Production			Export (m ³)	Local Use (m ³)
	Hardwood (m ³)	Softwood (m ³)	Total (m ³)		
1970	425 295	16 893	442 188	96 275	345 914
1971	420 777	21 595	442 372	79 437	362 935
1972	379 006	21 733	400 739	101 191	299 548
1973	375 135	23 283	398 418	111 547	286 871
1974	374 899	26 534	410 433	98 200	303 233
1975	368 844	27 086	395 930	100 127	295 803
1976	383 010	16 258	399 268	94 136	305 132
1977	369 151	16 685	385 836	77 352	308 484
1978	347 111	18 669	365 780	58 833	306 947
1979	331 135	18 145	349 280	66 420	282 860
1980	331 411	21 400	352 811	71 955	280 856
1981	330 863	22 954	353 817	65 109	288 708
1982	320 915	22 190	343 105	48 448	294 657
1983	252 124	13 216	265 340	41 789	223 551
1984	258 861	14 723	273 333	19 318*	254 015
1985	291 683	21 632	313 315	22 112*	291 203
1986	295 160	33 816	328 976	21 497*	307 479
1987	280 146	36 512	316 658	9 547*	307 111
1988	270 723	47 929	318 652	9 356*	309 296
1989	289 665	53 665	342 905**	12 965*	333 549
1990**	265 587	56 962	332 549	20 035*	302 514
1990***	245 201	49 036	294 237	N/A	N/A

* Figures for interstate export of jarrah and karri timber, sawn lengthwise, sliced or peeled, but not further prepared, or a thickness exceeding 5 mm, are excluded because of confidentiality restrictions applied by the Australian Bureau of Statistics.

** Final confirmed production levels for 1989/90.

*** Interim 1990 Calendar year volumes.

Appendix 6 SOURCE OF WOODCHIPS

Year	Crown Land													Logs From Private Property (m ³)	Grand Total Logs (m ³)	Ratio Private Property to Grand Total (%)	
	Residue			Logs from Thinning Regrowth Forest				* Logs from old Growth Forest					Total Crown Land (m ³)				
	Sawmill (t)	Forest (t)	Subtotal (t)	Marri (m ³)	Karri (m ³)	Other (m ³)	Subtotal (m ³)	Marri (m ³)	Karri (m ³)	Other (m ³)	Subtotal (m ³)						
1975-76														98 370	98 370		
1976-77	32 007		32 007					77 655	20 712				241 207	20 712	377 021	377 021	
1977-78	89 390		89 390					329 190	135 814				329 190	135 814	434 377	434 377	
1978-79	114 766		114 766					353 928	105 187				353 928	105 187	454 096	454 096	
1979-80	137 503		137 503				292	439 666	116 975			4 174	439 666	116 975	562 291	562 291	4.0%
1980-81	187 501		187 501				1 794	386 664	105 604			19 359	386 664	105 604	515 075	515 075	8.6%
1981-82	74 561		74 561				1 728	255 069	90 734			23 404	255 069	90 734	369 207	369 207	10.3%
1982-83	77 486		77 486				3 137	284 670	100 608			26 839	284 670	100 608	412 117	412 117	4.2%
1983-84	87 833		87 833				2 961	339 389	78 371			27 254	339 389	78 371	445 014	445 014	5.0%
1984-85	88 297		88 297				2 263	400 828	71 613			24 439	400 828	71 613	496 880	496 880	11.5%
1985-86	110 494		110 494				555	428 514	54 448			31 473	428 514	54 448	514 435	514 435	15.6%
1986-87	88 111		88 111				500	444 076	52 364			56 253	444 076	52 364	552 693	552 693	11.2%
1987-88	104 750	2 200	106 950				764	551 673	72 490			72 804	551 673	72 490	696 967	696 967	15.3%
1988-89	102 321	5 270	107 591				4 214	459 775	71 397			82 125	459 775	71 397	613 297	613 297	13.9%
1989-90	78 150	3 324	81 474				5 161	376 067	83 603	181		74 784	376 067	83 603	534 454	534 454	13.0%
1990-91	178 659	18 382	197 041				25 379	349 820	77 465			85 248	349 820	77 465	512 533	512 533	8.7%
Cum. Tot.	1 551 829	29 176	1 581 005	48 748	479 227	181	528 156	5 718 191	1 337 553	4 927	7 060 671	824 692	8 413 519	9.8%			

