

annual  
REPORT  
1997-1998

DEPARTMENT  
OF CONSERVATION AND  
LAND MANAGEMENT

# CALM's MISSION

*We conserve and manage Western Australia's native plants and animals, and the lands, waters and resources entrusted to CALM for the benefit of present and future generations.*

## WHAT WE DO

Western Australia has a beautiful, diverse and supportive natural environment which provides material, aesthetic and spiritual benefits. It is an essential part of Western Australians' livelihood and quality of life.

In keeping with our mission, the Department of Conservation and Land Management has the following objectives.

**Conservation:** To conserve indigenous plants, animals and ecological processes in natural habitats throughout the State.

**Value and Use of Resources:** To optimise the value and economic return to the community of wildlife, lands, waters and resources entrusted to CALM without compromising conservation and other management objectives.

**Recreation and Tourism:** To identify and provide opportunities and services to the community which allows them to enjoy and value the wildlife, lands, waters and resources entrusted to CALM without compromising conservation and other management objectives.

**Knowledge:** To seek and provide an up-to-date and sound scientific and information basis for CALM's conservation and land management activities.

**Community Support:** To promote community awareness and appreciation of the values of the wildlife, lands, waters and resources entrusted to CALM, and to develop community understanding and support for CALM's conservation and land management activities.

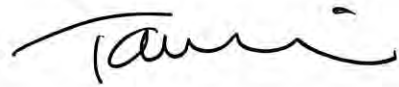
**CALM People:** To recruit, develop, reward and retain knowledgeable and talented staff, and to provide a stimulating, safe, productive and supportive work environment where staff can pursue individual goals consistent with those of CALM.

**Corporate Efficiency:** To optimise the efficiency, effectiveness and responsiveness of CALM in the achievement of conservation and other management objectives.



CALM is committed to developing a range of services which meet the needs of our many customers, and at the same time are consistent with our responsibilities for conservation and land management in WA.

Department of Conservation  
and Land Management  
Locked Bag 104  
Bentley Delivery Centre WA 6983  
Web site: <http://www.calm.wa.gov.au/>



**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 report of the Department of Conservation and Land Management.



Syd Shea  
EXECUTIVE DIRECTOR  
30 August 1998

## Highlights

- ✓ Two threatened mammal species recovered, and approved for removal from the threatened fauna list (p. 10)
- ✓ Banksia Environmental Award presented for 'Western Shield' (p. 10)
- ✓ Value adding of jarrah exceeding targets (p. 19)
- ✓ Code of Practice for Timber Plantations launched (p. 19)
- ✓ Bibbulmun Track: stage two constructed (pp. 27 and 30)
- ✓ Four supernovae discovered (p. 35)

## CONTENTS

WHAT WE DO .....	OPPOSITE
EXECUTIVE DIRECTOR'S REVIEW .....	II
THAT WAS THE YEAR .....	1
NATURE CONSERVATION MANAGEMENT PROGRAM 1 .....	7
FOREST RESOURCES MANAGEMENT PROGRAM 2 .....	19
TOURISM AND RECREATION MANAGEMENT PROGRAM 3 .....	27
ASTRONOMICAL SERVICES MANAGEMENT PROGRAM 4 .....	35
FACTS AND FIGURES .....	37
REGIONAL ACTIVITIES .....	37
SPECIALIST AND SERVICE ACTIVITIES .....	38
CALM DISABILITY SERVICE PLAN .....	39
ORGANISATION STRUCTURE .....	40
CORPORATE EXECUTIVE .....	41
CALM-MANAGED LANDS AND WATERS (Map, p. 42) .....	43
CORPORATE SERVICES .....	45
CALM <sub>fire</sub> MANAGEMENT .....	47
CALM <sub>fire</sub> PERFORMANCE INDICATORS .....	49
LEGISLATION AND COMPLIANCE .....	51
PERFORMANCE INDICATORS .....	53
FINANCIAL STATEMENTS .....	63
APPENDICES .....	79

THE OPINIONS OF THE AUDITOR GENERAL APPEAR AFTER THE PERFORMANCE INDICATORS AND THE FINANCIAL STATEMENTS.



## COMING ALONG IN STRIDES

We've covered a lot of ground in the past 12 months, from laying 480 kilometres of new trail for the southern section of the Bibbulmun Track to controlling feral predators over 3.4 million hectares and planting nearly 8000 hectares of tree crops.

The Bibbulmun Track is the State's only long-distance walking trail and one of the longest continuously marked trails in Australia. The newly aligned northern section of the track, which was opened during the year, has already attracted many new walkers and praise for the new facilities along the trail. Others travelled great distances just to walk 600 metres along the Tree Top Walk, bringing the number of people who've visited the site since September 1996 to more than 278 000.

CALM's Western Shield program to protect native fauna has also made great strides this year. In particular, another two species, the quenda and the tamar wallaby, have increased in number to the point where they have been able to be taken off the threatened species list. It was also the year that the noisy scrub-bird was reintroduced into its former range in the native forest beyond Harvey, 150 years after it was first recorded in the area.

And we've come a long way since the first formal forest research organisation was established within one of CALM's parent organisations, the Forests Department.

The formation of CALM in 1985 provided the opportunity to combine forest research with that of our other two predecessors, Wildlife (from the then Fisheries Department) and the National Parks Authority. The Department's research then extended across the length and breadth of the State, ranging from the irrigated plains of the Ord River Irrigation Area in the Kimberley to the sand plains around Esperance, and from the inland deserts to the waters off the coast. Today, with the inclusion of the Perth Observatory, CALM's research even extends into space.

As the past year has shown, CALM's scientific research is integrated into all aspects of the Department's activities, so researchers and operational staff work alongside each other. In this way, the answers science uncovers can be quickly incorporated into operational procedures. Indeed, the tremendous success of Western Shield has been due in large part because of the integration of the Department's scientific research and the operational side of the program.

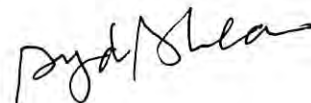
Another legacy is the continuing development of a vibrant tree crops and plantations industry that today is making a dramatic impact on the development of the State's timber industry and addressing the State's single biggest environmental problem — land and stream degradation caused by salinity.

The rate of planting maritime pines on cleared farmland is accelerating

and next year, the Maritime Pine Project (endorsed by the State Government under the Salinity Action Plan) will be extended to areas such as Esperance. This is part of a 30-year vision to establish 500 000 hectares of maritime pines that provide the resource for regionally based value-adding and downstream processing ventures. At the same time, these on-farm tree crops will lower water tables and help stem the rising tide of land and water degradation that results from salinity. This will not only have huge benefits in terms of agricultural production; it will also help landowners conserve and re-establish areas of natural bush that is habitat for native wildlife.

Once again, we wouldn't have made the distance without teamwork and commitment, but these are two of the strengths that are a hallmark of CALM's staff.

I would like to acknowledge the contribution of the Department's staff throughout the year. I also extend the Department's thanks to the many hundreds of CALM volunteers and private sector partners, without whose assistance, as always, we could not possibly accomplish the many things that we do throughout the year.



Syd Shea  
EXECUTIVE DIRECTOR  
30 August 1998



# THAT WAS THE YEAR ...

1997-98

*The Program sections in this annual report describe some of CALM's achievements in detail. Here is a review of some of the highlights of the year that took the public's attention.*

## **MARINE CONSERVATION: THE WAY AHEAD**

Steps to implement a world-class marine conservation network along Western Australia's 12 500 km coastline advanced significantly during the year with the appointment of members to the new Marine Parks and Reserves Authority and the adoption of a formal process to create new marine conservation reserves.

The Authority—in which marine conservation reserves are vested—is set up under amendments to the CALM Act that came into operation in August, 1997. This Authority is guided by a special scientific advisory committee that also was appointed during the year. As well as being the vesting body for marine conservation reserves, the Authority provides advice to the Minister for the Environment on developing policies for conserving and managing marine and estuarine environments as well as overseeing the development and implementation of reserve management plans.

The Government identified four areas as priorities for consideration as new marine conservation reserves. These are the Montebello-Barrow Islands, Dampier Archipelago, Jurien Bay and Geographe Bay-Capes-Hardy Inlet. While these areas have high conservation values, the increasing number of visitors and other users inevitably will lead to greater environmental pressures and impacts.

The process of establishing a marine reserve at Jurien already is under way. A community liaison and advisory group, including representatives from a wide range of users of the waters

*CALM is an integrated agency which manages lands and waters to conserve the native plants and animals they sustain, for the recreation and tourism they can support and for the renewable resources they provide.*

*CALM's primary responsibility is to manage these lands and waters on an ecologically sustainable basis so that the needs of the present are met without compromising the choices of future generations.*

around the coastal town, has been formed. It is working on issues such as a draft management plan and determining the management zones that may be included in a new reserve.

One role of the multiple-use marine conservation system is to preserve representative and special marine ecosystems. Another is to create a formal management framework to ensure that the various uses of the reserves are managed in an equitable, integrated and sustainable manner.

## **WESTERN SHIELD: ENCOURAGING RESULTS**

Major successes have been brought about through Western Shield, one of the biggest nature conservation initiatives undertaken anywhere in the world. This major CALM program aims to recover 30 native animal species on the brink of extinction by controlling introduced 'killing machines', chiefly foxes and feral cats.

Some of the statistics behind the project indicate just how big it really is. The area baited covers 3 400 000 hectares, or 34 000 square kilometres — an area greater than half the land area of Tasmania. Baiting is carried out by aircraft, which take eight weeks to complete a baiting operation. Each year the planes fly 156 000 kilometres, roughly equivalent to four times around the world.

Broadscale baiting (five baits per square kilometre) is possible because the synthetically manufactured '1080' toxin occurs naturally in Western

Australia's 'poison peas' (*Gastrolobium* species). This gives WA a natural advantage: because our native animals have evolved alongside these poisonous plants they have developed high tolerances to the poison's lethal effects, but the toxin is deadly to introduced species such as foxes and feral cats.

The success of Western Shield is easy to demonstrate. This year, two further native species were approved for removal from the threatened species list as a result of successful feral predator control. The quenda and the tammar wallaby join the woylie on the Conservation Dependent list under World Conservation Union (IUCN) rankings. At the same time, several other native animal species have been reintroduced to areas they have not occupied for up to 150 years because of the European fox and the feral cat.

In May, a colony of 40 chuditch was re-established in Cape Arid National Park east of Esperance, where the species had not been recorded for 50 years. The reintroduction followed comprehensive baiting of 28 000 hectares of the entire park. The following day, after 80 years of extinction on the mainland, the banded hare wallaby and the rufous hare wallaby (or mala) were brought to captive-breeding enclosures on Peron Peninsula in the World Heritage listed Shark Bay region, from the fox- and cat-free nature reserves on Bernier and Dorre islands.

Thirty mala also were introduced from a captive population in the Tanami Desert in the Northern

Territory to Trimouille Island in the Montebellos and to breeding enclosures in the Dryandra Woodland near Narrogin. Using animals bred at Peron Peninsula and Dryandra, CALM aims to reintroduce the mala back into the wild on the mainland where fox and cat control has been achieved.

Another milestone in restoring populations of native species into their former range was achieved when the noisy scrub bird was returned to the jarrah forests beyond Harvey. The reintroduction came 150 years after naturalist John Gilbert recorded the species.

### **TREES FOR ALL REASONS**

Planting for tree crops on cleared farmland is a major initiative under the State Salinity Action Plan. In the medium rainfall zone that encompasses much of the Wheatbelt, CALM has begun planting maritime pines (*Pinus pinaster*) in partnership with farmers as part of a program that ultimately will see hundreds of thousands of hectares of tree crops integrated into farming operations.

During the year, the maritime pines tree crops program was extended to the Esperance region, where the pines will have a major impact in combating salinity through drawing down water tables. The woodlots will provide a resource for a regional timber industry in the future. There are about 85,000 hectares in the Esperance region suitable for maritime pines and the first 500 hectares will be planted on about 10 farms next winter.

The Esperance plantings will be part of the State's program to capitalise on the Plantations 2020 Vision for the nation's tree crops estate launched during October. The plan aims to attract \$3 billion in private investment in farm tree crops and plantations and to treble the tree crops estate to 3.3 million hectares by 2020.

Western Australia is well on the way to turning the national vision into a reality, with a dramatic upsurge in the area of cleared farmland being turned

over to tree crops and plantations. In the higher rainfall zone, annual bluegum plantings have increased to more than 20 000 hectares, and in the past five years CALM has attracted overseas investment in farm tree crops and plantations that will be worth \$180 million in the next decade.

CALM has set its own sights on 800 000 hectares of tree crops on farms over the next 30 years. The original objective to plant 100 000 hectares of bluegums will easily be met next year, two years ahead of schedule.

### **SOWING THE SEEDS FOR THE FUTURE**

The burgeoning tree crops industry will mean an increasing demand for seedlings. As part of its commitment to farm forestry, CALM has embarked on an \$8 million tree nursery development at the Plant Propagation Centre in Manjimup. The new facility will enable the Department to increase its seedling production to more than 45 million plants a year within the next four years. This compares with current annual production of around 23 million seedlings a year and part of a longer-term strategy to lift output to 60 million seedlings a year.

The rapid increase follows CALM research that has revolutionised plant propagation techniques. Seedlings now can be produced by using cuttings taken from genetically superior 'mother plants' rather than direct from seed, enabling genetic gains to be passed on to tree growers much more quickly than by using traditional methods. These elite cuttings can be planted directly into containers and grown to the seedling stage; previously, maritime pine seedlings were produced in open paddocks.

Although maritime pines are the main species, CALM also is propagating cuttings of eucalypt hybrids. These include a cross between river red gum and Tasmanian bluegum, and another cross between Tasmanian bluegum and the flooded gum. The breeding program will enable the Department

to extend the range in which hardwood suitable for pulp logs can be planted.

The development also is a major boost to the Warren region's economy and employment prospects. The new facility will create an additional 20 full-time jobs and a similar number of part-time positions.

### **FARMLAND FOR WILDLIFE**

Land for Wildlife, part of the Salinity Action Plan, is a voluntary program that recognises the conservation efforts of private landholders and helps them to do more to conserve native plants and animals on their land. Since it was launched, 238 people have expressed interest.

In the year under review, landowners from Geraldton to Esperance set aside almost 15 000 hectares for nature conservation, equivalent to an area about four times the size of Yanchep National Park. The enthusiasm of landholders has shown that people are very aware that areas of wildlife habitat are an integral part of the measures to combat salinity and help conserve Western Australia's biological diversity.

### **TOURISM: A BALANCE FOR ALL SEASONS**

CALM's tourism strategy centres on an integrated approach of balancing conservation and tourism. The launch of the Nature-Based Tourism Strategy, a joint initiative between CALM and the WA Tourism Commission, ensures that Western Australia's natural assets are recognised and managed in a sustainable way, supporting tourism while at the same time protecting the natural environment.

A prime example of CALM's approach is the award-winning tree top walk among the tingle trees in the Valley of the Giants near Nornalup. The tree top walk occupies just three square metres of the forest floor, yet visitors can meander among the canopy along a 600-metre-long walkway that in parts is 40 metres above the ground. The tree top walk



today is one of the single biggest tourism attractions in the south-west, with more than 278,000 people visiting the site since it opened in September, 1996.

Another CALM nature-based initiative was highlighted during the year with the official opening of the northern section of the new Bibbulmun Track. When completed in September, 1998, the Bibbulmun will extend from Kalamunda to Albany, a total of 960 kilometres, making it one of the world's great walking trails and one of the longest continuously marked trails in Australia.

CALM and the Friends of Bibbulmun Track released two videos featuring the trail. The education and information videos are aimed at ensuring not only that trekkers have a great experience when they walk the track, but also that they care for the natural environment.

### **PREDICTING THE UPREDICTABLE**

A major national scientific research project that aims to provide fire managers with a better understanding of how bushfires behave under dry summer conditions was launched in February. Codenamed Project Vesta (after the Roman goddess of the hearth), it is part of a \$4.3 million, six-year program that will build on existing knowledge of fire behaviour. The program will help develop a standard system that land managers and planners throughout Australia can use to predict the spread and intensity of bushfires. This information is crucial in improving the safety of fire fighters and for protecting towns, community assets and environmental values.

Project Vesta is being undertaken jointly by CALM and CSIRO and has attracted world-wide scientific interest. It also is being supported by research institutions, fire and land management agencies throughout Australia and several local shires in the south-west forest region.

The research program, which involved conducting a series of experimental burns in the jarrah forest east of Harvey, aims to provide a better understanding of how fire behaviour is affected by the age and structure of forest fuels. Intense fires in summer pose the biggest threat to life and property, as well as to fire fighters themselves. So a more accurate understanding of how these fires behave will not only make fire fighting safer; it also will enable better planning for fire management, especially in areas such as the Darling Scarp near Perth, the Dandenongs near Melbourne, the Blue Mountains near Sydney, and the Adelaide Hills.

### **MORE EYES IN THE SKIES**

Aerial surveillance using spotter aircraft has been a part of Western Australia's forest fire management program for more than 25 years. Since aerial surveillance was introduced by the then Forests Department in 1971, the spotter fleet of Piper Super Cubs has notched up more than 130 000 flying hours and flown about two million kilometres — that's about 50 times around the Equator.

The past year saw the beginning of the first phase of a major upgrading for CALM's fire surveillance air wing with the introduction of two new spotter aircraft — Champion Scouts that are 30 per cent faster than the Cubs and have twice their surveillance endurance. The new planes have been named 'Numbat' and 'Chuditch' after two of the endangered species of animals found in the forest that aerial surveillance will help protect from the ravages of wildfires.

The aerial attack on bushfires was further strengthened through an agreement with the WA Police Service to use police aircraft and Forward-Looking Infrared Equipment (FLIR). Access to the FLIR will significantly upgrade CALM's capacity for early intelligence on fire behaviour by helping to determine fire perimeters and the location of hop-overs and hot-spots.

Operation Firebird (the codename for aerial fire suppression using water bombers that was introduced on a trial basis last year) again proved that this technique has a valuable role to play, particularly as a rapid-response, first-strike tactic in controlling wildfires

Two water bombers again were used in summer. They were Dromader M18-As, which attended 54 fires compared with 47 the previous year. The planes were exceptionally effective during a spate of fires in the Casuarina-Southern River area where a man was later convicted for lighting some of the fires. The cost-effective, rapid-response tactic of water bombing has helped in minimising property losses and giving ground crews an opportunity to get in and attack the fires.

### **DIEBACK: THE WAR CONTINUES**

Efforts to combat the enormous threat of the deadly plant disease 'dieback' to the State's native flora were increased with the setting up of a Dieback Consultative Council. The council has representatives from Government, industry, community and conservation and aims to extend research, allocate resources and advise government on the best management policies. The council is part of a new strategy after a comprehensive assessment by CALM of the recommendations made by the WA Dieback Review Panel and in public submissions made during the three-month public comment period following release of the review report. The Government accepted all of the 33 recommendations made by the review panel.

The council's role is to further advise the Government on adopting the Dieback Review Panel's recommendations, and replace the existing dieback policy with one that focuses on delivering resources to the most valuable and defensible areas.

During the year, a number of the review panel's recommendations were implemented. A senior officer was appointed as dieback co-ordinator and



a number of task groups were set up to deliver change.

Another priority has been to establish a Phosphite Action Team within the Department. Phosphite is a relatively simple compound based on phosphorous that protects dieback-susceptible plants from *Phytophthora cinnamomi*, the fungus that causes the disease. The ground-breaking research associated with phosphite has already allowed CALM to treat a number of populations of critically endangered rare flora in the Stirling Range, Fitzgerald River and Cape Arid national parks as well as two areas containing declared rare flora near Busselton.

CALM's expertise in dieback research and management was further recognised when the Commonwealth agency Environment Australia contracted the Department to develop a draft National Threat Abatement Plan for *Phytophthora* species. The plan will identify management and research strategies needed to reduce the dieback threat for specific regions of Australia, including the south-west of Western Australia. Environment Australia allocated \$500,000 to supplement CALM-funded research into a variety of dieback issues, including the treatment of priority areas with phosphite.

### **A BOOST FOR WA'S NATURAL HERITAGE**

The management and protection of Western Australia's natural resources received a major boost in July with the signing of the Natural Heritage Trust Partnership Agreement between the Commonwealth and WA Governments.

Under the agreement, WA received nearly \$27 million in 1997-98 for natural heritage projects in the State. Under the terms of the partnership agreement, WA will develop and implement national and State program objectives and priorities and also provide leadership to achieve improved environmental protection, sustainable agriculture, biodiversity conservation, waterways and

rangeland management supported by Natural Heritage Trust funding.

### **HERE COME THE BUSHRANGERS**

Conservation is about preserving the natural environment for future generations. CALM has recognised this by involving the future generation in its Cadets WA program, an initiative developed in conjunction with the Office of Youth Affairs. Bush Rangers, launched in June, will help young people gain a greater awareness and become involved with the conservation and management of the natural environment.

The program will teach young people teamwork and leadership skills, concentrating on practical skills such as first aid, bushcraft and survival, and landscape and environmental management. The program will also give young people the opportunity to undertake practical conservation projects with CALM.

### **CALM ON THE WEB**

CALM's internet site, NatureBase, has grown from strength to strength with an average of more than 10 000 'hits' a day. During the year, the site gained international acclaim by winning first prize in the academic/research/government sites section in a competition run by Canadian website software provider, SoftQuad Inc.

Bringing WA's natural features to the electronic world took another step in July with the release of CALM's CD-ROM, *Wild about Western Australia*. The CD gives people the opportunity to explore the sites and sounds of WA's natural wonders, including 'virtual reality' tours of places such as the Bungle Bungles, the Pinnacles, Monkey Mia, and the Tree Top Walk in the Valley of the Giants.

The Department's range of informative publications was further enhanced with the publication of the twenty-first title in the Bush Book series of pocket-sized field guides.

New titles included *Beachcomber's Guide to South-West Beaches*, *Common Trees of the Goldfields*, *Bugs in the Backyard*, *Wildflowers of Shark Bay* and *Australian Birds of Prey*.

The range of 'Discovering' books (guides to come of the State's great natural wonders) also was extended with the release of *Discovering Shark Bay Marine Park* and *Monkey Mia and Discovering Valley of the Giants and Walpole-Nornalup National Park*.

### **A FOREST ACCORD**

The Regional Forest Agreement (RFA) process — an agreement between the Commonwealth and State Governments for a 20-year plan for the management of the south-west native forests — entered its final phase. The Agreement aims to develop a world-class forest reserve system, ensure ecologically sustainable forest management and deliver certainty for forest communities and industry.

The ecology and management of the south-west forests have been the subject of more scientific research and more public debate over more years than any of our other natural resources. What the RFA seeks to do is bring together the best information available, expose it to critical examination and debate, and then produce an agreement that strikes a balance between the demands of groups on both sides of the debate. The outcome will be based on rigorous science and designed to serve the interests of the Western Australian community as a whole.

The RFA process has involved input from a wide range of independent scientists and experts, community groups and industry stakeholders. Members of 60 major stakeholder groups, including local government, conservation groups, the mining and forestry industries, unions, community groups, beekeepers, wildflower pickers, and tourism and heritage groups, have been involved in the process for more than a year,

via the Stakeholder Reference Group. More than 500 experts have been involved in reviewing existing information and producing new information about the south-west forest region. The experts' disciplines include forest ecology, soil science, botany, zoology, biogeography, geology, cultural heritage, economics and social science. Much of the new

and revised information comes together in the Comprehensive Regional Assessment (CRA) Report that was released in February.

A Public Consultation Paper, Towards a Regional Forest Agreement, was released in May 1998. This paper, which discussed possible approaches that could be taken to achieve the

objectives of the RFA, marked the beginning of a public consultation period. This included a series of RFA Open Days attended by more than 1 600 people in centres throughout the south-west and Perth.

Prime Minister John Howard and WA Premier Richard Court will sign the final agreement early in 1998-99.





# NATURE CONSERVATION

## MANAGEMENT PROGRAM 1

### Objective

To conserve indigenous plants, animals and ecological processes in natural habitats throughout the lands and waters of the State.

*This Program involves the production and implementation of area management plans, policies and management programs for wildlife (fauna and flora) conservation and protection. It also involves research into wildlife and ecological communities and regulation of human activities which involve protected wildlife, including aviculture, commercial wildlife interactions (e.g. whale watching) and scientific research licensing, as well as encouragement for conservation initiatives on private property and roadsides, prevention of illegal taking of protected wildlife, emergency actions such as rescues of stranded whales or oiled seals, and public information and liaison programs.*

*Wildlife management programs are developed for species and communities which are threatened, are commercially exploited, or have a high public profile or public interaction interest, according to the principles of ecological conservation and sustainability.*

*Lands and waters are reserved and managed to conserve viable representative samples of the State's natural ecosystems and their inherent natural processes, as well as for the protection of their flora and fauna.*

*The Program focuses on three areas:*

- 1. conservation of the State's wildlife;*
- 2. planning and research, to provide the basis for management;*
- 3. public awareness and liaison, to enhance appreciation of nature conservation needs and processes, and private contributions to nature conservation.*

### Highlights

- ✓ Two threatened mammal species recovered, and approved for removal from the threatened fauna list (p. 10)
- ✓ Banksia Environmental Award presented for 'Western Shield' (p. 10)
- ✓ Number of presumed extinct native plant species rediscovered in the wild brought to 18 since 1991 (p. 9)
- ✓ State Salinity Action Plan provides nature conservation benefits (p. 7)
- ✓ Land for Wildlife Scheme expands to 14 865 ha (p. 16)

*The Roadside Conservation Committee operates within the overall Nature Conservation Program to coordinate and promote the conservation and effective management of native vegetation on road and rail reserves for the benefit of the environment and the people of Western Australia. CALM meets the cost of servicing the Committee and obtains contributions towards the Committee's operations from Main Roads Western Australia and Westrail.*

### INTERNATIONAL LINKS

In November 1997 the World Conservation Union (IUCN) held a symposium in Albany entitled 'Protected Areas in the 21st Century: From Islands to Networks'. The main objectives of this symposium were to review the status of protected areas around the world and the principal challenges facing them at the threshold of the 21st century.

The symposium was attended by some 84 delegates from 38 different countries. It was co-hosted locally by CALM and Environment Australia, with field trips organised to the Stirling Range National Park, Fitzgerald Biosphere Reserve and Two Peoples Bay Nature Reserve. The Minister for the Environment and CALM's Executive Director gave presentations to the opening plenary session.

A meeting of the Australian Working Group on Biosphere Reserves, convened by the Australian National Commission for UNESCO, was also held in Albany concurrently with the IUCN symposium.

In March 1998, the IUCN published the first worldwide listing of threatened flora. This list was compiled by the World Conservation Monitoring Centre, with data for Western Australia being provided by CALM. The publication acknowledged that the data from Australia, North America and southern Africa were comprehensive, while those from other regions were incomplete. Australia was listed as having the second-highest number of threatened (and rare) plants, with the USA having the most.

### STATE SALINITY ACTION PLAN

1997-98 was the first full year of operation of the Salinity Action Plan released by the Western Australian Government in November 1996. As the lead nature conservation agency, CALM played a major role in its implementation.

The restoration of degraded areas of remnant vegetation, particularly those of small to medium size within highly cleared regions, is an important strategy in ensuring maximum water use by these areas. Works under the

Salinity Action Plan have included:

- assessment of sites requiring rehabilitation;
- collection and growing of seed for regeneration activities;
- shaping, ripping, topsoil return and mounding within gravel pits and other disturbed areas on reserves;
- planting and direct seeding; weed control;
- fencing of remnant vegetation; and
- purchase of high priority blocks of privately owned remnant vegetation.

CALM is the coordinating agency for 'Key Wetlands and Natural Diversity Recovery Catchments'. Recovery actions continued at Toolibin Lake, and began in the Lake Muir-Unicup and Lake Warden systems. A comprehensive biological survey (funded by Environment Australia) of the 15 reserves comprising the Muir-Unicup wetlands commenced. A Project Team has been established to coordinate the Muir-Unicup Recovery Catchment Project, and 160 ha of demonstration plantings have been completed under that project.

The Dongolocking Pilot Planning Project for Remnant Vegetation was successfully completed during the year. This project, a collaborative effort between CALM, CSIRO, the Land and Water Resources Research and Development Corporation, and Agriculture WA, integrates nature conservation and sustainable, profitable agriculture and provides a valuable planning framework for future projects.

The biological survey component commenced in the central band of the Wheatbelt (the area between Hyden/Merredin in the east and York/Narrogin in the west). Sixty-seven wetland areas have been selected and sampled for flora and fauna. The northern and southern bands will be sampled in subsequent years.

The plant database compiled as part of the survey project has listed 846 species of flowering plants as

## Definitions

**Declared Rare Flora—Extant Taxa:** Taxa which have been adequately searched for and are determined to be either rare, in danger of extinction, or otherwise in need of special protection in the wild, and have been declared under section 23F of the *Wildlife Conservation Act 1950* to be 'rare flora'.

**Declared Rare Flora—Presumed Extinct Taxa:** Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been declared under section 23F of the *Wildlife Conservation Act 1950* to be 'rare flora'.

**Critically Endangered:** Taxa (declared as rare flora) that are facing extremely high probability of extinction in the wild in the immediate future and are in need of immediate research and/or management actions.

**Endangered:** Taxa (declared as rare flora) that are not critically endangered but are facing a very high probability of extinction in the near future and are in need of urgent research and/or management actions.

**Vulnerable:** Taxa (declared as rare flora) that are not critically endangered or endangered but are facing a high probability of extinction in the wild in the medium-term future and are in need of research and monitoring.

**Priority One—Poorly Known Taxa:** Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

**Priority Two—Poorly Known Taxa:** Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

**Priority Three—Poorly Known Taxa:** Taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

**Priority Four—Rare Taxa:** Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

occurring in naturally saline areas of the agricultural zone. These are being cross-checked against other information to find species that may prove useful in rehabilitation, revegetation or as potential commercial crops.

A survey of the botany of the Highbury forest and Lake King Nature Reserve began during the year, and a flora list for Dryandra Forest (more than 850 species) has been prepared for publication.

Wetlands across the agricultural zone have also been sampled for physical and chemical parameters, as well as wetland birds, frogs and invertebrates. The results will be used to help select additional Key Wetland and Natural Diversity Recovery Catchments.

Tree planting initiatives, which are essential to protecting conservation values through lowering watertables, are reported under the Forest Resources Program.

## CONSERVATION OF WILDLIFE

CALM has responded to the growth in the Peel area by opening a new office at Mandurah to better service nature conservation issues in that area.

CALM scientists have completed a range of biological monitoring projects, in addition to those under the Salinity Action Plan. These include floristic survey in the Goldfields, a digital map of WA vegetation, and an assessment of watercourse health in the Wheatbelt, in terms of macroinvertebrate communities.



Further data have also been collected by CALM staff on issues such as the ecological effects of the Dawesville Channel, the wildlife of the Burrup Peninsula, and the impact of calicivirus on rabbit-grazing pressure on the Nullarbor.

CALM has participated in the preparation of 'Perth's Bushplan', a major conservation initiative that will, as far as is achievable, recommend a conservation system that is comprehensive, adequate and representative of the ecological communities and habitats of the Perth region. The plan incorporates information from CALM's biological surveys, and threatened species and ecological communities databases.

### Threatened Species

The Threatened Species Scientific Committee (TSSC) met twice during the year to endorse draft rankings of the threatened flora and fauna lists against IUCN criteria, and to consider further changes to these lists.

A number of threatened fauna and flora were recommended for deletion from the lists. These recommendations were approved by the Minister for the Environment and, at the end of the financial year, were awaiting gazettal.

Sixteen fauna taxa were recommended for deletion, including the quenda (or southern brown bandicoot) and the tamar wallaby, as a result of their recovery and ongoing management under CALM's Western Shield program. Two other mammals were also recommended for deletion, the spectacled hare-wallaby because of its abundance in other regions of Australia, and the western mouse because of the presence of viable populations in conservation reserves. Eight birds, one snake (the rough-scaled python) and three invertebrates were recommended for deletion, either because of being more common and widespread than the IUCN criteria allow for threatened species, or because there was insufficient information on which to make an assessment. With the exception of one invertebrate, these taxa will be listed as priority fauna.

Twenty taxa of declared rare flora were recommended for deletion from the list. Seventeen were recommended because of the relatively large number of plants known, or because sufficient populations occur in conservation reserves, and were thus considered to be not at risk. These taxa are to be moved to the Priority 4 category for ongoing monitoring. Three taxa were recommended for deletion from the list because there was not sufficient information available to permit evaluation against the IUCN criteria. These taxa, *Menkea draboides*, *Phlegmatospermum drummondii* and *Scaevola macrophylla*, were previously presumed to be extinct, but were found to be represented in the Herbarium by recent collections. They will be listed as priority flora requiring further survey.

Recommendations were also made for a number of fauna taxa to be added to the lists: seventeen invertebrate taxa, and seven species of albatross following a taxonomic review of this group of birds and evaluation of their conservation status.

Fifteen taxa of flora were recommended to be added to the list of declared rare flora following intensive surveys by CALM staff and volunteers. Two declared rare flora taxa, *Deyeuxia drummondii* and *Lasiopetalum rotundifolium*, presumed to be extinct, have been rediscovered and recommended to be transferred to the extant list. Their rediscovery has reduced the number of presumed extinct species of flora to 23. Since 1991, the number of presumed extinct flora has reduced from 53 to 23, with only three having been added during that time. Eighteen species have been rediscovered in the field, six were discovered as recent collections in the Herbarium, and nine were deleted following taxonomic revisions.

Once gazetted, there will be 116 threatened, 13 presumed extinct and 11 otherwise specially protected fauna, and 318 extant and 23 presumed extinct declared rare (threatened) flora. Where a declared

rare flora species has recognised sub-specific taxa, such as subspecies or varieties, CALM manages them to ensure the conservation of each taxonomic entity. The number of taxa of extant declared rare flora managed by CALM will be 327 once the revised list is gazetted. The Priority lists were also reviewed, and there are 170 priority fauna and 1959 priority flora.

Recovery teams continued to oversee the implementation of recovery plans and interim recovery plans for the following: Gilbert's potaroo, chuditch, numbat, dibbler, western ringtail possum, djoongari (Shark Bay mouse), south coast threatened birds (including noisy scrub-bird, western bristlebird and western ground parrot), western swamp tortoise, Lancelin Island skink, orange-bellied and white-bellied frogs, rose mallee, *Corrigin grevillea*, and *Rulingia* sp. (Trigwell Bridge). Regional and District Threatened Flora Recovery Teams operated in the Central Forest, Southern Forest and Swan Regions, and the Geraldton, Merredin, Albany, Moora and Narrogin Districts. Recovery teams for ecological communities covered Toolibin Lake, sedgeland in Holocene dune swales, thrombolites of Lake Richmond, aquatic root mat community of caves of the Swan Coastal Plain, and montane thickets (Stirling Range). CALM continued to assist the Western Australian Malleefowl Network, convened by the National Threatened Species Network, with projects aimed at conserving malleefowl in the wild.

Preparation of interim recovery plans (IRPs) continued for all plants, animals and ecological communities ranked as 'critically endangered'. During the year, IRPs were published for the night parrot, antina (central rock rat), western ground parrot, small flowered conostylis, red snakebush, dwarf rock wattle, Mogumber bell, Norseman pea, Kamballup dryandra, Stirling Range dryandra, metallic flowered eremophila, majestic spider orchid, and swamp starflower.



## Western Shield: Fauna Recovery

Fox baiting under CALM's predator control and fauna recovery project, Western Shield, expanded to cover more than 3.4 million hectares. More than 1 580 000 baits have been laid since the program started with Operation Foxglove in 1994. Continuing generous sponsorship by Alcoa Australia (\$120 000) and Cable Sands (WA) Pty Ltd (\$60 000) enabled more than 600 000 ha to be baited at minimal cost to CALM.

Community fox baiting programs are also being coordinated under Western Shield, with 300 km of perimeter fox baiting being completed cooperatively in the Southern Forest Region.

The objective of Western Shield is to control introduced predators so that populations of native fauna can recover. During the year, populations of malleefowl and woylies were reintroduced to François Peron National Park; noisy scrub-birds to an area near Harvey; chuditch to Cape Arid National Park; tammar wallabies to State forest west of the Perup River; woylies to State forest near Lake Unicup and west of Manjimup; woylies and numbats to the northern jarrah forest; western swamp tortoise to Twin Swamps Nature Reserve; and mala (rufous hare-wallaby) to Trimouille Island in the Montebello Island group.

The noisy scrub-bird was reintroduced to the Darling Range after an absence of more than 150 years with help from Alcoa Australia. Woylies were also provided for reintroduction into New South Wales to an area south-west of Dubbo after an absence of more than 70 years.

The success of previous translocations was confirmed during the year, with the first wild sighting of a numbat at Dragon Rocks Nature Reserve following translocations in 1996, and wild-bred woylies and chuditch being recorded at Lake Magenta Nature Reserve following translocations in 1997.

Two new captive breeding facilities were established, at François Peron National Park and Dryandra. These

have been stocked with mala from the Northern Territory, bilby from the Great Sandy Desert, and boodie, banded hare-wallaby and western barred bandicoot from Bernier and Dorre Islands. These animals will form the nucleus of breeding colonies that will provide animals for reintroductions across the south-west.

An education program has been developed for primary school children. Overnight camps and day activities have been undertaken at Hills Forest, Batalling, Dryandra and Perup, involving more than 310 children, 25 teachers and 27 parent helpers. It is estimated that more than 16 650 children and 870 teachers have been exposed to the Western Shield Action Pack, resulting in a better depth of understanding of fauna conservation issues among the young.

Fauna monitoring over a wide variety of sites continued to demonstrate the success of the Western Shield program. Populations of several species, including woylie, brush-tail possum, chuditch, tammar wallaby and quenda, are indicating strong growth in numbers and a continued expansion into new areas. The monitoring of the recovery of quenda and tammar wallaby populations, and the continuing removal of the predation threat from foxes, resulted in the recommendation for these species to join the woylie in being removed from the State list of threatened fauna. The recommendation was endorsed by the Minister for the Environment.

Advances continue to be made in cat research with the development of a dependable cat census technique based on olfactory lures ('Pongo'), auditory lures (Felid Attracting Phonic) and soft-jawed leg hold traps. Cooperative research with the Victorian Institute of Animal Science on developing a cat-specific toxin has advanced well, with target specificity and effectiveness trials being completed with promising results. Development of an effective cat bait has also progressed well. It is hoped to be able to undertake broadscale operational trials of cat control in the arid zone in the coming year.

The achievements of Western Shield in conserving Western Australia's wildlife were recognised during the year by the presentation of the Banksia Environmental Award for flora and fauna conservation. The Banksia Awards are run by the community-based Banksia Environmental Foundation. Launched ten years ago, these awards have become Australia's most prestigious environmental awards.

## Flora Recovery

Planning for further strategic applications of phosphite to protect flora threatened by *Phytophthora* dieback began in spring 1997. Suitable sites were identified, with 83 ha being aerially sprayed in the Stirling Ranges, 55 ha at Cape Arid and 22 ha in the southern ironstone community near Busselton. Monitoring was carried out to determine the effectiveness of the applied phosphite.

Volunteers continued to provide a significant contribution to the discovery of new populations, and the monitoring of known populations of rare flora. During the year, volunteers discovered 53 new populations of declared rare flora, and 127 new populations of priority flora, which combined was 30 per cent of the total new populations discovered during the year. Volunteers also monitored 59 known declared rare flora populations, and 61 priority flora populations, or 11 per cent of the total known populations monitored.

Volunteers have also participated in intensive survey programs assisting CALM staff to search for critically endangered flora. On one weekend 35 volunteers searched (although without success) for *Symonanthus bancroftii*, which is known only from a single plant.

*Rulingia* sp. (Trigwell Bridge), only known from only four plants in the wild, was approved for translocation during the year. Plants grown at Kings Park and Botanic Garden were established at Trigwell Nature Reserve, and at the only known site on private property at Trigwell Bridge.

## Threatened Ecological Communities

Draft interim recovery plans were completed during the year for 15 threatened ecological communities ranked as 'critically endangered'. Implementation of recovery actions identified in the IRPs included the purchase of an occurrence of the critically endangered Gingin ironstone community. Emergency actions were taken at Yanchep Caves to prevent two occurrences of the critically endangered aquatic root-mat communities from drying out. Implementation of the recovery plan for Toolibin Lake continued during the year.

A new Threatened Ecological Communities Advisory Committee was established to advise on the assessment and conservation of threatened communities, especially in relation to two new projects. The first of these is a project to apply the procedures for identifying threatened ecological communities to areas outside the South West Botanical Province (with funding from the National Reserve System Program of the Natural Heritage Trust). The second project aims to identify and conserve threatened ecological communities in the agricultural parts of the south-west (with funding from the Bushcare and Endangered Species Programs of the Natural Heritage Trust). An emphasis of this project is liaison and cooperation with landholders and other members of the rural community.

## The Herbarium

CALM's WA Herbarium mounted 27 000 new specimens, adding them to its database. Again the Herbarium volunteers have provided a valuable contribution to the curation of specimens, with a total of 95 755 specimens having been mounted by this group. A total of 64 volunteers are registered with the Herbarium, and are involved in mounting, curation, data imaging and the Community Reference Herbaria.

The total number of records in the WAHERB specimen database at 30

June 1998 was 439 842 and is comprised of the following numbers of specimens of all the plant groups curated in the State Collection:

algae	4 652
mosses	4 307
liverworts	959
fungi	6 048
lichens	4 475
gymnosperms	1 414
monocotyledons	68 663
dicotyledons	349 324
<b>Total number of databased specimens</b>	<b>439 842</b>

The Western Australian Census of Plants (WACENSUS) is an electronic database of WA plant names, both current names and synonyms. The Census is a CALM corporate database which ensures that names of plants are up to date, and this information is easily accessible to users. During the year there were a total of 1 014 edits to WACENSUS: 628 names were added to the database, with 600 being current names, and 386 edits were undertaken of synonyms and other names that have been misapplied.

Specimen loans were transacted with 38 national and international institutions, with 5659 WA specimens being loaned, and 5328 herbarium specimens received on loan from other herbaria. Also, 1715 herbarium specimens were distributed on exchange to other institutions, and 1325 herbarium specimens of WA flora were received from other institutions to add to the collection.

The public access Reference Herbarium now comprises 10 000 specimens vouchered and linked to a databased specimen in the main herbarium collection. This reference herbarium provides the main means of public flora identification/verification, and is used intensively by both amateur and professional botanists.

The Herbarium began a program of regional herbaria in 1996. The program has received funding from the Natural Heritage Trust, and now involves 57 regional herbaria. A total of 3126 specimens have been processed in the regional herbaria, including 20 declared rare flora and

125 priority flora. Workshops were held twice in the metropolitan area, and at four country centres for 65 participants to learn about herbarium curation.

## The Pastoral Region

CALM is involved in a major rangeland strategy focused on the Gascoyne-Murchison region of the State. This strategy, developed by the pastoral industry, the broader community and government agencies, recognises the importance of conserving biodiversity and managing the environment in a sustainable way. Under the strategy launched by the State Government in April 1998, \$6.8 million have been allocated over the next six years for the purchase and management of pastoral land for addition to the conservation reserve system. Voluntary conservation agreements with land managers in the region will continue to be developed.

CALM has also taken on interim management of non-industrial land on the Burrup Peninsula, pending formal vesting of the area.

## Shark Bay World Heritage Property

The agreement between the State and the Commonwealth of Australia on administrative arrangements for the Shark Bay World Heritage Property was signed by the Western Australia and Commonwealth Environment Ministers in September 1997.

The agreement reflects a cooperative approach between the Commonwealth and Western Australia and provides for the protection and management of the property primarily by the Western Australian Government in accordance with Australia's obligations under the World Heritage Convention. CALM has lead responsibility for implementation of the agreement.

The agreement established the Shark Bay Ministerial Council, which coordinates policy between WA and the Commonwealth and provides



advice to governments on issues that relate to the property. It also established the Shark Bay World Heritage Property Community Consultative Committee and Scientific Advisory Committee to provide advice to the Ministerial Council.

## Marine Conservation

The Acts Amendment (Marine Reserves) Act 1997 commenced operation on 29 August 1997. The Marine Parks and Reserves Authority (MPRA), in which marine conservation reserves are vested, was established and held six meetings during the year. The Authority's prime role is to oversee the development of marine reserve policy and management plans and their implementation by CALM. It also advises the Minister for the Environment on marine conservation and can develop policies to preserve the natural marine and estuarine environments outside marine conservation reserves.

A Marine Parks and Reserves Scientific Advisory Committee was also established to advise the Minister for the Environment and the MPRA, and held three meetings during the year.

A booklet, *New Horizons: The Way Ahead in Marine Conservation and Management*, was released by the Minister. It explains the State Government's marine conservation and management policy and describes the pre-declaration, management planning and declaration processes involved in implementing new marine conservation reserves.

The first reserve being considered under the new marine reserves legislation is the proposed Jurien Bay Marine Reserve. The Jurien Bay Marine Reserve Advisory Committee, chaired by CALM, was established in September. At its first meeting, the Advisory Committee agreed that the proposal to create a marine reserve had merit, and it is being progressed.

In December the Government announced a further three high priority

areas for consideration as possible marine reserves: the Montebello-Barrow Islands and Dampier Archipelago off the north-west coast, and the Geographe Bay-Capes-Hardy Inlet area in the south-west.

The South Coast Terrestrial and Marine Reserve Integration Study, funded by Environment Australia, was also completed. This project identified issues, opportunities and constraints affecting integrated management of terrestrial and marine reserves across the south coast and collated information on the nature conservation, recreation, aesthetic and economic values of nine candidate marine reserve areas and adjacent terrestrial national parks and nature reserves. A biological survey of the inshore waters adjacent to the Fitzgerald Biosphere Reserve confirmed the high conservation values of these waters.

CALM chaired two technical groups that provide essential support to the marine conservation and protected area programs. The Western Australian Physical Oceanography Coordinating Group, formed in mid-1997, coordinates oceanographic information requirements for marine reserve implementation and management. The Coordinating Group meets several times per year and has representation from State and Commonwealth Government agencies, universities, the CSIRO, and the Australian Institute of Marine Science.

The Marine Working Group of the State Liaison Committee on Remote Sensing is a technical information coordinating group which deals specifically with marine remote sensing issues. Significant progress was made by the Group, ensuring that marine remote sensing is explicitly considered in the State Government's existing spatial information data capture, processing and archival framework.

In March 1998, the Minister released the Whale Shark Management Program, which aims to ensure the ecological sustainability of one of the State's most important marine nature-based tourism attractions. The

management program, endorsed by the MPRA, details the research needed to gain a better understanding of this poorly known species, and to determine the possible links between environmental factors and whale shark numbers. It will also determine if any detrimental impacts are occurring as a result of increasing tourism pressure.

Marine conservation projects included the establishment of the Ningaloo Marine Park monitoring program to assess the 'health' of the coral communities, a Shark Bay water quality survey, and the Monkey Mia lagoonal water flushing study. A sea lion census was also undertaken on west coast islands, including the Houtman Abrolhos Islands.

## Wetlands

The Wetlands Conservation Policy for Western Australia was released by the Ministers for the Environment and Water Resources in August 1997. This whole-of-government policy lists five principal objectives for wetlands and a strategy for implementation listing 62 actions.

A Wetlands Coordinating Committee was established under the policy to coordinate its implementation and the activities of relevant agencies. The Committee held its inaugural meeting in June 1998.

## Commercial Use of Wildlife and Wildlife Harvesting

Licences are issued under the Wildlife Conservation Act 1950 and Regulations for taking, processing and dealing in protected fauna, and for harvesting protected flora from Crown lands, and the sale of protected flora taken from private lands.

A total of 6 294 fauna licences (excluding damage licences) were issued in the year. This represented a decrease of four per cent over the previous year. This reduction was spread across a range of licence types, including taking from the wild for educational purposes and public display licences, and is explained by year-to-year variability in activities.



Management of the commercial harvesting of kangaroos continued throughout the year, with input from the Kangaroo Management Advisory Committee. New management programs, providing for the export of products from red kangaroos, western grey kangaroos and euros were approved for the period 1998 to 2002 by the Commonwealth Minister for the Environment. Aerial kangaroo population surveys were again undertaken over the central survey zone, which stretches from Moora in the south to Meekatharra, Wiluna and Carnarvon in the north. The survey results indicated that grey kangaroo populations in the southern part of the zone were high in comparison with the average of counts since 1981, while the red kangaroo count was lower than average. It is considered that populations of both species will have continued to grow since the surveys were undertaken in 1997. Population estimates from the surveys and approved commercial harvest quotas for 1998 are detailed in the table below (Kangaroo Species).

The management program for saltwater crocodiles and freshwater crocodiles in Western Australia continued throughout the year. The management program covers all aspects of crocodile management, including crocodile population surveys and regulation of crocodile harvests, farming, processing and export. In recognition of the hardship faced by the farms following the decline in south-east Asian economies, the Minister for the Environment approved a reduction in the royalty rates for crocodiles processed by farms to \$1.00 per animal for the calendar year 1998. Population monitoring details for the saltwater crocodile (*Crocodylus porosus*) are provided in the table above (top right).

The number of commercial flora licences issued this year again decreased, being down five per cent on 1996-97. The trend in licence numbers since 1980-81 is shown opposite. After the Commercial Purposes licence fees were increased to \$100 in 1990, there was a significant drop in the number of

licences to a level consistent with that prior to the 1986 increase. Private property licences issued rose after the Crown land licence fee increase, and appear to have stabilised in recent years. Amendments to the Wildlife Conservation Act during the year now allow flora harvesters to take out licences to sell flora taken from private property, rather than each property owner having to be licensed. As a consequence, the number of licences issued in future years may decline.

The management program for the commercial harvesting of protected flora in Western Australia was redrafted for approval by the Commonwealth Minister for the Environment. This program provides for the export of Western Australian flora under the Commonwealth Wildlife Protection (Regulation of Exports and Imports) Act 1982.

The Western Australian Flora Industry Advisory Committee met twice during the year. During this time the two-year tenure of the Committee expired, and a new Committee was appointed by the Minister. The Committee acts as an information conduit between industry, other interested sectors, CALM and the Minister for matters to do with the flora industry. Issues considered during the year included the composition of the Export Flora List under the State management program,

Population estimates for non-hatchling *C. porosus* within surveyed areas of Cambridge Gulf through surveys undertaken for CALM by G. Webb Pty. Ltd (1992) and Wildlife Management International Pty Ltd (1993-1997).