* Includes Forest Residue

** Includes 7 391 cubic metres harvested by CALM contractors from thinning.

Appendix 7 Summary of Exports of Forest Produce

Year	Timber		Wood Manufacture Value (\$)	Essentials Oils and Training Materials (\$)
	(m3)	Value (\$)		
Brought Forward	13 081 830	177 786 912	8 536 935	17 386 964
1968	84 569	4 947 595	3 016 850	280 806
1969	86 455	4 984 098	3 802 927	267 565
1970	96 275	5 661 547	3 906 699	317 553
1971	79 362	4 803 842	2 110 802	343 512
1972	101 191	6 439 732	2 369 541	348 762
1973	111 547	7 036 637	2 604 116	337 736
1974	98 200	7 366 709	3 769 461	433 627
1975	100 127	9 080 092	132 278	479 019
1976	94 136	9 823 037	993 199	214 918
1977	77 352	10 150 025	205 173	45 767
1978	58 833	8 809 324	4 625 089	41 422
1979	66 420	10 560 052	8 122 584	61 525
1980	71 955	12 265 737	591 670	255
1981	65 109	12 331 467	1 414 745	2 361
1982	48 448	9 599 222	1 671 328	-
1983	41 798	8 295 949	1 634 839	300
1984	19 3185	284 658	^{1*} 9 910 609	3 138
1985	22 112	7 172 934	^{2*} 351 837	2 099
1986	21 497	7 328 350	^{2*} 547 344	318
1987	9 547	4 199 069	^{2*} 965 344	-
1988	9 356	4 757 117	^{2*} 1 629 591	N/A
1989	12 965	5 496 968	^{2*} 1 838 584	N/A

^{1*} Includes interstate cork and wood not elsewhere included. This incorporates interstate jarrah and karri timber sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5mm, previously included in "Timber" in the years prior to and including 1982/83.

^{2*} Does not include interstate cork and wood (which is not elsewhere included either) because of confidentiality restrictions applied by the Australian Bureau of Statistics.
Source: Australian Bureau of Statistics

Appendix 9
Area of Prescribed Burning 1990/91

Indigenous Vegetation - Handburning (a)	1989/90	1990/91
State forests		
Handburns	15 341	18 596
Slash and regeneration	4 377	6 653
Indigenous areas within pine plantation zones	--	--
Clearing burns for pine establishment	45	1 095
National Parks	6 965	3 755
Nature Reserves	4 189	1 500
Other Crown Lands and Private Property	1 355	4 893
Total	32 272	36 492
Indigenous Vegetation - aerial ignitions (ha)		
State forest hardwood	165 562	170 561
National Parks	12 175	73 964
Nature Reserves	70 000	74 730
Other Crown Lands and Private Property	2 758	6 445
Total	240 495	325 700
State Forest Softwoods (ha)		
Winter burning under pines	5 597	2 972
Total	5 597	2 972

Appendix 10
Fire Fighting Equipment by Regions - 1991

Region	Heavy Duty	Gang Trucks	Light Patrol	Portable
Metropolitan	1	0	5	4
Northern Forest	17	13	22	11
Central Forest	26	16	16	14
Southern Forest	16	11	9	8
South Coast	6	0	17	4
Wheatbelt	2	1	6	3
Greenough	3	0	10	0
Goldfields	1	0	1	0
Pilbara	1	0	5	0
Kimberley	0	0	5	0
Totals	73	41	96	44

Hygiene Washdown Units by Regions - 1991

Region	Mobile HP/LU Trailer or Vehicle	Fixed HP/LU DHQ Electric or Petrol	Washdown Ramp - Pad
Metropolitan	1	0	1
Northern Forest	3	3	3
Central Forest	1	5	6
Southern Forest	4	3	3
South Coast	5	8	10
Wheatbelt	1	1	2
Greenough	3	1	2
Goldfields	0	0	0
Pilbara	0	0	0
Kimberley	0	0	0
Totals	18	21	27

Appendix 11 Number of Wildfires and Areas by Land Categories

	Number		Area Burnt (ha)	
	1989/90	1990/91	1989/90	1990/91
State forest hardwood	111	133	1 491	13 640
State Forest Softwood	44	58	165	812
National Parks	45	40	172 781	486 003
Nature Reserves	21	30	43 509	396 859
Other Crown Lands	50	83	23 290	306 038
Private Property	54	121	5 911	17 750
Total	325	465	247 147	1 221 102

Causes

	Number		Percent	
	1989/90	1990/91	1989/90	1990/91
Deliberately & Illegally lit	146	230	45	49
Escaped from Departmental prescribed burns	24	27	7.5	6
Escaped from other burning off	39	57	12	12
Accidental by timber industry	4	9	1	2
Accidental by other industry	14	22	4	5
Accidental by recreational visitors	22	27	7	6
Lightning	39	50	12	11
Unknown	34	39	10.5	8
Other causes	3	4	1	1
Total	325	465	100	100

Appendix 12

Changes to Senior Staff Level 6 and Above

Allen D G	District Manager	Progression
Bailey C	Public Relations Coordinator	Transfer
Banks R O	District Manager	Promotion
Bowen P J	Manager	Reclassification
Davison E M	Principal Research Scientist	Progression
Donnelly D J	Chief Utilization Officer	Reclassification
Edwards D M	Chief Cartographer	Retirement
Friend G R	Principal Research Scientist	Progression
Hagan R P	District Manager	Progression
Hanly P J	Senior District Forest Officer	Progression
Hearn R W	Senior District Forest Officer	Progression
Henderson P A	District Manager	Progression
Herford I K	Planning Officer	Progression
Hopkins A J M	Principal Research Scientist	Progression
Keppel P	District Manager	Progression
Kerr B J	Manager	Promotion
Low K C	District Manager	Progression
McNamara K J	Manager	Promotion
Sharp J R	Manager	Promotion
Shedley P	Snr Principal Utilization Officer	Retirement
Stoddard J A	Snr Research Scientist	Resignation
Strelein G J	Snr Research Scientist	Progression
Vear K R	Regional Manager	Promotion
Wheeler J R	Senior Research Scientist	Progression
Young G C	Senior District Forest Officer	Promotion

Appendix 13
Department's Safety Record since 1960/61*

Year	Hours Worked	No. of Accidents			Frequency Rate*			Days Lost
		Lost Time Accid.	Medical Treat. Accid.	Total	Lost Time Accid.	Medical Treat. Accid.	Both	
1960-61		188		140				3 015
1961-62		188		142				2 516
1962-63		200		154				2 763
1963-64	x)	172	x)	135		x)		2 498
1964-65		181		153				3 700
1965-66		179		144				2 455
1966-67		185		100				3 244
1967-68	1 895 600	124	312	436	65	164	230	1 701
1968-69	2 019 568	96	155	251	48	76	124	1 738
1969-70	1 901 020	70	129	199	37	67	104	721
1970-71	1 808 406	48	158	206	27	76	110	458
1971-72	1 728 577	45	112	157	26	64	90	414
1973-74	1 651 621	45	119	164	27	72	99	359
1974-75	1 748 219	55	127	182	31	72	104	634
1975-76	1 762 693	31	113	144	17.5	64	82	383
1976-77	1 707 635	32	157	189	19	92	111	620
1977-78	1 764 519	26	151	177	15	86	100	731
1978-79	1 835 917	44	143	187	24	76	100	810
1979-80	1 826 452	32	125	157	17.5	68	86	983
1980-81	1 897 463	24	135	159	13	71	84	490
1981-82	1 915 684	19	141	160	10	74	84	450
1982-83	1 931 192	27	134	161	14	69	83	849
1983-84	2 144 995	43	198	241	20	92	112	819
1984-85	2 093 453	30	189	219	14	90	105	776
1985-86	2 649 390	41	204	245	15	77	92	1 477
1986-87	2 505 789	28	127	155	11	50	61	1 382
1987-88	2 500 935	34	118	152	13	47	60	590
1988-89	2 502 079	43	132	175	17	52	69	939
1989-90	2 393 040	37	115	152	15	48	63	1173
1990-91	2 405 291	49	124	173	20	51	71	696**

x) Data not available.
xx) Of the 696 days lost, 129 were carried over from 4 accidents sustained during the previous year.

* Statistics prior to 1985-86 relate to the former Forests Department.