Year	West Arm	East Arm/ Ord River	Total
1992	198	379	577
1993	153	410	563
1994	100	370	470
1995	173	422	595
1996	139	382	521
1997	161	422	583

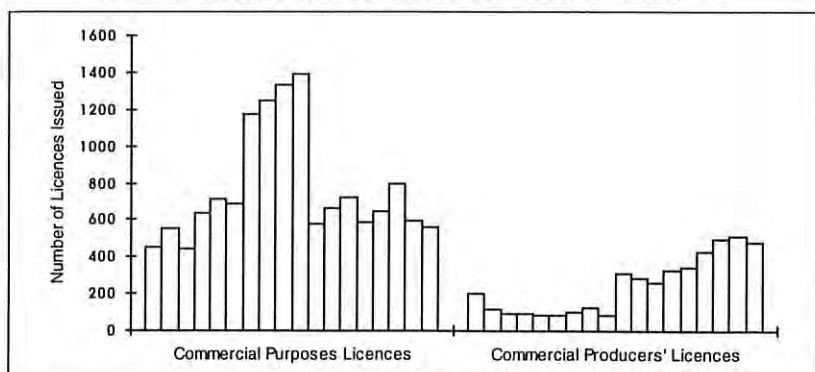
the management of particular species, and the management of the seed industry.

Intensive management of *Boronia megastigma*, *Stirlingia latifolia* and *Dryandra formosa* continued this year. An increase in quotas for *Boronia megastigma* was set as wild populations showed early signs of recovery from previously dry summers. The tagging of harvested boronia this season was a success, providing an effective means of restricting avenues for illegal selling of boronia sprays. Significant private property production of boronia has also led to reduced demand on wild sources.

Two new monitoring projects were established to assess whether the current harvesting levels of *Boronia purdieana* and *Andersonia caerulea* from the wild are sustainable.

KANGAROO SPECIES	Red	Western Grey	Euro
1997 population estimate	822 400	493 500	>168 000
1997 quota	180 000	70 000	12 000
1997 commercial harvest	116 300	48 000	4 700
1998 quota	180 000	74 000	10 000

Commercial Flora Licences issued from 1980-81 to 1997-98



Flora industry management teams continued to operate in CALM's Southern Forest and Swan Regions, providing coordinated regional management of the industry. New flora industry management teams were established in Central Forest Region and the northern sandplains areas to provide improved management over the major harvesting areas of the State.

### Environmental Protection

CALM staff liaised with the mining and petroleum industry, and reviewed numerous applications for mineral and petroleum tenements and exploration programs. Of a total of 92 mining tenements received, 82 were processed in consultation with the National Parks and Nature Conservation Authority and the Lands and Forest Commission, and appropriate mining conditions imposed. There was a significant increase in seismic programs in the Perth Basin.

The Department continued to pursue conservation opportunities by identifying land to replace or offset mined land and bringing these to the attention of mining companies. A total of \$3.52 million was received in mining compensation payments.

Staff also reviewed annual reports for mining operations on CALM-managed lands, and assisted other agencies to review reports and proposals that impacted on off-reserve conservation values. Comments were provided on 26 formal assessments by the EPA in addition to numerous environmental management plans relating to ongoing projects.

The Department has continued to make a significant contribution to goat control programs in the Kennedy Range area in the Gascoyne and in the Kalgoorlie area in conjunction with Land Conservation District Committees. Control programs were also undertaken in the François Peron National Park and the Zuytdorp Nature Reserves.

Development of an Environmental Weed Strategy for Western Australia commenced under the guidance of a steering committee representing government and community interests. This was made possible by a Natural Heritage Trust grant. The strategy addresses the means by which coordinated and effective control of environmental weeds can be undertaken. The accompanying database contains information on environmental weeds such as their distribution, importance and methods for control.

### Wildlife Interactions, Licences and Compliance with Legislation

Departmental officers attended 31 reported whale and dolphin strandings throughout the year, involving both live and dead animals. These strandings involved 55 individual animals, representing eleven species, including two minke whales, a pygmy sperm whale, a common dolphin, short-finned and long-finned pilot whales, a false killer whale and two humpback whales. The most commonly stranded cetacean was the bottlenose dolphin.

Three mass strandings and one entrapment of cetaceans occurred during the year. In November, six spotted dolphins were reported dead at Bundegi, near Exmouth. Also in November, seven killer whales stranded south of Exmouth in Exmouth Gulf. This is only the second record of this species stranding in WA. Three animals were successfully returned to the sea. In April, six striped dolphins stranded on remote Coodamurrup Beach, east of Windy Harbour. The two live animals were in poor condition, one died and the other was euthanased after attempts to revive it for release failed. Eight bottlenose dolphins entrapped in a salt pond near Useless Loop, Shark Bay, were successfully captured and released.

Officers also attended seven pinniped strandings throughout the year, including two sub-antarctic fur seals, one crabeater seal and four Australian sea lions. In most cases, these animals were ill or injured.

A humpback whale was reported entangled in crayfish pot ropes near Green Head. Fishermen were able to remove the rope and free the animal. A New Zealand fur seal was reported entangled in rope west of Denmark. It was not resighted. A dead Australian sea lion was recovered from Warren Beach entangled in plastic strapping.

A total of 106 whale-watch boat-tour operators are licensed State-wide, an increase of 45 per cent on last year. They carried 34 977 passengers from various centres around the State, but principally from Perth (68 per cent), an increase of 19 per cent from last year. While these tours were primarily based on humpback whales, southern right whales are the focus of whale-watching activities in the Albany area. Boat trips by metropolitan-based operators increased by eight per cent to 410, while country-based boat trips increased by 21 per cent to 781.

During the year, Departmental staff provided guidance to many people regarding the legal requirements of wildlife conservation legislation. Verbal warnings were issued for minor offences and 457 offences under the Wildlife Conservation Act and Regulations were the subject of written reports. Action in 237 matters was completed by the end of the year. A summary of reported offences is presented below (see also Appendix 17 for further details of offences).

Departmental staff also provided advice on a wide range of wildlife matters in response to many thousands of enquiries from members of the public. Calls involved sick, injured and orphaned fauna; fauna causing a nuisance, such as possums living in rooves and noise from frogs and ravens; dangerous fauna including venomous snakes and swooping magpies; and fauna such as kangaroos, ducks and parrots causing damage to private property and primary production. A summary of licences issued to take fauna causing damage and dangerous fauna is located at Appendix 15.



## NATURAL HERITAGE TRUST

In July 1997, Western Australia was the first State to sign a Natural Heritage Trust (NHT) Partnership Agreement with the Commonwealth. CALM played a lead role in the development of this Agreement, which sets out the roles and responsibilities of the Commonwealth and Western Australia for the delivery of the objectives of the Trust and associated programs. Under the Agreement, CALM is the lead agency for Bushcare (National Vegetation Initiative), National Wetlands Program, Endangered Species Program and National Reserve System Program, as well as joint lead agency for Farm Forestry, National Feral Animal Control Program and National Weeds Program.

A WA Bushcare Program Coordinator, funded under the Bushcare program and housed within CALM, facilitated the delivery of the Bushcare program, and also assisted in overall delivery of the NHT in Western Australia. The Coordinator was involved in drafting guidelines and financial agreements and setting up an urban Bushcare program.

Bushcare also provided funding for the appointment of regional Bushcare Facilitators to assist the community and regional organisations in developing regional strategies that incorporate nature conservation objectives, and in developing, implementing and monitoring integrated projects under the NHT. The Bushcare facilitators also assist in administering the NHT grants by providing technical support to the regional assessment process. Bushcare funds were also used to contribute to the appointment of part-time off-reserve conservation officers.

The Department provided technical advice for the assessment of 455 NHT applications for 1997-98 and was involved in all six regional assessment panels and the State Assessment Panel. Approximately \$27 million was provided for a wide range of nature conservation and other programs in Western Australia. The Department administered the community grants

component for Bushcare, under which \$4 531 603 was provided to 116 projects.

## OFF-RESERVE CONSERVATION

The Department continues to be involved in providing technical assessment of applications to the Remnant Vegetation Protection Scheme, administered by Agriculture WA. Eighty applications were made to the Scheme, and were assessed for their value in achieving nature conservation outcomes.

CALM is a member of the Inter-Agency Working Group established under the Memorandum of Understanding for the Protection of Remnant Vegetation on Private Land in the Agricultural Region of Western Australia. Nature conservation advice was provided for the assessment of 54 notices of intent to clear land, with the total area applied to be cleared being 2435.6 ha. Nineteen applications were referred through the Working Group to the Environmental Protection Authority for further environmental review.

Preparatory work continued during the year to give effect to the Government's commitment to introduce a voluntary nature conservation covenanting scheme and establish an independent fundraising foundation to assist nature conservation.

## Land for Wildlife

CALM's Land for Wildlife Scheme operated through its first full year in 1997-98. CALM entered into an arrangement with other States running Land for Wildlife, namely Victoria, Tasmania, New South Wales and South Australia, to coordinate the operation of the Scheme in each jurisdiction. CALM also endorsed a national template setting standards for operating the Scheme. These standards and coordinated approach will assist in generating national awareness, and collating national statistics on the operation of Land for Wildlife in Australia.

A further 133 persons applied to be members of the Scheme during the year, bringing the total number of applicants to 238 property owners. By the end of the year, assessments had been completed for 135 properties, comprising 14 865 hectares of remnant vegetation nominated as Land for Wildlife sites. Of the properties assessed, 114 (14 739 hectares) have met the requirements for full registration (having a remnant containing existing habitat for wildlife) and 16 (126 hectares) for interim registration (potential or minimal habitat for wildlife). A further five properties have been given pending registration.

The Land for Wildlife Coordinator and Administration Officer are now

1996-97 Reported Offences			1997-98 Reported Offences	
	30-6-97	Revised		As at 30-6-98
Total Offences Reported	280	356	Total Offences Reported	457
Convictions	10	120	Convictions	44
Dismissals	1	2	Dismissals	0
Letters of Warning	43	111	Letters of Warning	86
No Further Action	39	98	No Further Action	107
Pending	187	25	Pending	220
<b>Total Fines</b>	<b>\$3 200</b>	<b>\$35 600</b>	<b>Total Fines</b>	<b>\$12 050</b>
<b>Total Costs</b>	<b>\$1 200</b>	<b>\$17 292</b>	<b>Total Costs</b>	<b>\$1 970</b>

Note 1: Figures for 1996-97 reported offences are updated from those included in last year's report under the Revised column.

Note 2: See Appendix 17 for details of 1997-98 offences.

Note 3: Wildlife Protection Section also processed 81 offences under the CALM Act and Regulations for various offences.



being supported by regionally based part-time off-reserve conservation officers, who are part-funded by the Bushcare program and undertake Land for Wildlife property assessments.

During the year, four newsletters, two occasional papers and a booklet on managing granite outcrop vegetation were produced for Land for Wildlife. Staff also attended a number of field days and workshops to promote the Scheme and provide extension service to the community.

### Roadside Conservation Committee

As the result of a review of membership of the Roadside Conservation Committee, the Water Corporation and Alinta Gas were invited, and subsequently joined the RCC. Mr Om Mehra (Alinta Gas) and Ms Roni Oma (Water Corporation) represent those organisations.

Mrs Joanna Seabrook, the community representative on the RCC, was this year awarded the Order of Australia for services to flora conservation in the State, following her nomination for the award by the Executive Officer of the RCC. Mrs Seabrook is the longest-serving member of the RCC, having served on it since its inception in 1985.

During the year, the RCC received many complaints about the potential

or actual negative impact of roadworks or maintenance operations on roadside vegetation. In many instances the RCC was able to assist local government authorities in planning these works to minimise negative impacts. A good example of this was in the Chittering Shire, where proposed road works were reviewed with the assistance of the RCC and subsequently undertaken to the satisfaction of all stakeholders.

Community concern regarding the loss of roadside vegetation during operations of government instrumentalities resulted in several such activities also being reviewed by the RCC. A major upgrade of the Brookton Highway by Main Roads WA was inspected by the RCC, and advice was provided. The involvement of the RCC in gas pipeline works undertaken by Alinta Gas resulted in a review of the operational procedures of that organisation.

The RCC has identified training of local government staff as a key factor in conserving roadside vegetation. With a view to taking a proactive role, the RCC applied to the Natural Heritage Trust for funding of a full-time training officer to assist local government and utility provider organisations working in linear remnants. Alinta Gas, Westrail and Western Power (all member agencies of the RCC) have made financial donations to this initiative. An

important initiative in this area has been the production of a 44-page full-colour booklet entitled *A Roadside Hand Book*, which provides environmental guidelines for road construction and maintenance workers. The Local Government Works Supervisors Association provided financial support in producing this booklet.

The RCC reviewed its operation policies to ensure that they adequately reflect community and member agency aspirations. These redrafted policies of the RCC are to be produced in a booklet form with a generic Code of Practice of roadside conservation. The Code of Practice has been produced to formally complement recently completed generic local government bylaws for roadside conservation. The RCC has worked in conjunction with the Western Australian Municipal Association to produce these bylaws.

The roadside mapping project continued. Community surveys were completed for the Shires of Gnowangarup, Woodanilling, Harvey, Corrigin, Cuballing, York, and Serpentine-Jarrahdale. The latter two Shires are a repeat of surveys completed in 1990 and will provide a comparison of roadside vegetation quality over this time. Approximately 60 000 km of roadsides have now been surveyed under the RCC roadside mapping project.

# FOREST RESOURCES MANAGEMENT PROGRAM 2

## Objective

*To sustain and profitably manage the forest resources entrusted to the Department in ways compatible with conservation and other management objectives.*

*The program includes sustainable regeneration, protection, management and harvesting of native forests and plantations while maintaining or enhancing nature conservation, water, recreation, landscape or other values in the long term; managing the sandalwood industry on Crown land; and developing public awareness, understanding and community support for the Forest Resources Management Program.*

## FOREST MANAGEMENT

The Comprehensive Regional Assessment (CRA) phase of the Regional Forest Agreement (RFA) process was completed. This involved assessments of biodiversity, old-growth forests, wilderness, endangered species, national estate, world heritage, social values, wood resources, economic profiles of other economic values of forests including minerals, water, tourism and recreation, apiary, and wildflower production. Additionally, an assessment of ecologically sustainable forest management was completed in relation to all uses of forest across all land tenures in the region. Five major reports and 24 technical and background reports were completed. The data from the CRA is being used in the integration and options development phase of the RFA process. This will provide the scientific and technical basis for the signing of a long-term (20 year) agreement between the State and the Commonwealth, pertaining to forest allocation and management.

A number of consultative mechanisms have been developed

## Highlights

- ✓ Value adding of jarrah exceeding targets (p. 19)
- ✓ Code of Practice for Timber Plantations launched (p. 19)
- ✓ RFA process nearing completion (p. 17)

since the RFA process began in 1996. The aim of these has been to ensure that all groups and individuals interested in the RFA are kept informed of progress and developments, have ready access to information and have the opportunity to participate and contribute information as appropriate. Consultative processes have included CRA reports, information kits, an information line, a video and newsletters, fortnightly RFA updates published in *The West Australian* and local newspapers, internet availability of information, public meetings, a Stakeholder Reference Group, a Noongar Action Group, a State Agreement Acts Committee, community heritage workshops, and surveys and interviews. Consultation with the scientific community has included workshops to assist the development of projects, consultation with independent experts to assist development of methodologies and to validate results, the use of a panel of scientists and experts, the assessment of World Heritage values by a panel of experts, and the independent expert advisory group on the assessment of ecologically sustainable forest management.

The RFA process has placed a heavy demand upon staff and other resources across a wide range of branches.

## NATIVE FOREST

### State Forest Resources

The State Forest Resources Business

Unit is responsible for the commercial harvesting, associated regeneration and commercial sales of log timber from State forests and timber reserves in accordance with the Forest Management Plan 1994–2003.

In 1997, 18 240 ha of jarrah forest were harvested with the following silvicultural objectives:

	Hectares
Thinning	1 420
Release of regeneration	4 390
Establishment of regeneration	8 460
Single tree selection	2 240
Selective	1 450
Other	280
<b>TOTAL</b>	<b>18 240</b>

Regeneration of approximately 1000 ha of the above area was achieved through commercial harvesting operations. Silvicultural objectives for a further 1220 ha harvested in this or previous years were achieved by follow-up treatment.

In 1997, 1870 ha of karri forest were clearfelled or cut to seed trees and 60 ha were thinned. Regeneration was completed on 1560 ha harvested in either this or previous years.

Post-disturbance data continues to be collected and collated for the Kingston Project, a study investigating the impacts of timber harvesting on jarrah forest ecosystems. The study has demonstrated that fox control is a critical management tool for conservation of medium-sized

mammals, either in the presence or absence of timber harvesting, and that disturbance from harvesting and post-harvest burning has little impact on medium-sized mammal population sizes.

**Disease in Native Forest**

The presence of dieback disease (*Phytophthora cinnamomi*) and its predicted impact on the forest is mapped prior to operations such as harvesting, mining and the provision of public utilities such as roads, reservoirs and powerlines. Mapping is done either from interpretation of large-scale colour photographs or from intensive ground survey. In both cases interpretation is supported by laboratory analysis of plant and soil samples. With this information and the implementation of strict hygiene measures, operations can proceed with minimal spread of the disease. Because of the potential of the disease to spread naturally, the maps have a limited reliable life. In some instances areas mapped several years earlier must be re-mapped before operations begin.

During 1997–98, CALM staff mapped the presence and predicted impact of dieback on 34 007 ha of forest and rechecked the boundaries of 1320 ha previously mapped. Interpreters under contract to Alcoa of Australia mapped or rechecked the boundaries on 11 396 ha. CALM staff monitored the interpretation and mapping standards of this work.

A further 250 ha were mapped on a recoup basis for mining companies and other agencies.

During 1997–98, 46 800 ha of CALM land were photographed under shadowless conditions for dieback interpretation purposes.

**Wood Utilisation**

CALM Timber Technology has continued to promote and support adding value to WA timber through research and development, information and education, and limited fee-for-service operations.

**Silviculture**

**The Jarrah Forest**

Harvesting in the jarrah forest is undertaken using a variety of silvicultural objectives (silviculture is the art and science of establishing and tending forests). Where there is a predominance of vigorously growing trees, the stand is thinned; where this is not the case the stands are harvested with the object of regenerating them. This is achieved either by harvesting in a way that will release existing lignotubers to grow unimpeded into saplings; or, where there are inadequate lignotubers, harvesting to create a shelterwood under which seedlings are established. The proportion of each area that is harvested to each of these objectives, and the degree of intermixing, vary according to the existing stand structure and condition.

In many areas the desirable silvicultural objective is achieved completely or nearly completely by the harvesting operation itself. A proportion of the remainder is completed by silvicultural tending operations one or two years after harvesting. In more marginal forest types harvesting is done by selective cutting. In some areas harvesting precedes clearing for mining or the construction of public utilities such as reservoirs or power

lines. Cleared areas are not regenerated immediately but where possible are rehabilitated later.

**The Karri Forest**

Karri forest harvesting is also dependent on the structure and age of the existing forest, though it is less complex than jarrah harvesting. Patches of even-aged and vigorously growing forest which are greater than two hectares in size are identified for thinning. When the stand is old enough to yield saleable products, it is thinned to an appropriate density by commercial harvesting. No further tending is necessary.

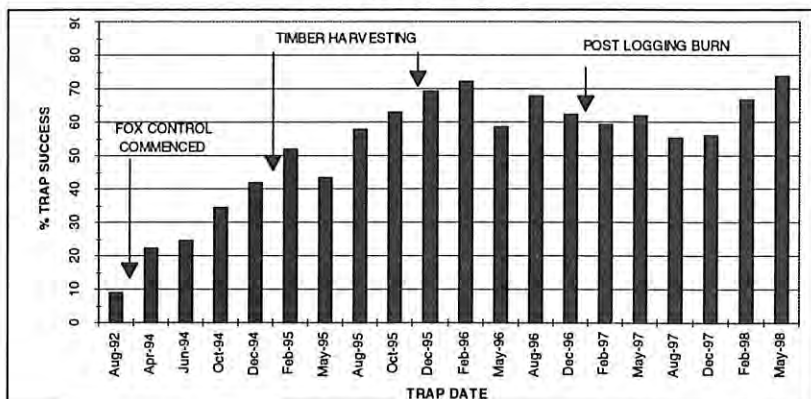
Mature forests and forests of mixed structure created by past logging activities are harvested under a clearfelling system. Regeneration following harvesting is achieved within the following year or two by means of temporarily retained seed trees, by planting with nursery raised seedlings, or by broadcast seeding. Seed trees are the preferred method, but planting is used in the years when there are inadequate seed crops available in the karri forest. Broadcast seeding is only used to a limited extent.

Correctly dried timber, a prerequisite for most value-added timber products, continues to be a focus of CALM Timber Technology’s research and training effort. Three timber drying courses for industry, run over seven days, were well attended. Drying of both karri and marri, and the use of the dried timber in new products, are being promoted in cooperation with the industry.

The manufacture of laminated hardwood products at Harvey continued, with an emphasis on hardwood flooring. This research and development work is being done in conjunction with timber processors who are close to the market.

Research into the basic wood properties and the drying and processing characteristics of south-

**Kingston Timber Harvesting Study—Trap Success Rates for all Medium-Sized Mammals (Woylie, Quenda, BT Possum, Chuditch) along Road Transects**





west, Wheatbelt and Goldfields species continued at the Centre, while other timber samples were sent for research and development studies conducted in Melbourne and overseas.

CALM Timber Technology also assisted with 'whole bole' utilisation studies. This work is investigating the concept of harvesting and selling the whole bole of the tree rather than the current system where the tree bole is cut into log grades in the forest.

### Log Timber Sales

The total of log timber harvested from Crown land in 1997-98 was 2 313 281 tonnes (see table on page 23). Of this amount, 1 671 020 tonnes (72 per cent) were harvested from the State's native forests, and 642 261 tonnes (28 per cent) from State-owned plantations. A further 328 517 tonnes of log timber were harvested from private property during 1997-98.

The output of 'value-added' sawn jarrah continues to increase. For the 12 months ending 31 December 1997, 63 per cent of the total sawn output from jarrah first and second grade sawlogs was in value-added (including kiln-dried) product. This is well in excess of the 50 per cent target stipulated in CALM's jarrah sawlog sale contracts.

### Sandalwood Business Unit

Falling prices of sandalwood associated with devaluation of Asian currencies resulted in a decrease in demand during 1997-98. Quotas for production of sandalwood from Crown land were therefore decreased by approximately 22 per cent.

The field component of a two-year inventory program was completed. This will provide information enabling better management of the State's sandalwood resource.

The planting of *Santalum spicatum* in the Wheatbelt region, in association with the maritime pine project, was commenced in 1997-98. This coordinated approach will allow the establishment of sandalwood on

farms, thus increasing the sandalwood resource and providing income to private landowners, all within the framework of the Salinity Action Plan.

The Sandalwood Business Unit has actively sought to broaden the market for sandalwood products through discussions with industry groups in the furniture and craftwood sectors and has begun trials on sandalwood oil extraction.

#### Sandalwood Production (tonnes) ex Crown Land

	1994-95	1995-96	1996-97	1997-98
green	1 024	926	1 029	925
dead	871	974	742	728
<b>Total</b>	<b>1 895</b>	<b>1 900</b>	<b>1 771</b>	<b>1 653</b>

Exports for 1997-98 totalled 1334 tonnes compared with 1073 tonnes the previous year.

### PLANTATIONS

The Plantations Group is a sub-program consisting of four business units: the Softwood Business Unit, CALM Sharefarms Business Unit, the Farm Forestry Business Unit and the Plant Propagation Business Unit. The group aims to maximise financial and environmental benefits by efficiently

managing Western Australia's public plantation assets.

On 2 July 1997 the Code of Practice for Timber Plantations in Western Australia was launched. This document, adopted by CALM and the Western Australian Chapter of the Australian Forest Growers, provides goals and guidelines to help ensure all plantation operations in Western Australia are conducted in accordance with the principles described in the document *Forest Practices Related to Wood Production in Plantations: National Principles* (1996).

1997-98 saw the first commercial production of Indian sandalwood seedlings for planting into a commercial plantation. Some 120 000 sandalwood seedlings and 380 host seedlings have been produced at the Kununurra nursery to be planted on 240 ha of the Ord River Irrigation Area on black soil. This will be an irrigated plantation. Indications for the 1998-99 season are that there will be 340 ha of commercial plantation. CALM staff have been involved with these commercial operations in an advisory capacity, mainly to ensure commercial operators put into place best-practice techniques in their operations. CALM's Tropical Plantations Unit is also involved in maintenance of Indian sandalwood

#### Fuelwood Production 1996-97 (tonnes)

Log Source	1995-96	1996-97	1997-98
<b>Forest Residue</b>			
from Crown land			
- Firewood	53 426	46 178	54 595
- Charcoal logs	86 017	94 008	75 417
from Private property			
- Firewood	8 100	900	3 788
- Charcoal logs	817	668	1 209
<b>TOTAL</b>	<b>148 360</b>	<b>141 754</b>	<b>135 009</b>
<b>Sawmill Residue</b>			
from Crown land	878 995	879 710	397 399*
from Private property	905	467**	177
<b>TOTAL</b>	<b>479 032</b>	<b>441 270</b>	<b>397 576</b>

\* July-Dec 1997 figures only, Jan-June 1998 data not yet available.

\*\*Amended with inclusion of additional data from late returns.

Sawmill figures for 6 months July-Dec 1996 published in the 1996-97 Annual Report have been updated to include January to June amounts, to give a final annual figure for 1996-97.

Above data includes all sawmill residue produced for: solid wood, bark, sawdust and shavings, wood chips, edgings and other—for sale, own use and not used.

trials, planting of demonstration areas of sandalwood using new technology, developing demonstration areas of valuable tropical timbers such as teak and ebony, and trialling a wide range of species that may perform well under irrigation in the Ord Valley.

**Softwood Business Unit**

A total of 1354 ha of State-owned coniferous plantation was established in 1997-98. This included 1238 ha of *P. radiata* and 116 ha of *P. pinaster* replanted in clearfelled plantation areas.

As part of the Department's ongoing strategy to optimise value and growth on its existing estate, approximately 11 500 ha of coniferous plantation were fertilised during 1997-98.

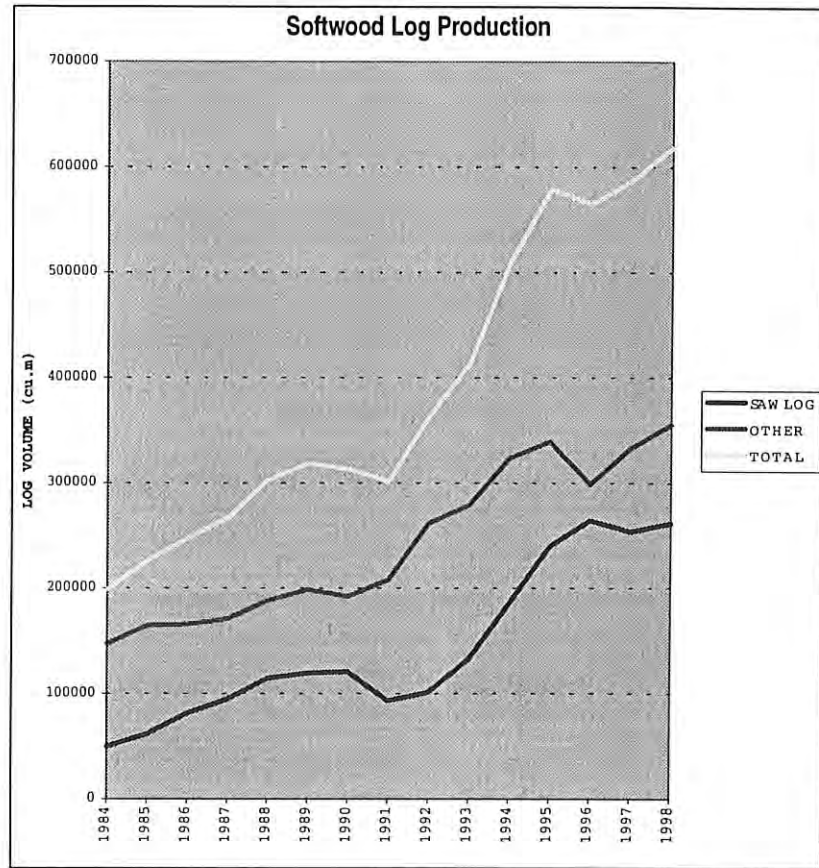
In-forest chipping of industrial wood was introduced into the Swan Region in October 1997 in order to increase resource utilisation and better supply the needs of customers.

First commercial thinning of plantations is, for the first time ever, largely up to date. Previously the available supply of industrial wood and particleboard logs has been greater than demand, resulting in some delayed first thinnings.

The demand for softwood log products increased marginally during 1997-98. Prices also increased marginally. This resulted in an increase in softwood sawlog stumpage revenue, and one softwood sawmill reopening. The demand for domestic and export panel board remained flat.

**CALM Sharefarms Business Unit**

Following the launch of the Maritime Pine Project in 1996-97, the Sharefarms Business Unit has been focussed on securing land for maritime pine (*Pinus pinaster*) establishment, targeting areas of land affected by salinity or erosion. In 1997-98, 1173 ha were planted, along with 151 ha of non-commercial species to complement other landcare objectives. Other potentially



commercial species such as *Corymbia maculata*, *Santalum spicatum* and *Allocasuarina obesa* were investigated.

The business unit is currently managing 2293 ha of *Pinus pinaster* plantations under sharefarming agreements.

In 1997-98 CALM established 5296 ha of *Eucalyptus globulus* plantations on behalf of the Albany

Plantations Forest Company of Australia Pty Ltd, Hansol Australia Pty Ltd and Bunbury Treefarms Pty Ltd, all of which are overseas investors.

The Business Unit is currently managing 14 807 ha of *Eucalyptus globulus* plantations for both government and private agencies.

CALM offered for sale 6510 ha of plantations during 1997-98 and negotiations are continuing.

Species	High Quality Sawlogs (m <sup>3</sup> )	1st Grade Sawlogs (m <sup>3</sup> )	Bole Logs (m <sup>3</sup> )	Other Sawlogs (m <sup>3</sup> )	Total (m <sup>3</sup> )
Jarrah	2 079	302 060	1 799	70 516	376 454
Karri	124	174 074		41 331	215 529
Marri	10	0		5 915	5 925
Other Species	2 678	1 598		581	4 857
<b>Total</b>	<b>4 891</b>	<b>477 732</b>	<b>1 799</b>	<b>118 343</b>	<b>602 765</b>
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Jarrah	2 720	397 209	2 366	91 740	494 035
Karri	154	215 185		51 250	266 589
Marri	12	0		7 334	7 346
Other Species	2 707	2 100		761	5568
<b>Total</b>	<b>5 593</b>	<b>614 494</b>	<b>2 366</b>	<b>151 085</b>	<b>773 538</b>

Softwood Production from Crown land 1997-98											
SPECIES	SAWLOGS						Sub-Total Sawlogs	Industrial* Wood	Wood chips	Pine Rounds	Grand Total
	Scanner Logs	by mid. Diam.class	Premium Grade	2nd Grade	3rd Grade	Small					
RADIATA											
m <sup>3</sup>	176 912	10 458	472	7 680	15	28 153	223 690	246 010	0	8 341	478 041
tonnes	176 912	10 458	472	7 680	15	28 153	223 690	246 010	0	8 341	478 041
PINASTER											
m <sup>3</sup>	20 513	0	0	1 873	14	16 258	38 658	53 671	47 331	461	140 121
tonnes	20 513	0	0	1 873	14	16 258	38 658	58 528	53 010	461	150 657
TOTAL											
m <sup>3</sup>	197 425	10 458	472	9 553	29	44 411	262 348	299 681	47 331	8 802	618 162
tonnes	197 425	10 458	472	9 553	29	44 411	262 348	304 538	53 010	8 802	628 698

\*Including particleboard logs. In addition 3174 Christmas trees were sold. There were no veneer logs produced during the year.

### Farm Forestry Unit

The Farm Forestry Unit's role is to develop new tree crop opportunities for farmland and to provide information on all aspects of farm forestry.

A further one million oil mallee trees were planted in 1997, bringing the total planted over four years to seven million. The 1997 planting was managed entirely by the Oil Mallee Association, a grower's representative body. The Association has sponsored the formation of a limited company to carry the development of harvesting and oil extraction. A business plan has been prepared and good progress is being made in developing new, low cost technologies.

The Farm Forestry Unit coordinates its activities with key stakeholders such as Agriculture WA, Regional Initiative Groups, the landcare movement, professional advisers and commercial operators, and reinforces key state and national policy initiatives such as the State Salinity Action Plan and Plantations Vision 2020.

A Farm Forestry Advisory Service has been established in conjunction with Agriculture WA. The service is to provide accurate and consistent information to staff in both agencies. Recent emphasis has been on collating current knowledge into an information sheet series called TreeNotes.

### Plant Propagation Business Unit

During the 1997-98 season the Plant Propagation Centre at Manjimup raised over 19 million seedlings and 500 000 cuttings. A breakdown by species is as follows:

#### Number of Seedlings and Cuttings ('000)

<b>Hardwood</b>	
<i>E. globulus</i>	10 318
<i>E. diversicolor</i>	3 651
<i>E. marginata</i>	79
Mixed species	1 222
<b>Softwood</b>	
<i>P. radiata</i>	365
<i>P. pinaster</i>	3 872

Approximately four million of these seedlings were sold for private use.

The State Government has approved plans for the establishment of a major

new nursery facility at Manjimup to supply seedlings for the maritime pine program. Maritime pine has been identified as ideal for the establishment of commercial tree farming in the 400-600 mm rainfall belt to provide the basis for a major softwood timber industry as well as having major benefits for landcare programs.

Some 330 000 mother plants were planted in 1997 to provide cuttings for the new nursery and an additional 200 000 seedlings have been propagated for mother plant establishment in 1998.

At Kununurra nursery, commercial interests took over the production of sandalwood seedlings for the establishment of sandalwood plantations. CALM staff have acted in an advisory role to this operation, which has produced 120 000 Indian sandalwood trees (*Santalwood album*) together with a range of host species, amounting to a total of 500 000 seedlings. This will be sufficient for 250 ha of sandalwood plantation.

	Crown Land		Private Property		Total	
	(m <sup>3</sup> )	(tonnes)	(m <sup>3</sup> )	(tonnes)	(m <sup>3</sup> )	(tonnes)
<b>Marri Logs:-</b>						
bolewood	413 327	507 883	43 793	53 701	457 120	561 584
branchwood	0	0	0	0	0	0
<b>Karri Logs:-</b>						
bolewood	179 826	217 615	9 298	11 168	189 124	228 783
branchwood	7 973	9 887	166	206	8 139	10 093
<b>Total</b>	<b>601 126</b>	<b>735 385</b>	<b>53 257</b>	<b>65 075</b>	<b>654 383</b>	<b>800 460</b>



Production from CALM-Owned Hardwood Plantation 1997-98						
SPECIES		Sawlogs	Chiplogs	Firewood	Fencing	TOTAL
Globulus	m <sup>3</sup>		10 803			10 803
	tonnes		12 639			12 639
Mallet	m <sup>3</sup>	202		605	66	873
	tonnes	240		605	79	924
TOTAL	m <sup>3</sup>	202	10 803	605	66	11 676
	tonnes	240	12 639	605	79	13 563

CALM's activities at Kununurra are now directed towards testing the suitability of valuable tropical timbers as irrigated tree crops within the Ord Irrigation Scheme.

Production of containerised stock at the Narrogin nursery included 12 000 potted stock, 810 000 mini plugs, 800 000 multi-celled containers and 810 000 multi-celled containers, supplied by Manjimup nursery and sold through the Narrogin nursery.

### Tree Breeding and Genetic Deployment Unit

In 1997-98 the Unit established:

- A series of *Pinus cambria* provenance trials, concentrating on greater drought tolerance and acting as a conservation pool.
- A breeding program for *Eucalyptus occidentalis* as a joint project with the CSIRO.
- A hybrid trial investigating *E. camaldulensis* with *E. globulus* and *E. grandis*. This trial will also investigate the effects of in-breeding depression on *E. camaldulensis* growth performance and compares tissue culture plantlets with seedling material.

A study, which was supported by the Rural Industries Research Development Corporation on 'Potential production of tannin and fuelwood from plantation bipinnate acacias', has been completed, indicating that *Acacia mearnsii* is a promising species for the south-west.

### SEED CENTRE

#### Seed Handling

Seeds of the principal species needed for CALM's forest plantings, rehabilitation and conservation projects, as well as for public sales, were acquired, processed and stored at the Manjimup Plant Propagation Seed Centre. A total of 580 native and exotic species totalling 3000 kg are stored at the Centre.

#### Seed Despatch

A total of 1832 kg of seed (260 orders) was despatched from the Centre in 1997-98, mostly within Western Australia. Some small quantities were despatched to other Australian states and to other countries including Argentina, Brazil, India (Orissa region), South Korea, Sweden and New Zealand.

### Seed Acquisition

A total of 2 258.7 kg was acquired through collection and purchase:

<i>Eucalyptus diversicolor</i>	39.9 kg
<i>Eucalyptus globulus</i>	522.5 kg
<i>Eucalyptus marginata</i>	240 kg
Other <i>Eucalyptus</i> species	248 kg
<i>Pinus radiata</i>	273.9 kg
<i>Pinus pinaster</i>	600 kg
Leguminaceae species (e.g. <i>Acacias</i> , <i>Kennedias</i> )	219 kg
Proteaceae species (e.g. <i>Banksia</i> , <i>Hakeas</i> )	4 kg
Other species	111.4 kg

### Seed Orchards

During 1997-98 three new seed orchards were established near Manjimup, one of *Eucalyptus dunnii*, one of *Corymbia maculata* and one of a new clone of *Eucalyptus globulus*.

1997-98 also saw the first collection of seed from the *Eucalyptus camaldulensis* seed orchard at the Manjimup PPC.

The *Pinus pinaster* seed orchard at Manjimup yielded 350 kg of seed in 1997-98.

Sawn Production from Crown Land and Private Property 1996-97			
	Hardwood m <sup>3</sup>	Softwood m <sup>3</sup>	Total m <sup>3</sup>
Sawn Timber Production			
- Crown land	250 835	112 542	363 377
- Private property	3 115	19 048	22 163
<b>Total</b>	<b>253 950</b>	<b>131 590</b>	<b>385 540</b>

Final figures for 1997-98 not yet available. These will be published in the next annual report.  
Note: The trend in the production of sawn timber is shown in Appendix 7.

## Log Production from Crown Land and Private Property 1997-98

TYPE	Crown Land		Private Property		Total	
	(m <sup>3</sup> )	(tonnes)	(m <sup>3</sup> )	(tonnes)	(m <sup>3</sup> )	(tonnes)
<b>SAWLOG TIMBER*</b>						
Jarrah	376 454	494 035	10 333	13 575	386 787	507 611
Karri	215 529	266 589	3 639	4 513	219 168	271 03
Marri	5 925	7 346	3 090	3 832	9 015	11 180
Blackbutt	1 426	1 874	33	44	1 459	1 918
Wandoo	746	980	42	55	788	1 035
Sheoak	2 565	2 565	375	375	2 940	2 940
Other	120	149	30	37	150	186
<b>Total Native Hardwood</b>	<b>602 765</b>	<b>773 538</b>	<b>17 542</b>	<b>22 431</b>	<b>620 307</b>	<b>795 969</b>
Globulus	0	0	642	764	642	764
Mallet	202	240	0	0	202	240
<b>Total Plantation Hardwood</b>	<b>202</b>	<b>240</b>	<b>642</b>	<b>764</b>	<b>844</b>	<b>1 004</b>
<b>Pine Sawlogs and Veneer Logs</b>	<b>262 348</b>	<b>262 348</b>	<b>56 847</b>	<b>56 847</b>	<b>319 195</b>	<b>319 195</b>
<b>TOTAL SAWLOGS</b>	<b>865 315</b>	<b>1 036 126</b>	<b>75 031</b>	<b>80 042</b>	<b>940 346</b>	<b>1 116 168</b>
<b>OTHER LOG MATERIAL</b>						
Native Hardwood						
Chiplogs	601 126	735 385	53 257	65 075	654 383	800 460
Industrial wood	6 323	7 841	1 446	1 792	7 769	9 633
Firewood/charcoal logs	123 792	130 012	4 821	4 997	128 613	135 009
other**	20 110	24 244	957	1 179	21 067	25 423
<b>SubTotal Native Forest/Other</b>	<b>751 351</b>	<b>897 482</b>	<b>60 481</b>	<b>73 043</b>	<b>811 832</b>	<b>970 525</b>
Plantation Hardwood						
Chiplogs	10 803	12 639	38 160	44 648	48 963	57 287
Industrial wood	0	0	0	0	0	0
other**	671	684	0	0	671	684
<b>SubTotal Hardwood Pltn/Other</b>	<b>11 474</b>	<b>13 323</b>	<b>38 160</b>	<b>44 648</b>	<b>49 634</b>	<b>57 971</b>
Softwood						
Industrial wood***	347 012	357 548	87 640	87 644	434 652	445 192
Pine rounds	8 802	8 802	43 140	43 140	51 942	51 942
<b>SubTotal Softwood/Other</b>	<b>355 814</b>	<b>366 350</b>	<b>130 784</b>	<b>130 784</b>	<b>486 594</b>	<b>497 134</b>
<b>Total Other Material</b>	<b>1 118 639</b>	<b>1 277 155</b>	<b>229 421</b>	<b>248 475</b>	<b>1 348 060</b>	<b>1 525 630</b>
<b>TOTAL LOG TIMBER</b>	<b>1 983 954</b>	<b>2 313 281</b>	<b>304 452</b>	<b>328 517</b>	<b>2 288 798</b>	<b>2 641 802</b>

\*Sawlog timber from all sources, including veneer, but not including chiplogs, particleboard, industrial wood, firewood, fencing material, poles, piles and minor forest products.

\*\* Includes poles, bridge timbers, burls, chopping logs, mining timber, pegging logs and fencing material.

\*\*\*Includes pine woodchips.

Note: The trends in the production of logs are shown in Appendices 5 and 6.





# TOURISM & RECREATION

## MANAGEMENT PROGRAM 3

### Objective

To identify, provide and maintain opportunities and services to the community which allow them to enjoy the wildlife, lands, waters and resources entrusted to the department without compromising conservation and other management objectives.

*This Program deals with tourism and recreation in the natural environment on lands and waters managed by CALM. It includes preparing and implementing management plans and the provision, management and maintenance of appropriate access, recreation opportunities and facilities, protecting visitors and facilities from fire, training of staff and CALM volunteers, designing and initiating educational information and activities concerning tourism and recreation in the natural environment, and developing public awareness, understanding and support for the tourism and recreation management program, services and policies.*

*The Department's operations are guided by a Recreation and Tourism Strategy (published as People in CALM Places) The strategy describes the vision of CALM's Recreation and Tourism Program and outlines a number of focuses and strategic actions in relation to managing natural areas for public use. It proposes ways of measuring effectiveness and efficiency in delivering recreation and tourism services and facilities and the effect recreation and tourism have on the natural environment. One of the key aims of this strategy is to articulate the Department's commitment to providing sustainable recreation and tourism opportunities of the highest quality on the lands and waters managed by CALM, and to communicate this to the community.*

*The strategy also provides the basis for more detailed regional action*

### Highlights

- ✓ Bibbulmun Track: stage two constructed (pp. 27 and 30)
- ✓ Regional Parks unit established and managing four parks (p. 25 and 32)
- ✓ Implementation of computerised RecData system (p. 31)
- ✓ More than 100 000 hours contributed by registered volunteers (p. 33)
- ✓ CALM and Ministry of Justice collaborate to improve visitor facilities (p. 31)

*plans which describe the steps to be taken in achieving Recreation and Tourism Program objectives throughout this State.*

### RECREATION PLANNING AND DESIGN

#### Area and Regional Plans

CALM aims to increase the area of CALM-managed estate covered by statutory plans. During the year a final management plan for Canning River Regional Park was gazetted, and draft management plans for Serpentine National Park, Esperance Lakes Nature Reserves, Jurabi and Bundegi Coastal Parks and Muiron Islands Nature Reserve were released for public comment. Work continues on 24 draft and final plans, all of which provide recreation and conservation strategies. Applications for funding the preparation of management plans for the Lower Ord Ramsar Wetlands, Parry Lagoons Nature Reserve and Rowles Lagoon Nature Reserve have

been successful, grants having been provided by Environment Australia through the National Wetlands Program. Last year the State Government gave CALM the task of coordinating management of regional parks. As part of that responsibility, the preparation of management plans for Beeliar, Yellagonga and Herdsman Regional Parks has begun, under contract to three private environmental firms.

The following tables list the area of each tenure category managed by CALM for which plans are now completed. It also lists the status of plans in preparation or already approved as at 30 June 1998.

Approximately 68 per cent of visits to the CALM-managed estate were to sites covered by management plans either approved or in preparation (but excluding regional plans). The estimated number of visits to the total CALM-managed estate to 30 June 1998 was 8.1 million.

Areas Covered by Management Plans			
Tenure classification	Area covered by plan (ha)	Total tenure area (ha)	% covered
National Park	951 357.0	4 874 282.0	19.5
Nature Reserve	81 047.7	10 772 271.0	0.8
Marine Reserve	1 115 799.0	1 145 940.0	97.3
Other Recreation/ Conservation Reserves	87 650.3	263 079.0*	33.3
<b>Total CALM Conservation Estate</b>	<b>2 235 854.0</b>	<b>17 055 573.0</b>	<b>13.1</b>

\*Does not yet include regional parks

CALM Management Plan Status at 30 June 1997			
Approved (gazetted) management plans	Date of gazettal	Final plans in preparation	Draft plans in preparation
NATIONAL PARKS			
Cape Range	23-03-90	Nambung	Millstream-Chichester
Fitzgerald River	19-07-91	Karijini	François Peron
Leeuwin Naturaliste	21-04-89	Stirling Range & Porongurup	Shannon D'Entrecasteaux
Shannon D'Entrecasteaux	08-01-88	Serpentine	Revision
Walpole-Nornalup	03-07-92		
Yanchep	29-09-89		
John Forrest	19-08-94		
West Cape Howe	04-08-95		
Yalgorup	15-08-95		
Lesueur	13-10-95		
Purnululu	05-03-96		
NATURE RESERVES			
Benger Swamp	12-02-88	Wanagarren	Lake Muir Unicup
Dampier Archipelago	31-08-90	Nilgen	Perup
Forrestdale Lake	10-07-87	Southern Beekeepers	Shark Bay Terrestrial Reserves
Mooradung	21-02-86	Esperance Lakes	Parry Lagoons
Nature Reserves of Shire of Wyalkatchem	10-07-87	Alfred Cove	Rowles Lagoon
Nature Reserves of Shires of York and Northam	10-07-87	Milyu	
Coomallo	13-10-95	Pelican Point	
Two Peoples Bay	07-06-96	Muiron Islands	
Wanjari	02-07-96		
MARINE PARKS			
Ningaloo	24-11-89	Swan Estuary	Rowley Shoals
Marmion	15-05-92	Shoalwater Islands	Jurien
Shark Bay	07-03-97		
OTHER RESERVES			
Lane Poole Reserve	14-12-90	Monkey Mia Reserve	Shark Bay World Heritage Area
Matilda Bay Reserve	21-05-93	Leschenault Peninsula	Beeliar Regional Park
Shoalwater Islands	20-10-92	Jurabi & Bundegi Coastal Parks	Yellagonga Regional Park
Hamelin Pool Marine Nature Reserve	07-03-97		Herdsmen Regional Parks
Canning Regional Park	5-12-97		Lower Ord Ramsar Wetland
STATE FOREST			
Logue Brook Reservoir and Catchment Area	16-03-90		
Waroona Reservoir and Catchment Area	16-03-90		
Dryandra Woodland	14-11-95		
REGION PLANS			
Central Forest Region	12-02-88		Wheatbelt Region
Northern Forest Region	12-02-88		Kimberley Region
Southern Forest Region	12-02-88		
Forest Management Plan 1994	22-03-94		
South Coast Region	13-03-92		
Goldfields Region	24-02-95		

Note: Regions are as delineated in Forest Management Plan 1994–2003 for Forest Regions. Area figures are of the total area within a region, including CALM-managed lands.

#### Regional Management Plans

CALM region	Area (millions of ha)	% of WA (total area)
Swan	2.1	0.8%
Central Forest	1.8	0.7%
Southern Forest	1.4	0.6%
South Coast	20.0	7.9%
Goldfields	82.0	32.5%
<b>Total</b>	<b>107.3</b>	<b>42.5%</b>

Note: Regions are as delineated in Forest Management Plan 1994–2003 for Forest Regions. Area figures are of the total area within a region, not just CALM-managed lands.

#### Landscape Management

The landscape management section undertook a broad range of projects in 1997–98, focusing on protecting the environment while enhancing visitors' experience. The landscape assessment and planning procedure was refined to improve the scope of its application, and continuous improvement to technological expertise increased the section's

capacity to undertake a broad range of computerised mapping, analysis, modelling and simulation work.

A landscape assessment of the Dryandra forest blocks was undertaken and a plan prepared to assist with the planning of mallet harvesting. A number of prominent timber harvesting coupes in the Southern Forest Region were assessed and concept plans were prepared.

Work continued on the review of travel route classification for the Forest Regions to incorporate changes to visitor use. An assessment of the Lower Ord area was completed and a plan prepared to assist with the management of visitors and their potential impacts. A similar project was started for the Shark Bay World Heritage Area.

Work was undertaken for Alcoa in relation to the Land Use Management Plans for their Wagerup and Kwinana sites, and work also began on the Benger farm forestry project in conjunction with the farm forestry unit.

Workshops were conducted with field staff to review the effectiveness of the landscape planning process and a number of improvements were enacted. Work on a set of landscape management guidelines continued, and draft guidelines were prepared for plantation establishment and harvesting, native forest harvesting, and CALM's landscape planning procedure. Lectures on landscape management were provided for local tertiary courses.