Appendix 14

PUBLICATIONS PRODUCED IN 1990/1991

GENERAL

Annual Report of Department of Conservation and Land Management 1990/1991
Annual Report of National Parks and Nature Conservation Authority 1990/1991
Four Corners: The Expose' Exposed
Four Corners: The Expose' Exposed - Summary
Shoalwater Bay Islands Nature Reserve Draft Management Plan No21
Leeuwin- Naturaliste National Park Management Plan No13
Shoalwater Bay Islands Nature Reserve - Key Issues
Lane-Poole Reserve Management Plan No 5
Lane-poole Reserve Management Plan; Summary of Submissions
Marmion Marine Park Draft Management Plan No 23
Fitzgerald River National Park; Public Submissions
Fitzgerald River National Park Management Plan No15
Marmion Marine Park; The Key Issues
North-West Bound (Book)
Parks of the Coral Coast
CALM Volunteers - A Community Program
CALM News (9 editions)
Volunteer News (4 editions)
Landscape - (4 editions)
CALM Book News (4 editions)
Training and Development Manual
Employee Information Booklet
C.E. Lane-Poole Memorial Trust - A Report To The Trustees by Greg Voigt
Tree Directory - resource directory
Marine Directory - resource directory
Granite Explorer - Riccardo the Dragon Lizard
Volunteer Management - Introductory Training Course
Forest Caretakers Flyer
Arbor Day Poster
Earth Secrets - A Guide to the Concept Path
Earth Caretaker Certificate
Rottnest Island Management Plan Mid-term Review
Avon Descent 1991 Public Information
Arbor Day 1991 Leaflets
To A Friend of the Trees - Certificate

WILDLIFE MANAGEMENT

Kukerin and Wheatbelt Wildflowers R.C.C.
Vesting and Management of Conservation Areas in WA
Coorow - Midwest Wildflowers R.C.C.
Whale Watching Log
Technical Report No 25 - Annual Waterfowl Counts 1988/89
Landnote 1/90 - Analysis of Water Quality in Shark Bay and Coral Bay: August-October 1989
Leaf and Branch (Book)
Western Australia's Floral Heritage
Plant Conservation Genetics and Germ Plasm
Dieback on the Central West Coast
Landnote 2/90 Possible Effects of Fox (and /or cat) Predation on Ground Nesting Birds in
Western Australia
Research Plan 1990/1991
Wildlife Management Program No6 The Western Swamp Tortoise
Resource Note No9 The Noisy Scrub Bird
Dolphins of Monkey Mia
Occasional Paper 2/90 The Natural Features of Lake Gregory : A Preliminary Review
Backgrounder - The Western Swamp tortoise
Backgrounder - The Chuditch
Backgrounder - The Numbat
Kingia Vol 1 No2
Kingia Vol 1 No3
Kingia Vol 1 No4
Coorow Shire - Lesueur Area R.C.C.
Sea-lions
Landnote 1/91 Biological Surveys of Four Goldfields Reserves
CALM Briefing Paper 1/91 Nature Conservation and Nature Reserves in the Jarrah Forest
Resource Note No 22 Mapping Plants along a Transect
Nature Conservation, Landscape and Recreation values of the Lesueur Area a Report to the
E.P.A. From CALM
Nature Conservation Reserves of the Kimberley
Fight Dieback, Give Our Plants a Chance
Take Care in Crocodile Areas
Information Sheets :
Common Dolphin
Bottlenose Dolphin
Scamperdown Beaked Whale
Sperm Whale
Humpbacked Whale
False Killer Whale
Southern Right Wright Whale
Long-finned Pilot Whale
Nuytsia Vol 7 No 3
Occasional Paper No 1/90 The Hill River Project
Information Sheet No 1/91 Aviary Birds
Occasional Paper No 2/91 Oral Histories Documenting Changes in Wheatbelt Wetlands
Wildflower Country (Book)
Flora Roads R.C.C.
Dieback Kills Wildflowers
Sources of Information on the Vegetation and Flora of WA
Fight Dieback - Speakers Kit
Presumed Extinct - Western Australian Plants
Occasional Paper No 1/91 Management of Spinifex Deserts for Nature Conservation
Roadside Manual R.C.C.