### Recreation Site and Facility Plans

**Recreation Master Plans** were produced for the Lower Ord Ramsar area and Parry Lagoons Nature Reserve (Kimberley Region), Karijini National Park – Northern Recreation Area (Pilbara Region), Millstream National Park (Pilbara Region), Lane-Poole Reserve, (Dwellingup District) Rocky River Headquarters – Flinders Chase National Park (Department of Environment and Natural Resources, South Australia), Two Peoples Bay Visitor Centre (South Coast Region), Contos Field – Leeuwin-Naturaliste National Park (Capes District), Koala Enclosure Redevelopment – Yanchep National Park (Perth District), Lancelin Island (Moora District), Peron Homestead – Peron National Park (Gascoyne District).

**Recreation Site Development Plans** were completed and are being progressively implemented for Boorara Tree and Lane Poole Falls

(Pemberton District), Wrights Bridge (Blackwood District), Karalee and Baladjie Granite Rocks (Merredin District), Kurrajong Group Camp Site (East Kimberley District), Eagle Bluff (Shark Bay World Heritage Area – Gascoyne District), Bloodwood Creek Campground – Cape Range National Park, Baden Powell and Chuditch Campsites – Lane Poole Reserve (Dwellingup District), Matilda Bay Kiosk (Perth District), Warner Glen (Blackwood District), John Forrest Entry Station (Mundaring District), Monkey Mia Dolphin Centre landscape surrounds (Gascoyne District), Karijini Road wayside sites (Pilbara Region), Hills Forest Animal Feeding Area (Mundaring District), Logue Brook Ramp Precinct (Mornington District), Dryandra Wildlife Enclosure (Narrogin District), Moses Rock and Quininup Falls (Leeuwin-Naturaliste NP), Hellfire Bay and Park Office – Cape le Grand (Esperance District), Penguin Island Well site, Litoria Stream – Canning Regional Park.

Recreation Concept Development Plans or Assessment Reports were completed for Wedge and Grey (Moora District), Ningaloo-Cardabia Coastal Zone (Exmouth), Greenbushes Eco-Cultural Centre, Cape Range Safari Camp, Nambung Visitor Centre (Moora District).

Design and Construction Documentation drawings were prepared for Warncliffe Camp Dormitories (Capes District), Vasse Wonnerup Wetland hides and lookout tower (Capes District), Coral Bay shade shelters, multiple transportable office buildings, Barrabup Pool platform and walkway (Blackwood District), various new toilets, John Forrest entry station (Mundaring District), money collection pillars, Penguin Island interpretive walls, Pilbara steel barriers, Lancelin Island steps and boardwalks (Moora District), Mt Wells Fire Tower Lookout (Mundaring District), Bibbulmun Track shelters, Herdsman Lake boardwalk extensions (Regional Parks), Matilda Bay fencing/bollard trial (Perth District), Wellington Discovery Park Office entry porch

(Mornington District), Charlie Sappi Park information shelter (Gascoyne District), The Ferns and Honeymoon Pool (Mornington District), Coalmine Caravan Park – chalet precinct (Walpole District).

Support and advice on recreation and tourism projects were provided to CALM staff throughout the year. Formal training was provided at an Advanced Recreation Planning and Management Course in May 1998.

## TOURISM AND RECREATION OPPORTUNITIES

### Regional Achievements

CALM continued to improve facilities and services throughout the State.

**South Coast:** The Esperance Lakes Draft Management Plan was released for public comment and submissions. A new camping area was constructed in Cape Le Grand National Park to complement the caravan camping area at Cape Le Grand Beach.

The Australian Trust for Conservation Volunteers assisted CALM in re-establishing the Heritage Trail at Stony Hill in Torndirrup National Park after the recent wildfire. A new parking area and major road modifications were initiated.

Assistance was received from Greencorps Grants for erosion control and track works in coastal areas within Stirling Range, West Cape Howe and Fitzgerald River National Parks.

A new Information Centre has been built at Two Peoples Bay Nature Reserve and is currently being fitted out. It will be opened to the public in the second half of 1998.

More than 80 km of the new Bibbulmun Track were established between Albany and Denmark.

The Stirling Range and Porongurup National Parks draft management plan was released, and rehabilitation and construction works were completed on the Mount Trio Path.



A take-off and landing ramp for hang gliders was constructed at West Cape Howe National Park. The Hang Gliders' Association paid for and constructed the ramp with help from CALM staff.

In conjunction with the Albany Residency Museum, CALM is continuing with the Interpretive Walks Program. Staff from the Perth Observatory also cooperated by running a successful Astronomy Night.

**Southern Forest:** In conjunction with the Peaceful Bay Progress Association, a walk trail, entry station and whale watching lookout were completed at Conspicuous Cliff Beach in the Walpole-Nornalup National Park.

Main Roads (MRWA) grants enabled the redesign and sealing of the car park at Salmon Beach in D'Entrecasteaux National Park, aimed at reducing erosion and facilitating access for conventional vehicles. Redevelopment was undertaken at the Gloucester Tree and Boorara Tree access and car parks. The redevelopments increase the capacity of the sites whilst improving visitor safety and comfort.

The Bibbulmun Track, which covers about 350 km in this region, was completed and will be ready for the official opening in September 1998. In the meantime the walking public is making good use of sections of the track for day and overnight walks.

Entry fees were introduced to Shannon and D'Entrecasteaux National Parks and a review of the Shannon and D'Entrecasteaux National Parks Management Plan was initiated. Special attention is being given to matters relating to Aboriginal culture and heritage with the help of Aboriginal people through the Manjimup Aboriginal Corporation.

The Valley of the Giants won various tourism and engineering awards, and the designers and manager of the Valley of the Giants Tree Tops Walk travelled (at no expense to CALM) to the United States to make

presentations about the facility and its management. The Valley of the Giants is receiving more than 200 000 visitors per annum, and recreation activity programs for primary school children and families were initiated during the Christmas school holidays.

**Central Forest:** The Hoffman Mill camping area in Mornington State forest is being rehabilitated in a joint project with the Harvey Primary School. The project aims to recreate the atmosphere of an old mill town by planting species that would have been found in the gardens of the original residences.

A hazardous-tree removal program in the lower Collie valley recreation sites was completed with minimal inconvenience to the public. The Crooked Brook community group continued with the development of picnic and walk trail facilities.

The construction of the Wellington Discovery Forest centre buildings was completed with the assistance of a grant from the South West Development Commission; 12 new interpretative panels were completed and a second interpretative trail was opened.

A bunkhouse was completed at Wharncliffe Mill camping site at Margaret River for the use of school groups, youth groups and other organisations.

In Leeuwin-Naturaliste National Park, visitor infrastructure at Calgardup and Giants caves was upgraded as part of a program to protect the caves' conservation values. More than 200 metres of elevated walkways were installed and a cave guide hut built with the support and voluntary labour of the local caving fraternity.

The Surfriders Foundation has assisted CALM at Three Bears surf break by providing a composting toilet, viewing platforms, access stops and interpretative information in order to enable the area to be used in a sustainable manner.

The public access road to Contos beach has been deviated around Contos camping ground resulting in a safer and more secluded campground.

A new campsite was completed at Workers Pool in the proposed St Johns Brook Conservation Park in the Blackwood district.

All sections of the Bibbulmun Track have been completed.

**Swan Region:** The Hills Forest Activity Centre continues to grow and provide innovative educational and recreation programs for over 20 000 visitors. The Aboriginal cultural excursions have been well attended, along with native animal encounter days and the night-time Kookaburra Cinema. Habitat regeneration programs are being undertaken close to the centre by Greencorps and an information shelter has been established along with two mountain bike-riding trails. Australia's only wheelchair-accessible campground linked to the Activity Centre was opened by Olympic wheelchair athlete Louise Sauvage.

Matilda Bay Reserve kiosk was demolished and a new facility was financed and built by the private sector to service the visitors to Crawley foreshore.

The Coastal Plains walk trail extending from Yanchep National Park to Walyunga National Park was opened and the Yanchep Rose trail developed to provide walkers with the opportunities to enjoy scenic vistas over Ridges Estate forest and Yanchep National Park.

Penguin Island beach access ramps were developed and training undertaken for 18 Shoalwater Marine Park volunteers. Works were undertaken on Penguin Island and Carnac Island to reduce the hazard of rock falls as recommended in the Department's rockfall risk report.

**Wheatbelt:** Dryandra woodland continued to be the focus of attention in the Wheatbelt region. A logo was

developed for Dryandra Woodland and locally produced merchandise made available to visitors. Recreation sites were assessed for visitor risks and tree lopping undertaken where it was considered necessary to ensure public safety.

Tomingley road is being widened and realigned in some sections. Works also commenced to refurbish several cottages at Dryandra Forest settlement, which is leased to the Lions Club of Western Australia.

The Dryandra Woodland Ecology Course continues to attract ecotourists. This year, local Nyoongars were involved for the first time in conducting cultural activities. The Wonders of the Woodland Activity Program was successfully conducted during July and September 1997, and April 1998.

A major research project examining the impacts of tourism at Dryandra stimulated the formation of the Dryandra Woodland Focus Group, a community-based organisation concerned with increasing the economic benefits of sustainable tourism. The group will work on strategies to encourage the growth of tourism in the local economy based on protection and use of the area's natural assets.

Landscape plans for recreation sites at Karalee Rock, Biladjie Rock and Wongan Hills Nature Reserve (Merredin District) were prepared in conjunction with local stakeholders. The Friends of Wyalkatchem Reserves Group (Merredin District) was established and discussions were held with stakeholders over water-skiing on Lake Coyrecup (Katanning District).

**Goldfields:** The installation of facilities to cater for disabled access completed the redevelopment of the Kalgoorlie Arboretum, which is acting as an important education and recreational site for locals as well as a tourist attraction. Visitors can see some excellent specimens of Goldfields timbers that are now regenerating throughout the region.

The clear skies of the Goldfields enabled the Perth Observatory, in conjunction with the Kalgoorlie-Boulder Tourist Centre, Goldrush Tours and CALM's regional office, to run a very successful stargazing program at Goongarrie Station, which is part of the CALM-managed estate. The homestead has been progressively upgraded to provide basic accommodation for visitors seeking nature-based recreation.

**Midwest:** The management plan was finalised for Nambung National Park and Wanargarren, Nilgen and Southern Beekeepers Nature Reserves. Work continued on the preparation of a management plan for Shark Bay's Terrestrial Reserves and the Shark Bay World Heritage Property Strategic Plan.

A Recreation and Tourism Plan was prepared for a 250 km section of the Shark Bay coast (Tamala and Carrarang) with funding from Coastwest/Coastcare. Interim Management Guidelines were prepared for Lancelin and Edward Islands Nature Reserve, and Interim Management Guidelines for Kalbarri National Park were updated.

Schematic designs for the Monkey Mia visitor centre and redevelopment were prepared. Expressions of interest for tour operations in the Shark Bay Marine Reserves were assessed and licences issued. Guidelines were developed for charter boat interaction with marine mammals at Monkey Mia.

Exhibits and interpretation were installed in the Peron Visitor Centre with World Heritage funding. Site development plans were prepared for visitor facilities at Eagle Bluff, and World Heritage funds were awarded for implementation. A World Heritage Community Education Officer was appointed with World Heritage funding assistance.

Planning began for a sealed road to the Murchison River gorges in Kalbarri National Park.

A viewing deck with lookouts was constructed at the Pinnacles Desert in Nambung National Park, with funding assistance from the National Tourism Development Program. A trial helicopter tour operation was conducted in the park and expressions of interest were sought for an exclusive licence. Planning commenced for the development of a visitor centre in Nambung National Park to interpret nature-based tourism attractions in the district.

Plans were prepared for the development of pedestrian boardwalks on Lancelin Island, and Coastwest/Coastcare funding was awarded for construction. Day visitor facilities were developed at Grigsons Lookout on the new Jurien to Greenhead Road, with Main Roads funding assistance.

Implementation of the Government's Squatter Management Policy continued, and Coastwest/Coastcare funding was awarded for the preparation of a management plan and site development plans for Grey and Wedge Point.

*LANDSCOPE* Expeditions were conducted to Burnerbinmah Station and François Peron National Park.

**Pilbara:** A major upgrade of the lookout and day use facilities in Karijini National Park was completed. The old Oxer lookout was closed after adverse reports from an engineer. The upgrade has resulted in two new lookouts being constructed as well as improved visitor and vehicle access. The work cost approximately \$250 000, with assistance being provided by Hamersley Iron and from the Federal Government under the National Tourism Development Program.

The major bitumen link road that connects the Great Northern Highway with Tom Price and provides good all-weather access across the park was completed by Main Roads. As a result, visitor numbers to the park are expected to increase significantly over the next five years.



**Kimberley:** Negotiations continued for management arrangements for the Mimbi Caves, and for portions of the Waterbank Station to be added to the conservation estate. Consultants preparing the draft Waterbank Structure Plan have developed various options, and the final arrangements will be determined by Cabinet.

There was continued development of the Kimberley Natural Eco-Centre attached to the Broome office, which will provide an education centre housing a computer linked to CALM's world wide web server.

A draft management plan is being prepared for the Rowley Shoals Marine Park. Eight commercial tour operators were licensed to conduct tours.

Work continued on the Government's nomination of the Bungle Bungle massif in Purnululu National Park as a world heritage area. A high-quality publication on the geology of the Bungle Bungle range was published by the Australian Geological Survey Organisation in conjunction with CALM and the WA Geological Survey Organisation.

CALM commenced management of some proposed reserves on the Mitchell Plateau under agreement with the Mitchell Plateau Mining Company and the Department of Resources Development. Staff are posted to the area, and negotiations with Shires, Aboriginal groups and neighbours have begun.

A cooperative environmental interpretation venture with charter boat vessels conducting tours of the Kimberley coast has begun. CALM staff provide commentary during the tour in return for the opportunity to assess the conservation needs of remote sections of the coast.

Visitor fees were introduced at Mirima National Park and substantial improvements were made to walk tracks by Greencorps.

## Tourism Licences

All commercial tour operators conducting activities on lands and waters vested in the National Parks and Nature Conservation Authority (NPNCA) or the Marine Parks and Reserves Authority (MPRA) and managed by CALM are required to obtain a licence. As of 30 June 1998, a total of 280 commercial tour operators were licensed to operate on CALM estate with a further 47 applications being assessed. This represents a 27 per cent increase in operators being licensed for the financial year.

CALM has continued its commitment to sustainable nature-based tourism by developing opportunities for the involvement of the private sector on CALM-managed land and waters.

## Leases

At the end of the financial year CALM was managing 266 leases and is in the process of issuing an additional 140. Of the leases in place, 195 are on State forest or timber reserves, 30 are on conservation estate, 31 either require resolution of some aspect of the lease or are continuing on an informal basis, usually due to the likelihood of the land being disposed of by CALM.

During the year, 14 leases were issued as a result of input by the Leases section and often combined with efforts of other branches or external agencies depending on the nature of the lease activity.

## Bibbulmun Track Project

The Premier officially opened 450 kilometres of new trail and associated facilities in the northern half of the track on 15 August 1997.

In the southern half, 18 campsites were added to the three already existing. Twelve major crossings were constructed on rivers and streams, and 480 kilometres of new trail were laid through heavy southern forests and coastal heathlands.

A Memorandum of Understanding was drawn up between CALM and the newly formed Friends of the Bibbulmun Track. This organization's mission statement is 'To support the management of the Bibbulmun Track so that it becomes and remains a long distance walk trail of international significance and quality'.

A further \$700 000 of 'in kind' contributions were made by the Ministry of Justice through fieldwork crews and in-prison prefabrication. This brings the Ministry's contribution to a total of \$1.5 million on the Bibbulmun Track. The Project continues to draw a wide range of volunteers to do construction and maintenance work. One 11-minute promotional video and one 33-minute educational video were produced jointly by the Project Team and The Friends of the Bibbulmun Track.

The southern half of the Track is nearing completion and will be opened on 13 September 1998.

## Visitor Interpretation Services

Environmental interpretation helps visitors gain a better appreciation of our natural environment. Officers assisted with the preparation of recreation site development plans, and also gave lectures in interpretation to students of Edith Cowan University, University of Notre Dame and Curtin University. They also made presentations to the Ecotourism Association of Australia, the Interpretation Australia Association and the Australian Association for Environmental Education.

CALM's Sign Design Studio prepared designs for 131 projects to meet regional needs for signs and displays in managing visitors. Products of particular note were the Hills Forest orientation signs at the Activities Centre; Bibbulmun Track signs; Shark Bay World Heritage shelter; display panels for Wellington Discovery Forest 'Living Windows' Centre; and revision of the Park Pass signs. Risk signs continued to be in



demand as part of CALM's risk management program. Numerous Cave Risk signs were produced for Cape Range National Park

Interpretive activity programs enrich visitor experiences while aiding the understanding and support for sound management of our heritage. Regular activity programs were maintained at Yanchep National Park and at The Hills Forest in the metropolitan area and at Mirima and Purnululu National Parks in the Kimberley. More than 20 000 people attended The Hills Forest 'Go Bush' Program.

CALM's nationally accredited Designing Interpretive Activities Workshop was conducted in collaboration with the University of Notre Dame. Professional development participants and students of Environmental Interpretation and Management were involved.

A new book, *Best Recipes for Interpreting Our Heritage: Activities for Ecotour Guides*, has been published to support tour guides with interpretive activities.

## PROGRAM INITIATIVES AND ACHIEVEMENTS

### Training

During the year the Department conducted another training course on recreation planning and management in natural areas for recent field officer recruits and other staff at the Ministry for Sport and Recreation's Point Walter Conference Centre. This marks the eleventh year the course has been held; during that time more than 200 CALM staff have completed this nationally accredited training program.

A four-day workshop on marketing and business planning was attended by staff from around the State. It involved external speakers representing the Western Australian Tourism Commission, commercial tour operators and other tourism and marketing interests.

Five staff from the Parks, Recreation, Planning and Tourism section and the Swan Region were invited to conduct a three-day seminar on planning and managing visitors to natural areas for the South Australian Department of Environment and natural resources. This seminar, held on Kangaroo Island in October 1997, was followed by a planning and design workshop in which CALM staff facilitated the preparation of a development plan for the Flinders Chase National Park headquarters.

In accordance with the Department's Disability Service Plan, a series of one-day Disability Awareness and Access Audit workshops were held for CALM operations and administration staff in eight regional and district centres around the State.

Staff also presented lectures on recreation planning and management to students at Curtin, Edith Cowan and Murdoch Universities.

### RecData

Work was completed on information about recreation and tourism facilities for the Department's computerised database RecData. Detailed records on some 700 CALM-managed recreation sites and facilities around the State are now stored on this system and can be used for a variety of purposes, ranging from accrual accounting to the preparation of facility maintenance programs and budgets. A training program to demonstrate how to enter and retrieve records was held for staff in a number of centres.

### CALM-Ministry of Justice MOU

CALM and the Ministry of Justice signed a Memorandum of Understanding, which establishes a framework for the management of collaborative projects. The main aim of the initiative is to involve offenders in conservation and recreation projects on CALM-managed lands and, in the process, enable prisoners to acquire vocational skills. A pilot project on the Bibbulmun Track involved teams of prisoners fabricating campsite shelters, toilets

and other facilities in the prison whilst other teams undertook installation and track building activities on site. The model has worked successfully for two years and will be expanded over Perth's regional parks.

### Visitor Risk Management

The Department is committed to developing and delivering recreation and tourism facilities and services that minimise the risk of accidents and injury. This year, staff prepared risk management guidelines and assessment procedures and have undertaken risk assessments in a number of areas across the State. A comprehensive training syllabus on risk identification, assessment and mitigation measures was also prepared during the year and will form the basis of a training program.

### Track Care WA

The Department continued to actively support the activities of Track Care WA during the year. Formed under the umbrella of Tread Lightly Australia in late 1996, Track Care's aim is to assist in the management of off-highway tracks in Western Australia and to promote their responsible use. The main focus of Track Care during the past year was the organisation of a clean-up and restoration program along the Canning Stock Route and the preparation of a draft track management plan. Department staff contributed to both these initiatives.

### Management of Squatter Settlements

The Department manages the Grey and Wedge island community squatter settlements in accordance with the approved Government policy to gradually remove unapproved buildings from nominated Crown land reserves. In doing so the Department has issued short-term (six-year) leases for 95 per cent of the squatters' residences and removed those buildings which were not leased. After this period all buildings, other than those required by professional fishers, will be removed and the coastal reserves rehabilitated and managed for use by the general public.

## VISITOR RESEARCH

The visitor research program continued, with 144 sites monitored by traffic counters, observation surveys and ticket sales.

There were 7.1 million recorded visits for the 73 parks, State forest areas and reserves throughout the State during the year. This represents an increase from the previous year's recorded 5.4 million visits (amended). This increase is in part due to more intensive sampling of some of the monitored sites, namely the heavily used marine parks in the Perth metropolitan area. This increase also reflects the continuous interest that the public has shown in visiting CALM-managed areas.

There were an estimated 8.1 million visits to CALM-managed lands and waters.

**Recorded Visits to CALM-Managed Land and Waters**

Year	Data collection sites	Recorded visits (million)	Estimated no. of visits <sup>1</sup> (million)
1993-94	124	4.8	5.8
1994-95	128	4.8	5.8
1995-96	129	5.0	6.0
1996-97	137	5.4 <sup>2</sup>	6.4 <sup>2</sup>
1997-98	144	7.1 <sup>3</sup>	8.1 <sup>3</sup>

<sup>1</sup> Visitor data are collected at selected sites and it is necessary to extrapolate the total number of visits to CALM-managed areas.

<sup>2</sup> Amended from last financial year as additional data became available.

<sup>3</sup> Provisional estimate, based on incomplete data and subject to future amendment.

The Recreation and Tourism customer survey, which is designed to provide feedback from the public on their recreational experiences and the facilities and services provided by CALM, was continued. A total of 3000 forms were distributed to visitors in July 1997, and 880 were returned from 26 parks, forests and reserves throughout the State, which is an overall response rate of 29 per cent. Respondents' overall level of satisfaction with their visit was 89 per cent (extremely or very satisfied). Only one per cent were slightly or not at all satisfied, with nine per cent moderately or somewhat satisfied.

Satisfaction with the facilities and services provided by CALM was also high, as respondents indicated that the natural attractiveness of the areas visited, the location of facilities and the condition and standard of sites and facilities were important to them.

The Dryandra Woodland Survey continued and is providing important information on visitor recreational patterns, as well as socio-economic information.

## Regional Parks

CALM is progressively taking on the responsibilities for managing eight regional parks in the Perth metropolitan area. Regional parks are areas of regional open space which have been identified as having outstanding conservation, landscape protection and recreation values. A Regional Parks unit comprising a Coordinator, Operations Manager, Senior Planner, Landscape Architect, and Administrative Assistant has been established. This team is purchasing services from the private sector as well as from staff employed through the Districts, including four trainee CALM officers.

Approximately 15 000 ha of land are being transferred from the WA Planning Commission to CALM. Currently CALM is managing the conservation areas of Canning River, Herdsman Lake, Yellagonga, Beeliar, Rockingham Lakes and Jandakot Botanic Regional Parks. In August 1998 Woodman Point and Point Peron will be transferred from the Ministry for Sport and Recreation and in 1999 the last of the regional parks, Darling Range Regional Park, will be transferred from the Commission. Each of the eight parks is unique in terms of conservation and recreational opportunities. At this stage only the Canning River Regional Park has a management plan, and CALM, in association with the Canning City Council, is upgrading the area while protecting the special values of the river and its surrounds.

Consultants are preparing management plans for Yellagonga, Herdsman Lake and Beeliar Regional

Parks. Management Plans for Woodman Point, Jandakot and Rockingham Lakes Regional Parks will be commenced before the end of September 1998.

Each park has a management advisory committee. These committees play an important role in coordinating efforts by community organisations, Local Government Authorities and CALM. They also assist by providing input into the preparation of the management plans for each of the regional parks.

## Aboriginal Tourism, Education and Training

The Aboriginal Tourism, Education and Training Unit provides people with the opportunity to experience Aboriginal heritage in the natural environment. It also encourages the development of cultural heritage and tourism projects on CALM-managed lands. The unit aims to develop cultural heritage programs that have the potential to provide employment opportunities for Aboriginal people.

In its first two years the unit concentrated on educational and training initiatives in conjunction with employment and training organisations, such as Rockingham TAFE. A very successful cultural heritage education program was developed for schools and has been conducted at the Hills Forest, Walyunga National Park and other locations around Perth. During the year one local Aboriginal person was trained to be a program presenter and two more will be trained in the next year.

The successful in-school presentation program continued. It has proved so popular that several schools expanded their curricula and ensured that all classes participated. The Unit aims to assist local Aboriginal people to develop their skills to be able to conduct these types of presentations.

Education and training organisations in Geraldton and the south-west were provided with assistance to develop similar programs for their

communities. Assistance was also provided to the New Norcia Education Centre, which aims to develop a program specialising in Aboriginal Studies for visiting schools.

The unit has revised its performance and priorities. Development and demonstration of cultural tourism programs will be a priority for the next three years. The Department will develop Aboriginal cultural tourism programs in Yanchep National Park. Similar initiatives will then be undertaken in other national parks and CALM-managed lands. It is intended that they become an important education and employment program for local Aboriginal people, while demonstrating to visitors the cultural significance of the land.

During the year the ranger-training program continued at Millstream-Chichester National Park, and several traineeships around the State continued. Negotiations between CALM and the Department of Resources Development were concluded to allow for CALM to act as interim manager of selected lands on the Burrup Peninsula. A Cultural Heritage officer will be appointed.

**Advisory Committees**

Advisory committees continue to work with CALM as prime liaison bodies with the general public for the management of CALM-managed lands. Advisory committees are established to involve local communities, meet regularly, assist in information exchange between CALM and the community, and advise the Department about management proposals.

The membership of the committees is made up of local representatives and Government and local Government officers, selected by the Hon Minister for the Environment.

Currently, there are 31 advisory committees relating to the management of CALM lands and waters and the flora and fauna on them. Several committees were reorganised during the year to allow for three-year appointments of members on a rolling basis to maintain continuity of the committee.

**Volunteers**

CALM works in close association with Volunteering Western Australia, the peak Volunteer body in the State. CALM's Volunteer Coordinator is a Councillor of the Institute of Volunteer Management in WA.

The Department's Community Volunteer program has diversified in several sections over the past twelve months. New projects by the Marine Branch, Perth Observatory and regional research centres have increased volunteer opportunities and assisted staff with research, surveys and guiding. Volunteers continue to help on major projects, including rare flora and fauna surveys, the Bibbulmun Track project, *LANDSCOPE* Expeditions, pig culling, wildlife care, herbarium curation, campground hosting, turtle tagging and general park rehabilitation and cleaning up.

During the year 21 projects were initiated. These new projects, coupled with ongoing or renewed projects,

maintained a wide variety of opportunities for community involvement. Approximately 1900 volunteers contributed some 104 680 registered hours to the Department. In addition to these hours are many that cannot be accurately measured because of the nature of the volunteer activity. These include the enormous contribution made by more than 500 wildlife carers and by other activities such as snake removal.

CALM registered 1673 new volunteers during the year, bringing the total number of volunteers registered with the Department to 4966. The volunteer register is to be reviewed during 1998. All volunteers will be asked if they wish to remain on the database, and those who do not will have their details removed. In addition the details of any volunteer who is inactive for a period of 18 months or longer will automatically be removed from the database.

There is clearly a 'million dollar effort' being directly contributed by the community toward the goals of CALM, and the Department will continue to expand and foster relations with those individuals and community organisations.

Year	CALM Volunteers	
	No. registered	Hours contributed
1990-91	980	31 000
1991-92	900	40 000
1992-93	1 260	40 000
1993-94	1 773	44 000
1994-95	1 921	38 000
1995-96	2 677	58 000
1996-97	3 293	84 000
<b>1997-98</b>	<b>4 966</b>	<b>105 000</b>





# ASTRONOMICAL SERVICES

## MANAGEMENT PROGRAM 4

### Objective

*To meet the demand for general and specialised up-to-date astronomical information and services from the public, business and educational community while furthering scientific research in astronomy in conjunction with other observatories and local tertiary institutions.*

This year the most significant event concerning Perth Observatory was a review of its scientific activities. Four external referees (three from overseas) reported on the merit of our astronomical research. Their responses were highly complimentary, indicating that the Observatory's research was impressive, significant and extremely relevant. As a result of this review the Observatory now formally constitutes a research group within the CALMScience Division.

Several discoveries were made during 1997-98. Four supernova star explosions (designated SN1998A, SN1998E, SN1998X, SN1998ce) were discovered in our ongoing search for these objects using the 24-inch Lowell telescope. Also, the change in light output in supernova 1998A was monitored and found to be unlike similar objects, except for supernova 1987A — the brightest supernova discovered for more than two centuries. Accurate positions, which not only confirmed their detection and assisted the follow-up observations by many other astronomers, were acquired for supernovae 1998A and 1998ce using the 10-inch robotic telescope.

We continued our ongoing collaboration with astronomers working in Tasmania, the Netherlands, Chile (based in the US) and South Africa, in which we monitor continuously, over 24 hours, the brightness variations of stars.

### Highlights

- ✓ Very favourable external review of Perth Observatory astronomy research (p. 35)
- ✓ Four supernovae discovered (p. 35)
- ✓ New 16-inch aperture telescope operational for visitors' star viewing (p. 35)
- ✓ Record numbers of visitors for star viewing programme (p. 36)
- ✓ Successful Open Day conducted (p. 36)

These variations occur when a very faint object passes in front of a distant star. By monitoring these events we find details about this unseen matter, which poorly tested cosmological theories suggest compose a large proportion of the matter in the universe. Two scientific papers concerning this work are about to be published. Perth Observatory's efforts in this collaboration have also been rewarded by the donation from our US collaborators of a new set of optical filters and an advanced work station to facilitate rapid data reduction. This work was also facilitated by the installation of a blue-sensitive detector in the electronic camera employed, and the improvement of an auxiliary camera that aids the tracking of the Lowell telescope over lengthy time exposures.

A 16-inch aperture Schmidt-Cassegrain telescope was also acquired in this period. It has temporarily been housed in one of the visitors' observing facility enclosures. Site works were begun for a new enclosure in which it will be permanently stationed. This telescope, with the largest aperture in our visitors' facility, has proved very popular with members of the public attending star viewing sessions. In the near future it will be automated and conduct scientific observations

outside the times of the viewing sessions.

Another instrument acquisition has been a 12-inch aperture Schmidt-Cassegrain telescope donated by Kent State University (Ohio, USA) in order to facilitate Perth Observatory's participation in project ASTRONET. This project will enable participating students from around the world to acquire astronomical observations during their class time. For example, the operation of a telescope in Perth enables students in the US to observe in their day time, and reciprocal arrangements will exist for WA students to enable them to observe with the Ohio facilities. In due course other telescopes around the world will become involved. This should prove to be a very educationally rewarding experience for students, as the Science Education group at Edith Cowan University will also contribute their expertise to the project.

Perth Observatory workshop staff have not only worked on the above-mentioned instruments but also converted a telescope for viewing the Sun on a projection screen. This method ensures the safety of the observers and enables the Observatory to conduct astronomical observations of our Sun, the nearest star, in the day time for the benefit of visitors.

Automation of the Observatory has also proceeded with the commissioning of a rain sensor and a cloud sensor. They have been tested and calibrated, and predict the cloud cover by using data from the on-site Bureau of Meteorology automatic weather station. This information can now be accessed across the Observatory's computer network so that enclosures can be opened and closed, and telescopes parked or reactivated, depending on the presence of rain or cloud. This facilitates observation and data acquisition with minimal operator intervention.

Numbers attending the Observatory's star viewing programme in 1997-98 set new records. The attendance of 4246 visitors for the year was a new record, and in January, during a long interval of clear weather, a new monthly record was set when 757 visitors attended. Also, the level of customer satisfaction remained high, with more than 98 per cent satisfied with their visit. Furthermore, the effectiveness of the Observatory remains high because the number of people who visited the Observatory,

called our information service, attended talks, or attended an astronomy field night, tallied more than 21 800. Also, an estimated 6 000 people telephoned the Observatory for information, and others were informed of astronomical events in 110 radio, four television, and 74 newspaper interviews.

More than 1100 visitors attended Perth Observatory's Open Day—the first it has conducted in living memory. This event was held on the day of Bickley Valley Harvest Festival and was assisted by a successful grant application from the federal Department of Industry, Science and Tourism's National Science Week initiative. More than 700 day-time visitors enjoyed a range of activities, including a safe view of the Sun (and its sunspots), guided tours of the facilities, and 'surfing the net' to astronomy sites. Star viewing with our telescopes was enjoyed by more than 400 of our visitors in the evening.

The Sun and Stars Festival held in conjunction with Yanchep National Park continues to grow in popularity. More than 1900 visitors enjoyed the

park environment and a safe view of the Sun with our solar telescope in the day, as well as a view of the night skies with the Observatory's transportable telescopes. We also brought astronomy to rural areas by providing telescope viewing at many schools and national parks around the State. All up, a new record of more than 6800 people viewed the stars with Observatory telescopes that were transported to their locality for one of these astronomy 'field nights'.

The volunteer programs continue to provide valuable assistance to the star viewing sessions, astronomy field nights and history archiving project. During this year another project was organised in which suitably trained volunteers could assist with research activities, such as observing and data analysis. For example, volunteers in this program made a significant contribution to the calibration of the Observatory's cloud sensor.

The growth in the number of Observatory activities and achievements attests to the hard work and skill of both our permanent and volunteer staff.



# FACTS & FIGURES

## GENERAL INFORMATION

The Department is headed by an Executive Director, who is also a member of the Lands and Forest Commission, a member of the National Parks and Nature Conservation Authority, and Chairman of the Forest Production Council. In keeping with the varied interests of CALM there is also a Corporate Executive, which consists of eight directors working with and reporting to the Executive Director. Regional, branch and other specialist officers often attend meetings of the Corporate Executive.

The Department gives responsibility to its staff whenever possible, depending on skills and potential. Provided there is opportunity, there is no impediment to the progress of a capable individual in the organisation.

The detailed structure of divisions, regions and branches is shown in Figure 1. The names and qualifications of the officers occupying senior positions are shown on the page opposite the figure.

### REGIONAL ACTIVITIES

CALM is committed to regionalisation. There are nine regions which, according to the intensity of activity, are subdivided into districts. Accordingly, the Department is spread over many locations. The map over shows CALM regional boundaries and the location of regional offices, as well as the types of lands and waters the Department manages.

Management structures are in place at nine regional, 18 district and six local offices. Within the regions there are national park rangers at 32 other locations, and a district wildlife officer at one other.

Because of community concern for protection of the natural environment and an increasing desire to experience

### What Standard of Service can our Customers expect?

While fulfilling our conservation and land management responsibilities, CALM places a great deal of importance on community and customer relations. We aim to increase our customer focus and provide a range of services that meet customer needs. Our customers can expect:

- ✓ positive, courteous and friendly service;
- ✓ competent and efficient assistance;
- ✓ timely and accurate information; and
- ✓ confidentiality where commercially sensitive issues are concerned.

### More specifically, our customers can expect that:

- ✓ CALM staff will be well trained, competent and helpful; will wear name badges when in direct contact with the community; and will identify themselves by name when answering the telephone.
- ✓ Requests for information or assistance will be met directly or referred to the appropriate person for answering as soon as possible.
- ✓ Telephone calls to our main offices will be answered on average within six rings. Telephone messages will normally be returned by the next business day.
- ✓ A contact name, address and telephone number will be given in all correspondence for future enquiries. Where it is not possible to respond to correspondence fully, an acknowledgement will be sent, advising of the current situation and when a reply may be expected.
- ✓ Brochures and other information materials will be easily understandable, accurate and up-to-date.
- ✓ Recreational facilities in national, conservation and marine parks, reserves and State forests will be well maintained and kept clean.

its values, the roles of regional managers and their staff are most important. Satisfactory experiences for the 8.1 million visits (1996–97 estimated figures) to CALM-managed lands and waters, drawn from interstate and overseas as well as from all over Western Australia, are largely in their hands. Regional staff are also responsible for the conservation of native flora and fauna within regional boundaries. The three forest regions in the south-west of the State have a large commitment to manage wood resources, and to regenerate and protect the forests for a wide range of other values. The Goldfields region (and to some extent

the Midwest) has a similar commitment to sandalwood resources, as have the South Coast and Wheatbelt regions to economic tree crops that can be integrated into farming practice.

Regional managers have a degree of autonomy. Each is responsible under corporate direction for developing the region's annual works program, and for managing the region's budget allocation. Liaison with local groups, especially Aboriginal communities, other Government agencies and the community in general, is extensive. There are often advisory committees established with a focus on parts of CALM-managed lands and waters.

The committees make input into the preparation of management plans and, after their approval, advise on management. It is mostly the regional managers and their staff who are responsible for this important interface with the local community.

## SPECIALIST AND SERVICE ACTIVITIES

CALM's operations are directed by the Corporate Executive and supported by specialist and service staff. Their responsibilities are as follows:

**CALMScience** provides up-to-date, scientifically sound information to uphold effective conservation and land management in Western Australia. Three science groups address CALM's scientific needs: to discriminate and document the biota, ecological processes and biological resources of the State; to conserve threatened species and ecological communities by minimising inimical processes; and to ensure that lands, waters and biological resources are used sustainably.

**Perth Observatory** is a group within CALMScience. It has three astronomy-based core functions; research, information services and educational services.

**Corporate Relations** directs the knowledge and information-sharing infrastructure within CALM, for corporate planning, and internal and external communications, marketing, advertising and community education. The Division initiates, develops and implements communication strategies to address major issues of conservation and land management, produces publications, displays and multimedia productions, designs and stages special events, coordinates CALM's media activities, provides the community with an information service, and conducts market research.

**CALMfire** sets fire management standards, coordinates the preparation of fuel reduction and suppression plans, provides detection communications, aircraft and other fire support services, and conducts fire training.

**CALMTimber Technology** conducts research and develops commercial

applications which increase the value-adding and utilisation of the State's timber resources.

**Environmental Protection Branch** prepares guidelines and procedures for protection from dieback, weeds and feral animals, evaluates mining and development proposals, and advises on rehabilitation of CALM-managed lands and waters, and on environmental protection generally.

**Financial Services Branch** maintains, operates and develops financial systems and procedures and provides users with financial training, expertise, reports and budgeting information.

**Forest Management Branch** carries out resource inventories, disease mapping, and database maintenance for the Native Forests and Plantation Business Units. It maintains corporate resource information and GIS databases relating to forest areas in the South West and prepares strategic resource plans.

**Forest Resources Services Branch** controls and manages the harvesting of timber and the collection of royalties and other charges. It advises on timber quality, wood technology and related matters.

**Human Resources Branch** provide strategic planning, policy development and formulation, advice and coordination in the management of the Department's human resources. Services are provided by the Branch in the functional areas of personnel, payroll, labour relations, training and development, and risk management.

**Information Management Branch** plans, coordinates and implements CALM's information systems support, and is responsible for corporate document and records management. The Branch maintains CALM's Geographic Information System (GIS), and provides a land-related information service.

**Management Audit Branch** reports to the Executive Director, providing systematic audits of management systems to advise on their effectiveness, efficiency, economy and compliance with legislation, policies and procedures.

**Marine Conservation Branch** provides policy, strategic and scientific advice for marine conservation and management, and advises marine reserves planning teams.

**Park Policy and Tourism Branch** develops policies and strategies for recreation and tourism, including business development, leases and licences, external funding and community involvement. It coordinates policies and programs concerning Aboriginal and other special interests, and visitor research and surveys.

**Planning and Visitor Services Branch** incorporates land administration, management plans, recreation planning and design, landscape management, and visitor interpretation.

**Plantations Group** develops silvicultural guidelines and practices for coniferous and broadleaved plantations and advises on their implementation. It manages CALM nurseries and seed supplies.

**Sandalwood Business Unit** manages the sandalwood industry including research into plantation development for Western Australian and Indian sandalwood.

**State Forest Resources Business Unit** manages the silvicultural practices, regeneration, and harvesting of native forest, and the sale of log timber. It advises on timber quality, wood technology, and marketing.

**Threatened Species and Communities Unit** coordinates and assists with Departmental programs for threatened species and communities, including preparation and implementation of recovery plans.

**Wildlife Branch** develops policies and provides information and advice on wildlife protection and management throughout the State, administers wildlife licences and permits, enforces the Wildlife Conservation Act and Regulations, maintains and manages databases on wildlife resources and conservation status, and ensures compliance with legislation and licence conditions.

## CALM DISABILITY SERVICES

During the year, staff throughout CALM continued in their efforts to implement the Department's Disability Service Plan. The main aim of this plan is to help ensure that people with disabilities are better able to access, use and enjoy our State's natural areas and the associated facilities, services and programs provided by the Department for the benefit of the entire community.

High priority was again directed towards ensuring that CALM recreation and tourism employees have a better understanding of the needs of people with disabilities and how to meet those needs. The staff training program conducted five Disability Awareness and Access Audit workshops in regional and district centres around the State. A member of the Disability Services Commission's Access Improvement Branch assisted CALM officers in the preparation and delivery of these one-day workshops.

Work also was undertaken at a number of locations to improve public access and upgrade visitor facilities. The wheelchair-accessible campground at the Hills Forest Activity Centre, which includes accessible tent sites, toilets, showers and a camper's kitchen, was opened in October, 1997 by Para Olympic champion Louise Sauvage and MLA John Day, at a ceremony attended by several hundred guests. Construction of these and adjoining facilities, featuring an accessible outdoor amphitheatre, has been supported by a number of organisations, including

ACROD WA, Alcoa, and the Gordon Reid Foundation of the Lotteries Commission. In recognition of the work, CALM's Hills Forest staff received a Disability Awareness Award from People With Disabilities WA (Inc.) in December.

Other accessible facilities completed during the year include the new visitor centre at Two Peoples Bay east of Albany and a boardwalk at the Pinnacles Desert in Nambung National Park. Work has also begun

on a wheelchair-accessible boardwalk and lookout at Canal Rocks in Leeuwin-Naturaliste National Park.

Work experience opportunities were provided for an additional five people with disabilities at CALM's Operational Headquarters at Como during the year. One of these individuals has subsequently secured a 12-month clerical traineeship with the Department, while a second person was employed in a three-month contract position.

## Customer Focus 1997-98

*Everyone knows when they've received good customer service: it leaves you feeling positive about the experience; it is often delivered by staff who are down to earth and helpful; it is polite, often casual, and always efficient.*

*Our Customer Service Charter sets out a statement of the services provided by CALM and the standards of service CALM's wide range of customers can expect from us. It explains how to find out more about CALM and its services, and how to give feedback on our performance.*

*During 1997-98, CALM continued to take steps to improve its customer focus.*

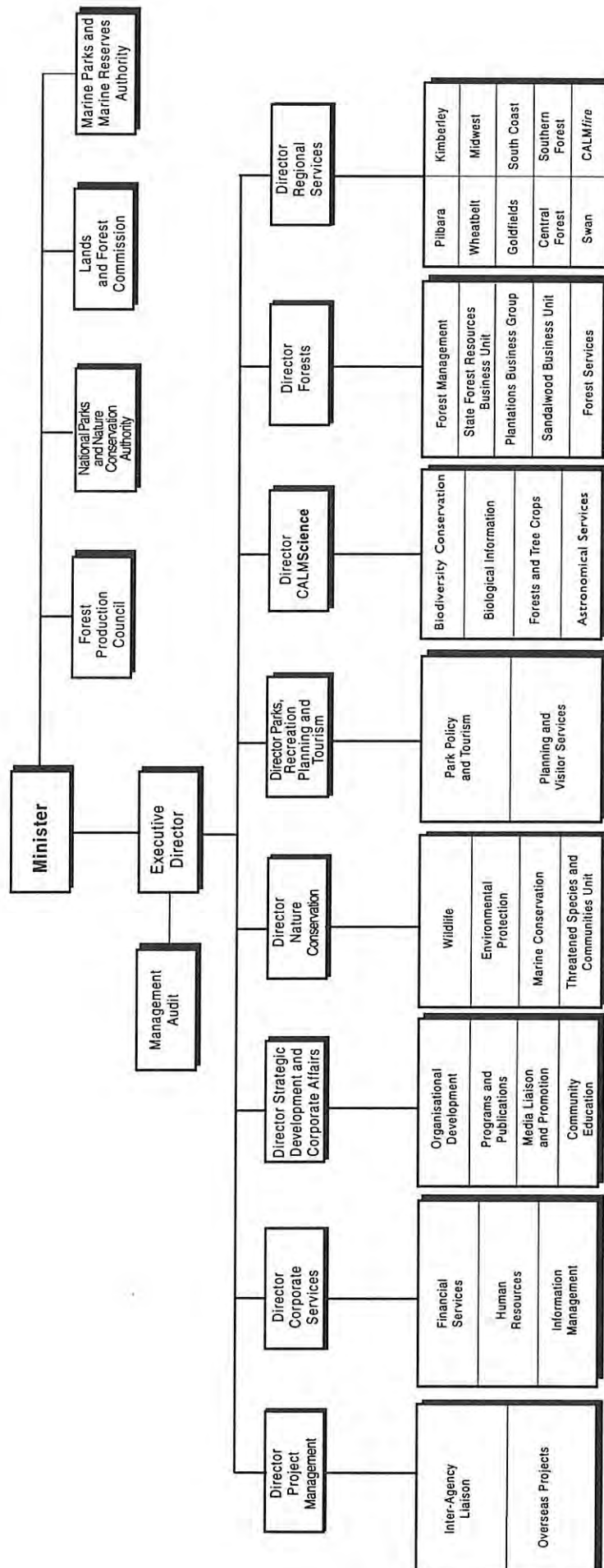
*A range of customer satisfaction surveys were conducted and the results used to guide policy and resource allocation decisions within the department.*

*Staff training (to increase their skills in customer relations, in understanding what customers want, and in using customer feedback to provide responsive services) was conducted. CALM's Albany Regional staff gained gold medal status in the AussiHost customer service program when more than 90 per cent of the staff in the region completed the training.*

*Initiatives to improve access to information and services included an expansion of CALM's Internet site NatureBase, and the publishing of a number of customer-oriented publications including a new and free State-wide guide to recreation and tourism services in national parks, marine parks, State forests, and other reserves.*



**ORGANISATIONAL STRUCTURE**



**CORPORATE EXECUTIVE**

## EXECUTIVE DIRECTOR

S R Shea BSc, MSc, PhD

## DIRECTOR, REGIONAL SERVICES

R Sneeuwjagt\* BSc, MSc

## DIRECTOR, NATURE CONSERVATION

K J McNamara B Nat Res (Hons)

## DIRECTOR, PARKS, RECREATION PLANNING &amp; TOURISM

J R Sharp B Ed, Dip PE, M Ed

## DIRECTOR, FORESTS

D J Keene Dip For, BSc

## DIRECTOR, CALMScience

N D Burrows BSc For, PhD

## DIRECTOR, PROJECT MANAGEMENT

F H McKinnell Dip For, BSc, PhD

## DIRECTOR, CORPORATE SERVICES

J C Byrne MBA, PhD, FCPA

DIRECTOR, STRATEGIC DEVELOPMENT  
AND CORPORATE AFFAIRS

R A Kawalilak BA, FPRIA

**OTHER SENIOR STAFF**

## REGIONAL MANAGER, CENTRAL FOREST

R Chandler BSc

## REGIONAL MANAGER, GOLDFIELDS

I G Kealley BSc

## REGIONAL MANAGER, KIMBERLEY

C C Done BSc

## REGIONAL MANAGER, MIDWEST

K Gillen BSc (Hons)

## REGIONAL MANAGER, PILBARA

C Muller Dip For, BSc For

## REGIONAL MANAGER, SOUTH COAST

J R Watson BSc, Grad Dip Rec, PhD

## REGIONAL MANAGER, SOUTHERN FOREST

P Keppel Cert For Mngmt

## REGIONAL MANAGER, SWAN

B E Harvey BSc For

## REGIONAL MANAGER, WHEATBELT

K J Wallace Dip Ed, BSc (Hons)

## MANAGER, BIODIVERSITY CONSERVATION GROUP

K D Morris BSc, MSc

## MANAGER, BIOLOGICAL INFORMATION GROUP

N G Marchant BSc (Hons), PhD

## MANAGER, CALMfire

D A Haswell\* BSc For, MSc

## MANAGER, CALM TIMBER TECHNOLOGY

I D Rotheram BSc For, MSc Nat Res

## MANAGER, ENVIRONMENTAL PROTECTION BRANCH

F E Batini Dip For, BSc, MSc

## MANAGER, FINANCIAL SERVICES BRANCH

M J Neilson BA, MAcc, CPA

## MANAGER, FORESTS AND TREE CROPS GROUP

J F McGrath BSc (Hons), PhD

## MANAGER, FOREST MANAGEMENT BRANCH

F J Bradshaw Dip For, BSc

## MANAGER, FOREST RESOURCES SERVICES

J Clarke BSc For

## MANAGER, HUMAN RESOURCES BRANCH

C W Gillam BA (Hons), MA, PG Dip Bus, CMAHRI

## MANAGER, INFORMATION MANAGEMENT BRANCH

C J Pearce BSc (Hons), PhD

## MANAGER, MANAGEMENT AUDIT BRANCH

P Jones BSc For

## MANAGER, MARINE CONSERVATION BRANCH

C J Simpson B App Sci (Biol), G Dip Nat Res, PhD

## MANAGER, PARK POLICY AND TOURISM BRANCH

C B Ingram B App Sc

## MANAGER, PLANNING &amp; VISITOR SERVICES BRANCH

A J Williamson Dip For, BSc, M For, MSc

## MANAGER, PLANTATIONS GROUP

G M Butcher BSc For

## MANAGER, PROGRAMS &amp; PUBLICATIONS

R F Bailey BA (Hons), PhD

## MANAGER, REGIONAL FOREST AGREEMENT

A W Walker BSc For (Hons)

## MANAGER, STATE FOREST RESOURCES BUSINESS UNIT

J H Murch BSc (Hons)

## MANAGER, WILDLIFE BRANCH

G J Wyre B Nat Res (Hons)