RECREATION MANAGEMENT

Yanchep National Park Activities Program July 1990
Lets Go Bush
Garden Island
The Dampier Archipelago - Islands in the Sun
Getting BushED with CALM
Badgingarra Nature Trail
Bushwalks in State Forests
Marmion Marine Park
Kalbarri National Park
Kalbarri National Park - Mushroom Rock Nature Trail
Yanchep National Park
Esperance National Parks
Dwellingup and Lane-poole Reserve
Give a Little Get a Lot Lane-Poole Reserve
Houtman Abrolhos - Islands Visitor Guide
Forest Affair
Nambung National Park
Recreation Facility - Field Construction Guide
Hamersley Range National Park - Geology of the Gorges
Hamersley Range National Park - Bird List
For the Reader Who is Going Places

FORESTS RESOURCES MANAGEMENT

W.U.R.C. Report No.16 - Drying and Grading Marri Boards
W.U.R.C. Report No 18 Moisture Content Fluctuations of Regrowth Jarrah and Karri Under
Different Environmental Conditions
W.U.R.C. Report No 19 Powder Post Borer (Lyctus spp.) Attack on Dry Timber - A Review
W.U.R.C. Report No 20 Drying Regrowth Eucalypts using a Low Temperature Sandalwood
Booklet
W.U.R.C. Out of the Woods - Small Eucalypt Processing Study Broome Nursery List
Tree Crops For Profit - Timberbelt Sharefarming Project 1990
A.F.D.I. Biennial Conference - Timber Production in Land Management
Tree Fund Review
Information Sheet No 3/87 - Tree Planters Guide
The Wheatbelt - Trees for Rural Areas
Calling All Squirrels
Code of Logging Practice
Manual of Logging Specifications
Forests for the Future
Forests for Australia - Towards Policies and Strategies
Insect Manual
Australias Native Forests Principles For Management I.F.A.
Sandalwood
Research Bulletin No3 Jarrah Dieback
Tree Killer - Dieback
Sandalwood Booklet
Agroforestry Update Newsletter
Research Bulletin No4 Review of Sandalwood
Future Forest Management in WA by Hon.Bob Pearce MLA
Valwood - It Turns Sows Ears into Silk Purses
Stop the Rot - Winter Firewood
CALM Briefing Paper 2/91 Domestic Firewood, Craftwood and Other Minor Forest Products in
the South West
CALM Briefing Paper No 3/91 Future Forest Management in WA

Appendix 15 Licences Issued in 1990/91

Fauna Licences	Licences Issued	Fauna Licences	Licences Issued
SCIENTIFIC		KANGAROOS	
Reg 17	191	Take kangaroos for sale (Reg 6)	163
Bird/Bat Banding Reg 23	94	Deal in carcasses (Reg 8)	30
EDUCATION & PUBLIC (to take)(Reg 15)	195	Deal in skins (Reg 10)	13
		Process (Reg 7)	19
		EXPORTS - Interstate	
EDUCATION & PUBLIC (to hold)(Reg 16)	73	Licences Issued	352
AVIAN FAUNA		SPECIES	Number
Keep and breed in captivity (Reg 12)	3 911	BIRDS	
Deal (Reg 13)	71	Finches	
Breed for Commercial Purposes (Reg 14)	3	Plum-headed	31
Trap (Reg 11)	4	Blue-faced Finch	7
Species Trapped	No.	Long-tailed (Blackheart)	13
Western Rosella	436	Pictorella	38
Western King Parrot	658	Yellow-rumped	58
Twenty Eight Parrot	1529	Gouldian	20
Galah	4	Masked	35
Red-browed Finch	156		
FAUNA		Parrots	
Keep in captivity (Reg 12A)	110	Bourke	7
EMUS		Cloncurry	2
Emu farming (Reg 14)	24	Port Lincoln Ringneck (Twenty Eight)	1 267
Dealing (Emu eggshells Reg 13)	19	Red-capped (WA King)	629
Skin Dealing (Reg 10)	2	Elegant	32
CROCODILES		Rock	15
Crocodile farming (Reg 14)	3	Mulga	30
Process (Reg 7)	1	Regent	58
GAME		Turquoise	1
Duck (Reg 21)	65	Weero (Cockatiel)	10
Quail (Reg 22)	0	Galah	29
		Australian King	20
		Hooded	29
		Major Mitchell	2
		Eclectus	1
		Scarlet-chested	13
		Golden-shouldered	4
		Alexandra's (Princess)	8
		Red-rumped	9
		Little Corella	2
		Gang Gang Cockatoo	2