## SCIENCE ADVISER

I J Abbott BSc (Hons), PhD, DSc

## GOVERNMENT ASTRONOMER

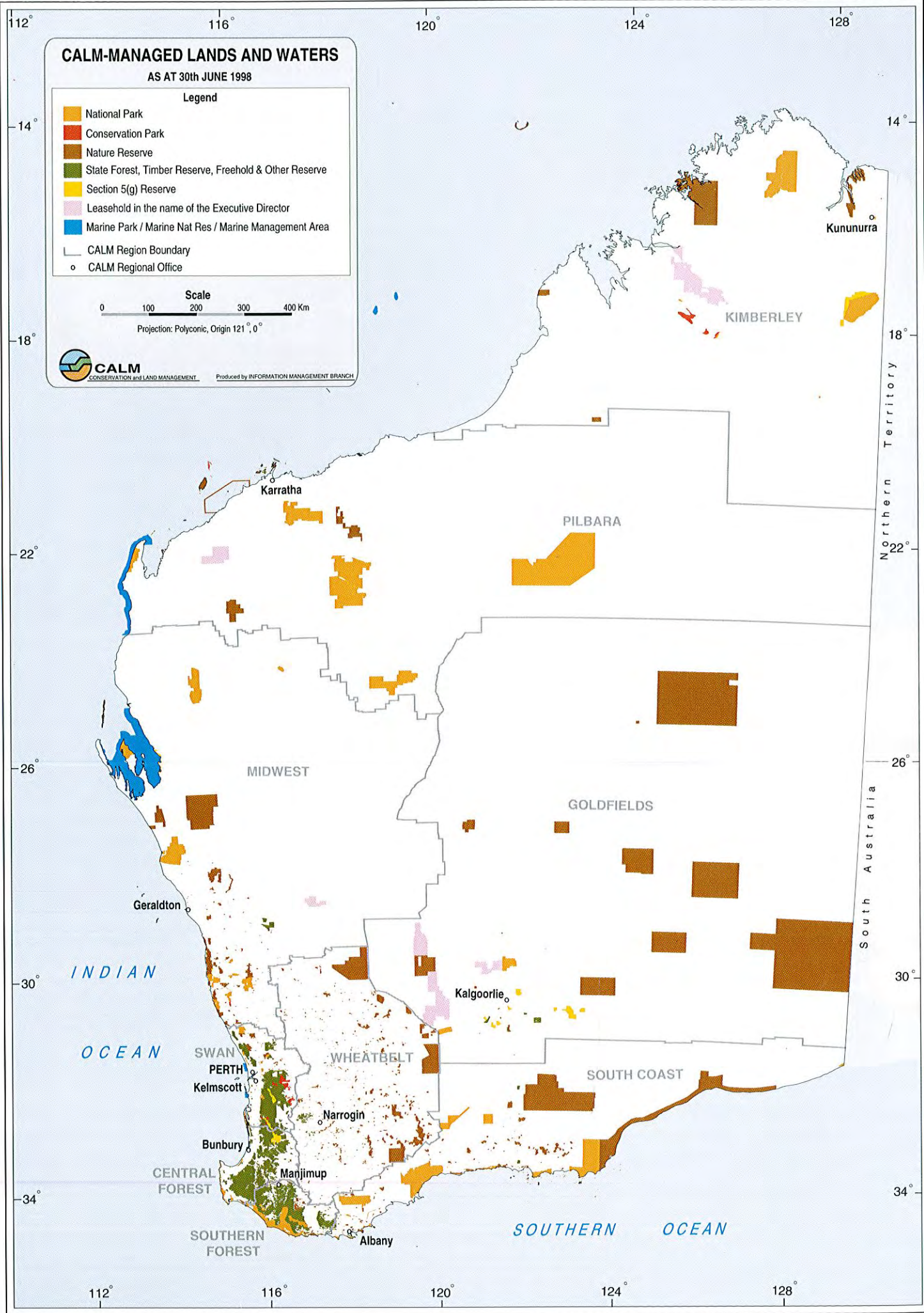
J Biggs BSc (Hons), PhD

DIRECTOR, WA THREATENED SPECIES & COMMUNITIES  
UNIT

A A Burbidge BSc, PhD

\* Acting





**CALM-MANAGED LANDS AND WATERS**

AS AT 30th JUNE 1998

**Legend**

- National Park
- Conservation Park
- Nature Reserve
- State Forest, Timber Reserve, Freehold & Other Reserve
- Section 5(g) Reserve
- Leasehold in the name of the Executive Director
- Marine Park / Marine Nat Res / Marine Management Area
- CALM Region Boundary
- CALM Regional Office

**Scale**

0 100 200 300 400 Km

Projection: Polyconic, Origin 121°, 0°



Produced by INFORMATION MANAGEMENT BRANCH



## CALM-MANAGED LANDS AND WATERS

### Total Estate

As at June 1998 the total area under CALM's care was 20 264,666 ha. This was an increase of 3 708 ha during 1997-98.

The land area (not including marine reserves) is approximately 7.6 per cent of the land area of Western Australia.

The table below provides a summary of all tenure classifications.

### National Parks

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

The area of the 63 national parks at 30 June 1998 was 4 874 282 ha. The major changes to the national park estate consisted of additions to Cape Le Grand National Park (223 ha), Porongurup National Park (110 ha) and François Peron National Park (58 ha).

### Conservation Parks

Conservation parks have the same purpose as national parks, but they do not have the same national or

international significance. They have significant local or regional value for conservation and recreation.

The area of conservation parks at 30 June 1998 was 117 324 ha.

### Nature Reserves

Nature reserves are for wildlife and landscape conservation, scientific study, and preservation of features of archeological, historic or scientific interest. Recreation which does not harm natural ecosystems is allowed.

The area of nature reserves at 30 June 1998 was 10 772 271 ha, representing an increase of 1579 ha in 1997-98. Notable were an addition to Benger Swamp Nature Reserve (428 ha) and a new reserve created near Kwooncup Lake (40 ha) as a result of a bequest. Other new reserves include areas at Port Kennedy (589ha), adjacent to Serpentine River at Mandurah (258 ha) and Kweda Townsite (175 ha).

### State Forest

State forests are managed for multiple purposes, including water catchment protection, recreation, timber production on a sustained yield basis, and conservation. Provision is also made for public utilities and mineral production where these activities are imposed.

Within State forests, designated areas are managed for specific purposes, such as conservation or optimum yield of exotic plantings.

The area of State forest at 30 June 1998 was 1 727 514 ha, an increase of 2478 ha in 1997-98. The major increase of 2461 ha comprised mostly vacant crown land west of Darkan.

### Timber Reserves

Timber reserves declared under the CALM Act are managed on the same basis as State forests. The category is transitional; as reserves are evaluated they may be changed to a more appropriate tenure, e.g. State forest or nature reserve.

The area of timber reserves at 30 June 1998 was 141 550 ha. There were no changes during the year.

### Marine Reserves

Marine parks are managed for 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.

Marine Management Areas will provide a formal integrated management framework over areas that have high conservation value and intensive multiple use, selected primarily on the basis of their biological and recreational values and their existing or future commercial activities.

The area of marine parks at 30 June 1998 was approximately 1 013 940 ha. The area of marine

Tenure Classification	Central Forest	Goldfields	Kimberley	Midwest	Pilbara	South Coast	Southern Forest	Swan	Wheatbelt	Total
National Park	27 458	86 397	696 876	504 845	2 396 627	891 810	223 898	45 079	1 292	4 874 282
Conservation Park	581	405	54 670	3 643	1 466	-	-	56 559	-	117 324
Nature Reserve	9 622	6 267 610	809 497	731 931	250 519	1 585 323	32 846	49 866	1 035 057	10 772 271
Marine Park	-	-	23 250	748 735	225 564	-	-	16 391	-	1 013 940
Marine Nature Reserve	-	-	-	132 000	-	-	-	-	-	132 000
Marine Management Area	-	-	-	-	-	-	-	-	-	-
State Forest	656 456	781	-	-	-	4 055	547 212	490 944	28 066	1 727 514
Timber Reserve	33 765	28 576	-	26 338	-	5 231	19 139	28 501	-	141 550
5g Reserve	30 364	81 617	79 623	2 316	8 130	-	634	27 358	466	230 508
Miscellaneous Reserve	354	<1	61	517	1 779	3 813	470	5 950	7	12 952
Freehold (Exec Dir)	21 966	<1	<1	<1	<1	63	5 161	3 662	<1	30 854
Leasehold (Exec Dir)	-	575 987	427 729	59 908	147 847	-	-	-	-	1 211 471
<b>Totals</b>	<b>780 566</b>	<b>7 041 374</b>	<b>2 091 707</b>	<b>2 210 233</b>	<b>3 031 932</b>	<b>2 490 295</b>	<b>829 360</b>	<b>724 310</b>	<b>1 064 889</b>	<b>20 264 666</b>

Source: Information Management Branch (TENIS)

## National Parks Vested in the National Parks and Nature Conservation Authority

NAME	AREA (ha)	NAME	AREA (ha)	NAME	AREA (ha)
Alexander Morrison	8 500	Greenmount	58	Scott	3 273
Avon Valley	4 366	Hassell	1 265	Serpentine	4 360
Badgingarra	13 121	<i>Hidden Valley</i>	2 068	Shannon	52 598
Beedelup	1 786	John Forrest	2 676	Sir James Mitchell	497
Boorabbin	26 000	Kalamunda	375	Stirling Range	115 920
Brockman	49	Kalbarri	183 004	Stokes	9 726
Cape Arid	279 382	Karijini	627 442	Tathra	4 322
Cape Le Grand	31 801	Kennedy Range	141 660	Torndirrup	3 936
Cape Range	50 581	Leeuwin-Naturaliste	19 037	Tuart Forest	2 049
Collier Range	235 162	<i>Lesmurdie Falls</i>	56	<i>Tunnel Creek</i>	91
D'Entrecasteaux	116 686	Lesueur	26 966	Walpole-Nornalup	15 861
Drovers Cave	2 681	Millstream-Chichester	199 736	<i>Walyunga</i>	1 812
Drysdale River	448 264	Moore River	17 540	Warren	2 982
<i>Eucla</i>	3 560	Mount Augustus	9 168	Watheroo	44 474
Fitzgerald River	329 882	Mount Frankland	30 830	<i>Waychinicup</i>	3 982
Francois Peron	52 587	Nambung	18 362	<i>West Cape Howe</i>	3 517
Frank Hann	67 550	Neerabup	1 060	William Bay	1 734
Geikie Gorge	3 136	Peak Charles	39 959	Windjana Gorge	2 134
Gloucester	875	Porongurup	2 621	Wolfe Creek Crater	1 460
Goongarrie	60 397	Purnululu	239 723	Yalgorup	13 001
Gooseberry Hill	33	Rudall River	1 283 706	Yanchep	2 842
				<b>TOTAL</b>	<b>4 874 282</b>

\* Names shown in italics are not yet gazetted

nature reserves at 30 June 1998 was approximately 132 000 ha. There were no changes during the year.

As yet no Marine Management Areas have been proclaimed.

### 5(g) Reserves

Within the meaning of the CALM Act, land categorised as 5(g) reserve is land reserved under the Land Administration Act 1997, which is vested in the NPNCA or the LFC. These reserves are not national park, conservation park, nature reserve or marine reserve. Immediately before the commencement of the CALM Act some were vested in, or under the control and management of, the National Parks Authority but not as a national park, e.g. Matilda Bay Reserve. Predominantly they have a conservation/recreation purpose.

The area of 5(g) reserves at 30 June 1998 was 230 508 ha, a net increase for the year of 57 ha.

### Miscellaneous Reserves

There are some remaining reserves managed by CALM that do not fall

within any of the above categories. The purposes of reserves within this category are varied and may include settlements and offices for the Department's operations. The area of miscellaneous reserves at 30 June 1998 was 12 952 ha. There were no changes during the year.

### Other Land

The area of freehold land held by the Executive Director at 30 June 1998 was 30 854 ha, a decrease of 793 ha during the year. The major portion of this land is committed to commercial softwood forestry.

The area of pastoral leases held by the Executive Director at 30 June 1998 was 1 211 471 ha. There were no changes during the year.

### Conservation Land Acquisitions

The Department acquired several parcels of land during the year for future addition to the conservation estate. The priorities are to obtain good examples of ecosystems that are not adequately represented in the existing conservation reserve network, and also to add to existing

reserves land that would greatly improve their diversity or facilitate their management.

The major land purchases for the year were: an area of 550 ha bought as an addition to the Fitzgerald River National Park; a 570-ha piece of remnant vegetation for addition to the North Karlgarin Nature Reserve; a small area of land near Busselton to protect the Southern Ironstone threatened plant community; a 726-ha block of remnant vegetation for addition to the North Tarin Rock Nature Reserve; a 137.4-ha parcel of land in the Toolibin Lake catchment area; and 160 ha of remnant bushland south of Moora.

CALM gratefully acknowledges money contributed by the Commonwealth Government through the National Reserve System Program of the Natural Heritage Trust towards the purchase of the Busselton, Moora and North Tarin Rock properties. Salinity Action Plan funds also contributed towards the purchase of the North Tarin Rock, Toolibin Lake and Moora properties.

## CORPORATE SERVICES

### Financial Services

Staff of the branch coordinate the Department's core financial and supply processes. In addition to normal services, in 1997-98 staff initiated:

- Management of debt and cash to minimise interest payable and maximise interest earnings;
- 30-day payment terms in forest contracts and general accounts payable;
- Improved management reports on commercial activities and tourism income trends;
- Inclusion of forestry assets and tourism facilities in the Department's Statement of Financial Position;
- Long-term financial planning forecasts;
- Liaison with forestry and operations staff to work towards best practice in purchasing and tendering;
- New budget paper formats for the Treasury Department that identify key Department outputs and their costs; and
- Commencement of an upgrade to a Year 2000-compliant version of our financial software for completion by November 1998.

### Human Resource Branch

Improving service delivery remains a key focus of the Human Resources Branch. To that end, an upgrade of the CONCEPT computerised personnel and payroll system to Version 8, which is fully Year 2000-compliant, was begun; live costing for salary allocations was implemented; and design modification for the Training and Development module completed.

A significant number of Human Resources-related Policy Statements, Administrative Instructions and Departmental Circulars were reviewed in light of the Department of Family and Children's Services Premier's Award-Winning Best Practice Manual. After a detailed consultative process and formal endorsement by Corporate Executive, the first 29 of these were published

## Standards and Ethics

*We have attempted to comply with the Public Sector Standards in Human Resource Management, the Western Australian Code of Ethics and our Code of Conduct. Steps are being taken to rectify minor errors and omissions detected during 1997-98. We have put in place procedures designed to ensure such compliance and conducted appropriate internal assessments. Three applications for a review of the Recruitment, Selection and Appointment Standard were made during 1997-98, of which one breach was sustained.*

Syd Shea  
Executive Director  
30 August 1998



on the intranet as the *CALMpeople Manual*. Human Resources Branch commitment to new technologies has been rewarded by the response to a decision to make all advertised job vacancies available on the CALM internet site, *NatureBase*. At 30 June, an estimated 19 000 people had accessed this service.

Forty salaried staff achieved career advancement through promotion via advertised vacancies. Nine salaried staff were reclassified into higher level positions, and three achieved advancement through criteria progression.

### Employee Relations

Workplace reform continued with the drafting of a number of new Workplace Agreements and their submission to Cabinet for endorsement to offer to CALM employees. A proposed Workplace Agreement for Public Service personnel was approved for offer in December 1997, and Agreements for Rangers and Construction and Maintenance Workers were awaiting consideration by Cabinet Standing Committee on Labour Relations at 30 June.

### Risk Management

In accordance with Treasurer's Instruction 109 CALM is developing a risk management program on a whole-of-organisation basis. Modern risk management is the identification, analysis and economic control of those risks which threaten an

organisation. It is the practice of dealing with perceived risks in such a way as to minimise the adverse consequences that may arise should the exposure to risk materialise. An Executive Risk Management Committee has been established to ensure that appropriate accountability for risk management is in place across the organisation.

### Occupational Safety and Health

A total of 105 work groups across CALM achieved their safety performance targets in the reporting period and were presented with awards marking their achievement under the IFAP/GIO Safeway Award Scheme. CALM was, for the fourth year running, the most successful participating organisation.

CALM recognises the benefit of a safe working environment and acknowledges the interaction of health, fitness and safety in minimising injury to workers and reducing costs. The effectiveness of the programs operating within the Department is reflected in the continuing downward trend in working days lost as a result of workplace injury, an indicator which reduced by a further 29 per cent over the reporting period.

### Training and Development

Fifteen field-officer recruits graduated in May 1998 after completion of fourteen weeks of competency-based training delivered over a two-year period. Training



programs included Four Wheel Drive Operator's Course, Field Engineering, Recreation Planning and Design, Chainsaw Operator's Course, Disease Management, Fire Management, Forest Silviculture and Senior First Aid. Each of the programs has recognition by the Australian National Training Authority. Fourteen of the graduating officers have since achieved permanent appointment within CALM, and one has resigned.

Four CALM people were successful in their applications for three internal Scholarship programs, which promote continuous learning in the following areas:

*Executive Director's Scholarship:* made available to all permanent AWU staff to assist them financially in post-secondary education studies required for entry to Field Officer positions. The 1998 recipients were Tanya Linning of Dwellingup and Peter Masters of Esperance.

*Dr George Malajczuk Post Graduate Scholarship:* designed to provide continuous learning opportunities in a variety of science disciplines. The 1998 recipient was Kevin Crane of Fremantle.

*Seamus Mulholland Scholarship:* designed to provide continuous learning opportunities in a range of management/leadership disciplines. The 1998 recipient was Stev Slavin of Mundaring.

In an endeavour to assist technically qualified CALM people in the acquisition of formal qualifications in general management, information sessions on available management programs were conducted in Perth, Bunbury and Manjimup. Twenty-five CALM people have now enrolled in the Certificate IV Effective Manager course.

In order to evaluate training and development investment across all organisation units, an audit of all training and development activity was begun in May 1998. The audit is still in process at 30 June.

#### Occupational Safety and Health Performance Indicators:

	1996-97	1995-96
Lost Time Injury Frequency Rate	10	17
All Injury Frequency Rate	49	64
Number of Lost Time Incidents	32	50
Number of Days Lost	987	1 232
Annual Workers' Compensation Premium	\$903 266	\$689 672

### Planning and Policy

CALM's Human Resources Reference Group reviewed its charter and was reconstituted as the CALMpeople Reference Group during the course of the year. Systems have been established for gathering information about human resources process and practice across the organisation, and priorities established for 1998-99. The primary objective will be to formulate policies designed to achieve greater integration of human resource planning with CALM's business planning processes.

In March 1998 Human Resources Branch proposed the establishment of a task-oriented Performance Development Committee. Drawing representatives from across the organisation, and chaired by the Director of CALM Science Division, this Committee was established in May 1998. It will develop a comprehensive policy and associated implementation plan ensuring best practice performance management in CALM by June 1999.

### Information Management

Information Services Section extended the data communications infrastructure to provide staff with dial-in access from home, and from remote locations accessing corporate computing facilities and services. Other key activities included the major upgrade of corporate computing environment, systems and databases to be Year 2000 compliant, and provision of the delivery of information using World Wide Web technology.

Corporate Information Section began implementation of the Keyword

Classification Thesaurus, which has standardised methods of record identification and retrieval, and resulted in improved services to eight Sections and Branches. The first stage of an Archival Project was completed, resulting in obsolete files being disposed of in accordance with regulatory requirements. The section is undergoing a restructure to provide more client-focused services, and to meet anticipated changes to government records legislation.

Geographic Information Services Section began to develop an intelligent desktop mapping system (SmartCOG) as an extension of the established production and maintenance system for the CALM Operations Graphics. This was done in partnership with the Fire and Emergency Services Authority. Work also began on a project to integrate plantation data and provide a plantation information system.

The Section played a major role in coordinating and managing data for the Regional Forest Agreement (RFA) process. It produced twenty-two maps for inclusion in the Comprehensive Regional Assessment Report, and nine maps for the National Estate Report. It also produced a new series of six maps of Vegetation Complexes over the RFA area in the South West.

Maps were produced for four management plans, and for tourism and recreation support. The section also continued to provide a tenure information service, as well as support for the development of information systems for tourism and nature conservation. The Department was provided with a remote sensing analysis service, which included participation in the Land Monitor Project under the Salinity Action Plan.

## Year 2000: The 'Millennium Bug'

The Department is aware of the risks to software and data files posed by date confusion as the year 1999 changes to the year 2000. A risk assessment of CALM's exposure has already been completed, and a Year 2000 Preparedness Committee, with representatives from each Division, has been established by CALM's Corporate Executive.

Work has begun on the transfer of VAX-based corporate systems to Year 2000-compliant Alpha environments. Currently being moved are the Concept human resources system (to be completed by September 1998), Oracle Financials (by November 1998), and the Logging Operations Information System (by May 1998). Other corporate systems are currently being scheduled for the move.

## INTELLECTUAL PROPERTY MANAGEMENT

Following its publication in June 1997, the Department circulated the Public Sector Intellectual Property Management Policy to all staff.

CALM is engaged in many activities, such as contract research and plantation management for investment companies, in which a broad body of intellectual property (IP) developed by CALM staff is a key ingredient. None of these activities in the last financial year has resulted in the commercialisation of a particular aspect of IP, in the sense envisaged in the Government's IP Management Policy.

Steps have been taken to incorporate specific provisions relating to ownership of IP in letting contracts for areas such as data collection. The revised CALM workplace agreement, expected to be finalised early in the 1998-99 financial year, will contain a clause clarifying intellectual property requirements.

## EXTERNAL FUNDING

Grants and sponsorship remain the two major sources of CALM's external funding. This year funding has been available from the new and restructured programs under the Natural Heritage Trust (NHT). The NHT provides grants for environmental, natural resources and sustainable agricultural programs and is administered by the Commonwealth Ministers for the Environment and Primary Industries and Energy and their respective agencies (Environment Australia and the Department of Primary Industries and Energy). Programs fall under a 'one-stop-shop package' which includes most of the terrestrial programs (including Bushcare, National Reserve Systems, Wetlands, Farm Forestry) and the Coast and Clean Seas initiative (including Coastcare, Marine Species Protection, Introduced Marine Pests).

In 1997-98 Commonwealth grants totalled \$8.67 million.

### Commonwealth Grants

Year	Amount (million \$)
1990-91	1.70 m
1991-92	2.25 m
1992-93	3.06 m
1993-94	3.98 m
1994-95	4.95 m
1995-96	4.80 m
1996-97	5.14 m
1997-98	8.67 m

The Green Corps Grant Program administered by the Australian Trust for Conservation Volunteers (ATCV) continued to provide accredited 26-week employment programs to young Australians to work on high priority conservation projects. CALM ran five programs, including Stirling Range National Park Footpath Management Plan and The Hills Forest Fauna Enhancement Project.

CALM received funding for special-purpose grants from State Government agencies, Main Roads Western Australia being the major contributor with \$1 million. The Department of Resources Development provided \$200 000 for the management of non-industry land on the Burrup Peninsula in the Pilbara.

CALM continued to receive valued support from corporate sponsorship for conservation, education and infrastructure projects. The Western Shield campaign continued to receive support from Cable Sands (WA) Pty Ltd for its Coastal Storm component. Woodside Petroleum Ltd, Apache Energy and Kailis M.G. Group supported CALM's turtle research program. Hamersley Iron Pty Ltd supported CALM's work programs in the Pilbara Region. Alcoa continued to be a major supporter of recreation and tourism projects within the Swan and Central Forest Regions.

The BankWest *LANDSCOPE* Visa card raised approximately \$18 500 for the conservation of endangered species and ecological communities. Projects funded during the year include the assessment of central Wheatbelt populations of the threatened skink *Egernia stokesii badia*, and work on sedgeland in the Holocene Dune swales community.

## CALM fire MANAGEMENT

### Wildfires

Extended drought periods throughout Western Australia during 1997-98 resulted in high numbers of wildfires. These burned through large tracts of CALM-managed lands in the Pilbara, Kimberley, South Coast and Goldfields Regions, and the three forest regions.

Approximately half of the Karijini National Park was burnt out by a series of wildfires during November 1997. In addition, wildfires burned out large sections of the Millstream-Chichester National Park and Rudall River National Park. It is estimated that fires burned through more than 13 million hectares of land within the Kimberley. Some of these fires affected CALM reserves, including Prince Regent Nature Reserve, Purnululu National Park, Drysdale River National Park, and the proposed national park at Mt Hart Station.

Very hot and windy conditions in December 1997 caused serious fires to develop in the Southern Forest

Region. Approximately 25 000 hectares of forest were affected, including 761 hectares of regrowth forest.

A lightning strike within the Fitzgerald River National Park in January 1998 burned approximately 67 500 hectares of the park, including a large section of the central wilderness area. There were numerous other lightning fires in the Goldfields and South Coast Regions, which affected large areas of vacant crown land and CALM-managed reserves. CALM fire staff assisted bushfire brigades and local government authorities on serious fires that burned on lands adjoining CALM reserves. The most serious fire was the Pingelly-Brookton fire in December 1997, which burned 21 000 hectares of farmlands and remnant bush, and resulted in the death of a young woman.

### Prescribed burning

The extremely dry weather during most of 1997 and early 1998 severely limited the implementation of prescribed burning programs planned for the south-west forests and the heath and woodland vegetation types within the Midwest, Goldfields and South Coast Regions. Overall, the program in the forest regions achieved 167 151 hectares, including 40 768 hectares of forest silvicultural burning following harvesting. Prescribed burning in 1997-98 was 43 275 hectares below the average achieved over the past five years. Approximately 38 346 hectares of prescribed burning was conducted

outside of the forest regions. This included 192 kilometres of aerial ignition buffers that were lit early in the dry season on CALM reserves in the Kimberley Region.