SPECIES	Number	SPECIES	Number
Long-billed Corella	14	Amphibians	
Red-tailed Black Cockatoo	20	Trilling Frog	2
Yellow-tailed Black Cockatoo	2	Humming Frog	1
Baudin's White-tailed Black Cockatoo	29	Shoemaker Frog	13
Carnarby's White-tailed Black Cockatoo	2	Goldfield's Bull Frog	3
Sulphur-crested Cockatoo	4	Neobatrachus kunapalari	52
Western Rosella	518		
Northern Rosella	33	Other	
Adelaide Rosella	2	Red Kangaroo (kg meat)	16 000
Eastern Rosella	3	Red Kangaroo (skins)	56 498
Blue-cheeked Rosella	4	Western Grey Kangaroo (skins)	13 736
Crimson Rosella	6	Euro (skins)	5 853
Rainbow Lorikeet	10	Emu (eggs)	206
Musk Lorikeet	10	Emu (skins)	176
Purple-crowned Lorikeet	4	Emu (litres of oil)	17
Little Lorikeet	4	Emu (kg of meat)	1 664
Red-collared Lorikeet	32	Emu (kg of feathers)	1
Varied Lorikeet	4	Emu (skeleton)	1
Scaly-breasted Lorikeet	7		
Red-vented Blue Bonnet	6	EXPORTS - Overseas - subject to ANPWS permit/conditions.	
Yellow-vented Blue Bonnet	4	Licences issued	193
Other Species		Birds	
Australian Bustard	2	Galah	16
Wedge-tailed Eagle	1	Pied Heron	4
Black-breasted Buzzard	2	Silver Gull (specimens)	30
Black Kite	1		
Cape Barren Goose	3	Mammals	
Radjah Shelduck	6	Australian Fur-seal	6
Bar-shouldered Dove	12	Yellow-bellied Sheathtail Bat (specimen)	2
Spinifex Pigeon	24	Hill's Sheathtail Bat (specimen)	2
Common Bronzewing	17	Northern Mastiff-bat	2
Rose-crowned Fruit-dove	2	White-striped Mastiff-bat	2
Pheasant Coucal	2	Chocolate Wattled Bat	1
Emu	128	Yellow-lipped Eptesicus	1
White-winged Fairy-wren	10	King River Eptesicus	2
Splendid Wren	5	Greater Long-eared Bat	2
Fire-backed Pheasant	2		
Yellow-billed Spoonbill	1	Others	
Royal Spoonbill	1	Red Kangaroo (skins)	166 831
Little Penguin	4	Western Grey Kangaroo (skins)	29 807
Red-chested Button-quail	16	Eastern Grey Kangaroo (skins)	1
Painted Button-quail	5	Euro(skins)	2
Mammals		Red Kangaroo (meat tonnes)	250
Koala	3	Emu (skins)	798
Southern Hairy-nosed Wombat	3	Emu (eggs)	180
Common Wombat	1	Emu (oil litres)	198
Reptiles		Emu (kg meat)	27
Carpet Python	1	Emu (kg feathers)	9
Pygmy Python	1		
Children's Python	1		
Reticulated Velvet Gecko	75		
Tree Dtella	31		
Bynoe's Gecko	40		

**Fauna
Licences**

SPECIES **Number**

IMPORTS - Interstate

Licences Issued 566

Birds

Finches

Star 26
Gouldian 461
Blue-faced 6
Banded (Double-bar) 96
Plum-headed 8
Black-throated 27
Crimson (Blood) 113
Chestnut-breasted 116
Painted Firetail 226
Yellow-rumped 4

Parrots

Galah 1 294
Mulga 11
Mallee Ringneck 34
Port Lincoln Ringneck 40
Cloncurry 2
Swift 6
Hooded 25
Elegant 11
Blue-winged 35
Alexandra's (Princess) 234
Blue-bonnet 34
Weero (Cockatiel) 11
Australian King 157
Regent 21
Red-rumped 30
Turquoise 137
Gang Gang 17
Scarlet-chested 252
Superb 41
Bourke 276
Major Mitchell 14
Golden-shouldered 1
Red-winged 81
Eclectus 2
Long-billed Corella 408
Little Corella 285
Sulphur-crested Cockatoo 33
Yellow-tailed Black Cockatoo 7
Red-tailed Black Cockatoo 7
Adelaide Rosella 17
Crimson Rosella 244
Yellow Rosella 46
Eastern Rosella 202
Northern Rosella 12
Pale-headed Rosella 73
Green Rosella 24
Scaly-breasted Lorikeet 38
Rainbow Lorikeet 300

**Fauna
Licences**

SPECIES **Number**

Birds

Parrots

Varied Lorikeet 17
Little Lorikeet 28
Musk Lorikeet 12
Red-collared Lorikeet 45
Purple-crowned Lorikeet 6

Other Species

Brown Quail 4
Painted Button-quail 2
Black-shouldered Kite 1
Brown Goshawk 1
Grey Goshawk 1
Pacific Baza 1
Green-winged Pigeon 34
Squatter Pigeon 16
Wonga Pigeon 2
Spinifex Pigeon 18
Brush Bronzewing 8
Figbird 4
Emu 169
Australian Brush Turkey 1
Mallee Fowl 20

Exotics

Canary 4
Nyassa Lovebird 18
Peach-faced Lovebird 200
Fischer's Lovebird 10
Masked Lovebird 123
Rose-ringed Parakeet 8
Red-fronted Parakeet 32
Yellow-fronted Parakeet 47
Alexandrine Parakeet 5
Red-sided Eclectus Parrot 1
Sun Conure 2
Jandaya Conure 4
Red-faced Parrot-finch 9
Strawberry Finch 22
Cutthroat Finch 50
Cuban Finch 6
Melba Finch 176
Jacarini Finch 59
Aurora Finch 79
Red-headed Finch 40
African Firefinch 30
Cordon Bleu 56
Magpie Mannikin 20
White-headed Munia 13
White-backed Munia 14
Red-crested Cardinal 2
Waxbill 36
Golden-breasted Waxbill 126
Ruddy Ground Dove 8

Fauna Licences

SPECIES

Number

Exotics

Mandarin Duck	2
Hooded Siskin	14
Japanese Quail	20

Mammals

Rufous Bettong	2
Tasmanian Devil	3
Northern Quoll	2
Koala	9
Spinifex Hopping-mouse	4
Agile Wallaby	2
Tammar Wallaby	1
Red-necked Wallaby	2
Swamp Wallaby	2
Bush Rat	12
Southern Hairy-nosed Wombat	4
Common Wombat	4

Reptiles

Estuarine (Saltwater) Crocodile	255
Centralian Carpet Python	4

Others

Red Kangaroo (meat tonnes)	40
Western Grey Kangaroo (carcasses)	33
Euro (Carcasses)	68
Red Kangaroo (carcasses)	1 469
Western Grey Kangaroo (skins)	12
Red Kangaroo (skins)	162
Euro (skins)	26
Galah (mounted specimen)	1
Australian Hobby (mounted specimen)	1
Platypus (skull)	1
Little Penguin (specimens)	99

Exotic

Addax	4
Nyala	4
Kudu	2
Addra Gazelle	6
Grant's Gazelle	2
Ostrich	6
Grevy's Zebra	10
Cheetah	6
Brown Bear	7
Himalayan Bear	3
New Guinea Crocodile	2

Flora Licences

During the twelve months ending 30 June 1991 the following licences were issued:

Commercial Purposes Licence:

. 578 licences were issued authorising the taking of protected flora for sale from Crown land.

Commercial Producer's Licence

. 284 licences were issued authorising the taking of protected flora for sale from private land.

Scientific or Other Prescribed Purposes Licences:

. 1,189 licences were issued authorising the taking of protected flora from Crown land for scientific, educational, hobby, propagation and personal enjoyment purposes. Holders of this licence are not permitted to sell flora taken.

Appendix 16
Open Seasons Declared in 1990/91

**Government
Gazette**

Quail Hunting Season
1 January to 30 June each year
Cancelled

14.12.90

Appendix 17
Offences under the Wildlife Conservation Act and Regulations

Wildlife Conservation Act

Section		Recomm'd Charges	Convictions	Fine \$	Cost \$	Dismissed	Letters of Warning	No Further Action	Pending	Other \$
16(1)	Illegal taking of protected fauna	41	6	4400.00	380.90		8	4	23	
16(2)	Taking fauna contrary to the provisions of a notice	2							2	
16A(1)	Unlawful possession of protected fauna	19	4	1600.00	222.10		3	3	9	
16A(2)	Possession of untagged fauna	3					2		1	
17(2)(c)	Illegal importation of of fauna	1							1	
17(2)(e)	Selling fauna or taking fauna for the purpose of sale without authority of a licence	4					2	1	1	
17(2)(g)	Processing fauna without a licence	1					1			
17(3)(a)	Use of illegal means or device in the taking of fauna	1						1		
23B(1)	Illegal taking of protected flora from Crown Land	54	11	25300.00	549.40		16	6	21	
23D(1)(b)	Taking protected flora without permission of the owner/occupier of the land	5							5	
23D(2)(a)	Sold protected flora taken from private land, without authority of a licence	3					1		2	
23E(1)(a)	Illegal selling of protected flora	2							2	
23E(1)(b)	Failed to keep a record of flora purchased for resale	1							1	
23F(4)	Illegal taking of declared rare flora	13					5	1	7	
25(1)(a)	Wilfully misleading, assaulting or resisting a Wildlife Officer	11	1	200.00	20.00			2	8	*2067.55
25(1)(f)	Using abusive language to a Wildlife Officer	1							1	
25(1)(g)	Failed to observe the conditions of a licence issued pursuant to the provision of this Act	11	1	100.00	23.00		2	1	7	

*Restitution

Wildlife Conservation Regulations

Section		Recomm'd Charges	Convictions	Fine \$	Cost \$	Dismissed	Letters of Warning	No Further Action	Pending	Other \$
12(2)	Breeding or keeping avian fauna without a licence	1							1	
12(7)(a)	Possession of avian fauna, of a class not applicable to licence	4					1	1	2	
12(7)(b)	Possession of avian fauna in excess of numbers applicable to licence which have not been bred or lawfully obtained	2							2	
12(7)(d)	Keeping avian fauna at premises other than specified on licence	1							1	
12(7)(e)	Disposal of avian fauna without authority	1					1			
13(3)	Illegal possession or control of avian fauna not applicable to licence category	1							1	
13(4)(a)	Failure by licensed bird dealer to keep records	1							1	
13(5)	Failing to submit bird dealer returns within the specified period	1							1	
28(1)	Keeping fauna in captivity without a licence	1							1	
29(a)	Clip or pinion wings of wild fauna without authority	2						1	1	
32(2)	Transporting avian fauna without adequate caging	1							1	
34A(1)	Failure to supply adequate provisions to fauna in confinement	1							1	
44(1)	Dumping of rubbish on a nature reserve	4					4			
44(2)(a)	Illegal camping on a nature reserve	1					1			
44(4)	Failure to remove a structure from a nature reserve	1					1			
45(1)	Taking non-indigenous flora/fauna onto a nature reserve	2					2			
46(a)	Disturbing soil on a nature reserve	2					2			

Wildlife Conservation Regulations (continued)

Section		Recomm'd Charges	Convictions	Fine \$	Cost \$	Dismissed	Letters of Warning	No Further Action	Pending	Other \$
46(b)	Taking of flora from a nature reserve	2					1		1	
46(f)	Operate a vessel on a nature reserve in an area not set aside for that purpose	1						1		
46(g)	Operate a vehicle on a nature reserve, other than on a track provided for that purpose	1					1			
46(k)	Taking a dog etc. onto a nature reserve	2					2			
46(l)	Constructing a road, track or drain on a nature reserve	1						1		
46(m)	Lighting a fire on a nature reserve	2					2			
50(1)(a)	Consigning skin or carcass without a licence	1					1			
50(3)(b)	Affixed a tag to fauna not lawfully taken	1							1	
50(5)	Transporting fauna unlawfully taken or tagged	1							1	
51(5)	Failure to affix tag as required	1							1	
54(8)	Using a mist net to take fauna without authority of a licence specifically endorsed for such purpose	1						1		
54(9)(a)	Using animals in the taking of protected fauna	1					1			

TOTALS		215	23	31600.00	1195.40		60	24	108	*2067.55 Restitution
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