CALM applied smoke management guidelines on prescribed burns in association with the Bureau of Meteorology and the Department of Environmental Protection. This ensured that smoke from CALM burns did not exceed the stringent haze particulate limits within the Perth metropolitan area during the 1997-98 burning season.

### Equipment development

Ten large fire tankers (heavy duty) were constructed to replace CALM's ageing fire-fighting fleet. At the same time, refurbished heavy duty tankers were made available to bushfire brigades for the protection of community assets.

A new fire lookout tower was constructed at Ellis Creek near Nannup. The tower, named the Styles Tower in honour of CALM's former senior fire control officer, Mr Gordon Styles, now provides excellent detection coverage for important pine plantations and nearby communities.

Two new single-engine Champion Scout aircraft were purchased as part of the replacement program for CALM's fleet of surveillance aircraft. The aerial detection and tower detection system covers more than four million hectares in the south-west, stretching from Yanchep in the north to Walpole and Denmark in the south.

### Fire research

CALM participated with CSIRO's Forestry Fire Research Section in a collaborative national project to study the behaviour of fires within dry eucalypt forest. The research study, named Project Vesta, is a six-year project that involves the study and analysis of fires lit at the same time in a series of prepared plots of different-aged fuels. It is planned that this project will result in greatly improved predictability of forest fire behaviour, and the development of a reliable fire danger prediction system that can be applied to dry eucalypt forests throughout Australia.

### Training

CALM's fire training programs included three Incident Control System courses in the Pilbara and the Kimberley, Fire Management for CALM's new recruits, Basic Fire Fighter Training, Fire Operations Officer, Logistics Officer Training, and specialised courses for CALM managers and fire practitioners. CALM also ran a CALMfire-developed Fire Operations Officer course for the Department of Natural Resources and Environment in Victoria. CALM continued the development of Planning Officer and Sector Commander training courses as part of the National Incident Control System. Cooperation with other fire services in Western Australia has been advanced, with joint development of a number of fire fighting training modules. Liaison at national level has been maintained and significant input given to developing national fire-training material.



## CALM fire PERFORMANCE INDICATORS FOREST REGIONS 1997-98

### Key Effectiveness Indicators

1. Prescribed Burning	Region	Priority 1 (%)			Priority 2 (%)		
		1995-96	1996-97	1997-98	1995-96	1996-97	1997-98
<i>The reduction of fuels in Priority 1 zones to a satisfactory condition in 75% of designated areas, and in Priority 2 zones in 60% of designated areas.</i>							
	Swan Region	48.8	45.6	43.9	49.1	45.8	37.9
	Central Forest Region	89.0	82.9	73.8	83.6	77.3	66.6
	Southern Forest Region	69.7	67.7	59.0	71.0	68.9	69.4
<b>Notes</b>							
The Performance Indicators assume (i) jarrah to be tolerant to prescribed fire from age 10 years and karri from age 25 years and that (ii) 80% of jarrah fire tolerant regrowth exceeding 10 years and 50% of karri fire tolerant regrowth exceeding 25 years is returned to prescribed burning programs.		influenced in 1997-98 by increased burn complexity and adherence to the State's air quality management criteria and severe fire weather in December 1997 and January 1998.			in jarrah and 15.0 to 19.0 tonnes per hectare in karri. Under these fuel conditions headfire attack will be successful on days except when the fire danger in very high or extreme.		
The Performance Indicators exclude areas that are not available for burning due to the presence of (i) fire sensitive regeneration and mining rehabilitation (ii) hardwood and softwood plantations (iii) stream reserves and temporary exclusion zones and (iv) No Planned Burn and scientific study reference areas.		<b>Definitions</b> Priority 1 zones refer to those areas where life, property and environmental values are very high or where the potential risk of fires starting is high. Priority 2 zones refer to those areas where life and property values are relatively low, but where environmental or forest resource values may be high, or where the potential risk of fires starting is moderate.			The 75% and 60% low fuel coverage limits provide the minimum level considered necessary to enable fire fighters to restrict large fires to acceptable levels of size and damage within Priority 1 and Priority 2 zones.		
Prescribed burning achievements relative to CALM's Wildfire Threat Analysis (WTA) benchmarks were		Satisfactory condition means forest fuels available for burning will not exceed 7.5 to 8.5 tonnes per hectare			Designated areas are forests where prescribed burning is allowed and where areas are available for burning. The need to protect jarrah and karri regeneration after timber harvesting renders these areas unavailable for prescribed burning for between 10 and 25 years for jarrah and karri stands respectively.		

2. Fire Suppression	Region	Priority 1 (%)			Priority 2 (%)		
		1995-96	1996-97	1997-98	1995-96	1996-97	1997-98
<i>In 95% of fires attended under 95 percentile weather conditions, the commencement of attack with effective suppression forces to be in place before fires exceed 1 hectare in Priority 1 areas, and 2 hectares in Priority 2 areas.</i>							
	Swan Region	95	100	100	80	100	100
	Central Forest Region	100	100	100	100	100	100
	Southern Forest Region	100	100	100	100	100	100
	CALM Average	98	100	100	93	100	100
<b>Notes:</b>							
Suppression forces are prescribed in CALM's Red Book Dispatch Tables for fire crews and equipment and by Wildfire Threat Classes.							
The 95 percentile weather conditions are days when fire danger is below Extreme.							

**Key Efficiency Indicator**

1. Prescribed Burning	Year	Cost (in 1997-98 \$)	Area (ha) (ha)	Unit Cost (\$/ha)
<i>The 5 year averaged rolling cost of achieving prescribed burning to meet the Key Efficiency Indicator should not exceed \$10.50 per hectare.</i>	1993-94	1 792 405	250 830	7.15
	1994-95	2 244 248	260 846	8.60
	1995-96	2 306 036	233 758	9.87
	1996-97	1 987 949	157 721	12.60
	1997-98	1 486 442	126 085	11.79
	<b>Averaged Rolling Cost (over five years)</b>			<b>10.00</b>
<b>Notes</b>				
Averaged rolling costs allow comparisons between fire seasons by smoothing environmental variations, operational and budgeting variations.	included in the fire management budget only the last five years provide meaningful comparisons.	The 1997-98 prescribed burning unit cost was high because of the significantly reduced burn area that was achieved due to unfavourable burning weather conditions and the severe restrictions placed on burning due to smoke management programs. Costs were incurred in preparing burns that were subsequently not burnt.		
The rolling average for unit costs has been reduced from 10 to 5 years because salaries and wages components including leave, leave loading, workers compensation and overheads were previously allowed in CALM's central budget. Because these cost components are now	All costs have been adjusted to 1998 dollar values following a 1.6% movement in the Consumer Price Index (All Groups Perth) between June 1997 and June 1998.			

# LEGISLATION & COMPLIANCE

1997-98

## ACTS ADMINISTERED

- *Conservation and Land Management Act 1984*
- *Sandalwood Act 1929*
- *Wildlife Conservation Act 1950*

On behalf of the people of Western Australia, the Department manages national parks, conservation parks and marine parks, State forests and timber reserves, nature reserves and marine nature reserves, other reserves and lease areas and any associated fauna, flora and forest produce. It is also responsible for conserving flora and fauna throughout the State.

The *Conservation and Land Management Act 1984* (CALM Act) established CALM and provides for five controlling bodies: the Lands and Forest Commission, the National Parks and Nature Conservation Authority, the Marine Parks and Reserves Authority, the Marine Parks and Reserves Scientific Advisory Committee and the Forest Production Council. All are responsible to the Hon Minister for the Environment. Their functions are described in separate annual reports.

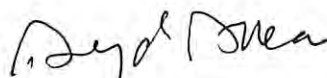
## MINING AND GOVERNMENT AGREEMENTS ACTS

The CALM Act does not generally protect land managed by the Department from mining or development projects. Section 4 of the CALM Act states that nothing in the Act shall take away from the operation of any Act relating to minerals or petroleum or any Agreement Act for a development project (except in Marine Nature Reserves and certain zones in Marine Parks which are protected from petroleum drilling and production). Agreement Acts (e.g. the *Alumina Refinery Agreement Act 1961*) are administered by the Minister for Resources Development.

## STATEMENT OF COMPLIANCE WITH WRITTEN LAW

We have attempted to comply with the requirements of relevant written law, as originally enacted and as variously amended. Steps have been taken to rectify minor errors and omissions detected during 1997-98. The relevant Acts and amendments are noted in this section of the annual report.

Syd Shea  
Executive Director  
30 August 1998



The CALM Act cannot 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 requirements of the *Environmental Protection Act 1986* also need to be satisfied with such projects on land managed by the Department.

The following mining and petroleum Acts prevail over the CALM Act: *Mining Act 1978*; *Petroleum Act 1967*; *Petroleum Pipelines Act 1969*; *Petroleum (Submerged Lands) Act 1982*.

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

The Agreement Acts with specific departmental responsibilities include: *Alumina Refinery Agreement Act 1961*; *Alumina Refinery (Worsley) Agreement Act 1973*; *Collie Coal (Griffin) Agreement Act 1979*; *Collie Coal (Western Collieries) Agreement*

*Act 1979*; *Dardanup Pine Log Sawmill Agreement Act 1992*; *Silicon (Kemerton) Agreement Act 1987*; *Wesply (Dardanup) Agreement Authorisation Act 1975*; *Wood Chipping Industry Agreement Act 1969*.

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

The establishment of hardwood plantations by way of timber sharefarming agreements with CALM under section 34B of the CALM Act have been ratified by the following Agreement Acts: *Albany Hardwood Plantation Agreement Act 1993*; *Bunbury Treefarm Project Agreement Act 1995*; and the *Collie Hardwood Plantation Agreement Act 1995*.

## OTHER RELEVANT ACTS

The *Bush Fires Act 1954*, which has important requirements for the Department with respect to fires on land managed by the Department.

Other State Acts which have relevance to CALM's operations and role as an employer include: *Aboriginal Heritage Act 1972*; *Aerial Spraying Control Act 1966*; *Agriculture and Related Resources Protection Act 1976*; *Agriculture Protection Board*



*Act 1950; Beekeepers Act 1963; Control of Vehicles (Off-Road Areas) Act 1978; Country Areas Water Supply Act 1947; Dividing Fences Act 1961; Energy Corporation's (Powers) Act 1979; Electricity Corporation Act 1994; Environmental Protection Act 1986; Equal Opportunity Act 1984; Explosive and Dangerous Goods Act 1961; Financial Administration and Audit Act 1985; Fish Resources Management Act 1994; Freedom of Information Act 1992; Government Employees Housing Authority Act 1964; Health Act 1911; Heritage of Western Australia Act 1990; Industrial Relations Act 1979; Labour Relations Amendment Act 1997; Land Acquisition and Public Works Act 1902; Land Administration Act 1997; Local Government Act 1995; Long Service Leave Act 1958; Metropolitan Water Supply, Sewerage and Drainage Act 1909; Minimum Conditions of Employment Act 1993; Misuse of Drugs Act 1981; Mutual Recognition (Western Australia) Act 1995; Occupational Safety and Health Act 1984; Occupiers Liability Act 1985; Public Sector Management Act 1994; Soil and Land Conservation Act 1945; State Employment and Skills Development Authority Act 1990; State Supply Commission Act 1991; Swan River Trust Act 1988; Timber Industry Regulations Act 1926; Titles Validation Act 1995; Town Planning and Development Act 1928; Water Agencies Restructure (Transitional and Consequential Provisions) Act 1995; Water and Rivers Commission Act 1995; Water Corporation Act 1995; Water Services Coordination Act 1995; Workers' Compensation and Rehabilitation Act 1981; Workplace Agreements Act 1993.*

Commonwealth Acts relevant to the Department's activities: *Arts, Territories and Environment Act 1975; Endangered Species Protection Act 1992; Environment Protection*

*(Impact of Proposals) Act 1974; National Parks and Wildlife Conservation Act 1975; Native Title Act 1993; Superannuation Guarantee Act 1990; Training Guarantee Administration Act 1990; Whale Protection Act 1980; Wildlife Protection (Regulation of Exports and Imports) Act 1982; Workplace Relations Act 1996; 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; Convention on the Conservation of Migrating Species of Wild Animals; Convention on Biological Diversity.*

## CHANGES IN LEGISLATION

### Marine Conservation Reserves

Major amendment and addition was made to the provisions of the CALM Act applying to marine conservation reserves, including the establishment of a Marine Parks and Reserves Authority, a Marine Parks and Reserves Scientific Advisory Committee, a new multiple-use reserve category (the 'marine management area'), and new consultation and planning procedures applying before reservation is effected. These changes were made

by the *Acts Amendment (Marine Reserves) Act 1997*, which also amended five other Acts in relation to the Government's marine conservation reserve policy.

### Land Administration

Amendment to the CALM Act was made by the *Acts Amendment (Land Administration) Act 1997* by substitution of references to the repealed *Land Act 1933* with *Land Administration Act 1997* and the concept of 'vesting' of reserves with that of placement of the 'care, control and management' of reserves in a controlling body. The Amendment Act also made consequential changes to the *Wildlife Conservation Act 1950*.

### Minor Amendments to Acts

Minor amendments effecting repeals, removal of anomalies and correction of inconsistencies were made to the CALM Act and the *Wildlife Conservation Act 1950* by the *Statutes (Repeals and Minor Amendments) Act 1997* and the *Statutes (Repeals and Minor Amendments) Act (No.2) 1998*.

### Apiary Site Management

The *Forest Management Amendment Regulations 1998* increased the number of Crown land apiary sites, which can be held by beekeepers according to their hive numbers. Apiary site permit fees were increased and administrative fees were introduced or adjusted.

### Matilda Bay Reserve

Parking fees on the Matilda Bay Reserve were increased by the *Conservation and Land Management Amendment Regulations 1998*. An increase in parking fees has also been made by the University of Western Australia and the City of Subiaco for areas under their control immediately adjoining the reserve.

# PERFORMANCE INDICATORS

## MANAGEMENT PROGRAMS

### NATURE CONSERVATION MANAGEMENT PROGRAM 1

#### Objective

*To conserve indigenous plants, animals and ecological processes in natural habitats throughout the lands and waters of the State.*

#### Note

CALM uses the National Strategy for the Conservation of Australia's Biological Diversity definition of 'conservation', i.e. 'the protection, maintenance, management, sustainable use, restoration and enhancement of the natural environment'.

The performance of the Program can be best measured by effectiveness and efficiency indicators in the three key output areas:

1. *Wildlife and habitat management.*
2. *Wildlife utilisation.*
3. *Threatened species management.*

#### Key Effectiveness Indicators

1. *Wildlife and habitat management.*

Land is set aside for the management of wildlife and habitat. Management strategies are developed to ameliorate threatening agents, such as fire, pests, weeds and diseases, which can impact on the functioning of native ecosystems, and threaten the survival of species.

#### Performance Indicator

*Example population estimates of native fauna following control of a threatening process.*

Research by CALM scientists demonstrated in 1988 that fox predation was a major cause of small fauna decline in the south west of Western Australia. This led to the baiting for foxes in selective areas of

*I certify that these performance indicators are based on proper records and fairly represent the performance of the Department of Conservation and Land Management for the year ended 30 June 1998.*

Syd Shea  
Executive Director  
15 August 1998



CALM estate which resulted in the recovery of several species of threatened fauna at those sites. In 1994 the baiting program was extended as Operation Foxglove, where 500 000 ha of the northern jarrah forest was baited on a regular basis. In 1996, this program was further expanded as Western Shield with fox baiting now occurring over 3.4 million hectares of the State.

If baiting for foxes is successful in reducing fox predation as a threatening process, then it would be expected that fauna in the size range susceptible to fox predation would firstly stabilise, and then recover to an equilibrium level for the area of suitable habitat in a bushland locality. To monitor the implementation of Western Shield, monitoring sites are

being established across the range of the baiting program.

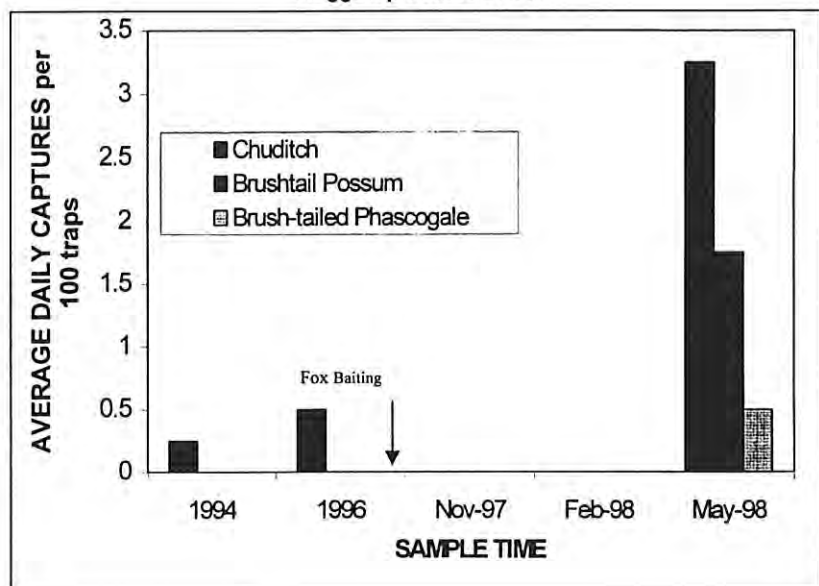
#### Measure

Population estimates for native fauna susceptible to fox predation in areas where fox baiting is occurring, as shown by monitoring sites in each CALM region where Western Shield is operating.

#### Note

As the full Western Shield program commenced in 1996, only first year monitoring data are available for CALM Regions where baiting was not previously undertaken. Data trends will be able to be presented in subsequent years. An example set of data from an area baited under Operation Foxglove is presented below.

**Noggerup Forest Block**



**Note**

Approximately three million hectares of CALM-managed land is being baited under Western Shield, out of a potential area of 17 050 269 hectares of CALM-managed lands within the distribution of the fox in Western Australia. The latter represents 89 per cent of the terrestrial land area managed by CALM.

**Note**

The Noggerup Forest Block diagram shows the recovery following fox baiting, of medium-sized mammals that are prone to fox predation, from the 3 806 ha Noggerup Forest Block in CALM's Blackwood District, south of Collie. Prior to fox baiting low population levels of Chuditch were recorded from the forest block. Following fox baiting the population size of Chuditch has increased, and the medium-sized fauna diversity of the area has increased, with populations of Brushtail Possum and Brush-tailed Phascogale also being recorded. This response to fox baiting is typical of the response over the range of fox baiting activity. Further examples of monitoring have been presented in previous annual reports.

**2. Wildlife utilisation.**

Species such as kangaroos, crocodiles and a number of flora species (excluding timber) are commercially utilised and must be managed to ensure the use is sustainable.

**Performance Indicator**

**Example population levels of harvested wildlife.**

The management of flora is based on the non-destruction of the harvested plants and is therefore sustainable. Limited harvesting of breeding crocodiles, eggs and hatchlings occurs from the wild. Kangaroo harvesting, however, involves the taking of larger numbers of animals from the wild, and must, therefore, be managed in a manner that does not threaten the wild populations.

The management programs for red and western grey kangaroo harvesting were first published in

1973. These programs outline the basis of sustainable harvesting using population estimates and harvest quotas.

From 1981 to 1993, triennial aerial surveys were undertaken for red and western grey kangaroos over the pastoral region of Western Australia. Since 1995 the surveys have been done annually, covering one third (one million km<sup>2</sup>) of the pastoral region. These data are used to estimate the populations of these species which are subject to commercial harvest.

Annual population estimates are calculated from the survey data, with the estimates for the between-survey areas being extrapolated using population trend information. Sustainable harvest quotas have been determined from historical monitoring, and are set at a maximum of 25 per cent of the population estimate for red kangaroos, and 15 per cent for western grey kangaroos, with the actual quota based on:

- current population trends;
- seasonal conditions;
- review of previous harvests;
- the proportion of the habitat and population not subject to harvesting;
- current land use practice and trends in land use; and
- significance of the take outside the commercial quota.

**Measure**

The management of harvest levels that allow for the maintenance of kangaroo populations in areas where commercial harvesting is occurring.

**Note**

The variation observed in the population of the kangaroo species is due to variation in rangeland condition, primarily as determined by rainfall, and is not affected by the level of harvest permitted. As a natural feature of kangaroo population data, this fluctuation is taken into account over the longer term in setting sustainable harvest levels.

**3. Threatened species management.**

A management system is in place to identify, protect and recover flora and fauna that is threatened with extinction or otherwise in need of special protection.

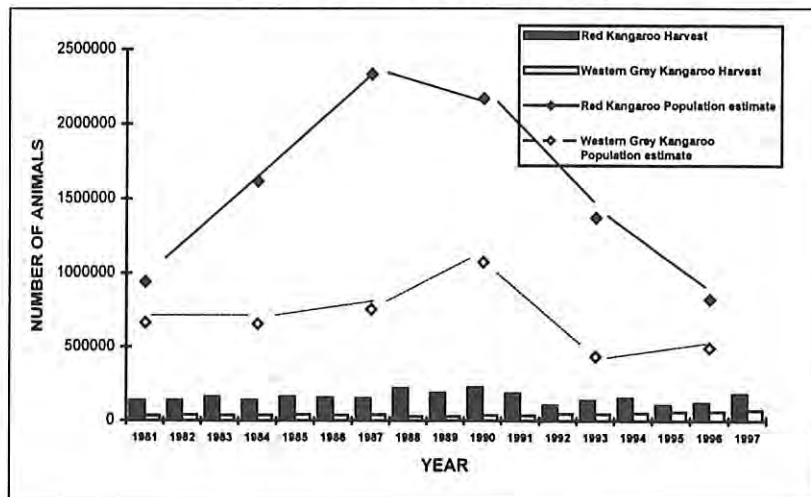
**Performance Indicator**

**The identification and management of wildlife taxa that are threatened or requiring special conservation attention.**

This indicator may be addressed through two management phases:

The management of threatened taxa for their conservation in Western Australia is based firstly on the identification and listing of these taxa in appropriate categories as determined by the level of threat and the level of available knowledge.

**Population Estimates and Harvest Levels for Managed Kangaroo Populations in Western Australia**





a. The number of the State's wildlife taxa listed as either threatened or requiring special conservation attention, compared to previous years.

**Measure**

A total of 2 619 taxa (2 309 flora and 310 fauna) were declared to be specially protected, or included on the Department's priority flora and fauna lists, at the end of 1997-98. This represents an increase of 1.3 per cent in the number of taxa listed as requiring special conservation status compared to 1996-97. A total of 51 flora and 38 fauna taxa were added, and 22 flora and 32 fauna taxa were deleted from the lists during the year. Additions were due to further scientific study of the State's flora and fauna revealing additional taxa that appear to warrant special conservation attention, while deletions were due either to taxonomic studies revealing taxa that were inappropriately listed, or surveys revealing that taxa were more common than previously thought, and hence no longer warranting special conservation attention.

**Notes**

Migratory bird species listed under Schedule 3 of the fauna notice are not included in the numbers of taxa requiring special protection as most are not Western Australian species.

A taxon (plural taxa) is a term for any classificatory group of organisms, including species, subspecies and varieties. The indicator refers to the number of the State's wildlife taxa that are either:

- declared to be specially protected by the Minister for the Environment under the Wildlife Conservation Act 1950, that is, taxa that are considered to be either rare, likely to become extinct, or otherwise in need of special protection; or
- listed by the Department as priority flora or fauna, that is, taxa that are either poorly known but potentially in need of special protection based on the

information available, or rare but not currently threatened and in need of monitoring. Full definitions were presented in the Department's 1996-97 annual report.

The increase in the number of taxa listed is a reflection of the Department attaining a better knowledge base of the State's wildlife through taxonomic study, curation of collections, databasing of information, and field investigations, and does not in itself represent a change in the conservation status of the State's wildlife.

The objective of threatened taxa management is to enable threatened taxa to be de-listed, or re-listed in less threatened categories, and to obtain the necessary information for poorly known taxa to categorise them properly.

Given the probabilistic nature of the categories of threat, and the long term nature of threatened taxa recovery, significant management actions may occur before a taxon moves from one category to a lower risk category. The measure of such movements thus will occur over long time periods.

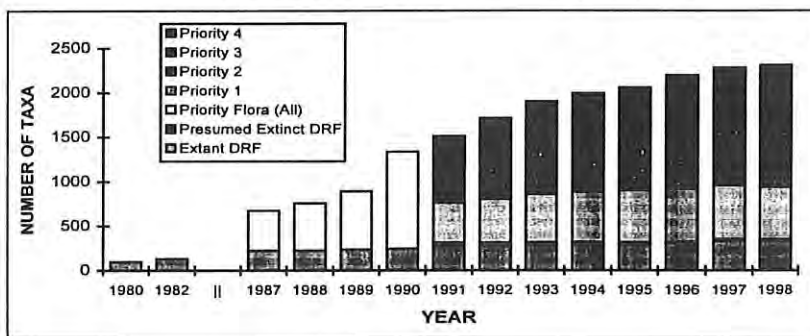
b. The recovery of threatened taxa as a consequence of specific management actions as demonstrated through case examples.

**Measure**

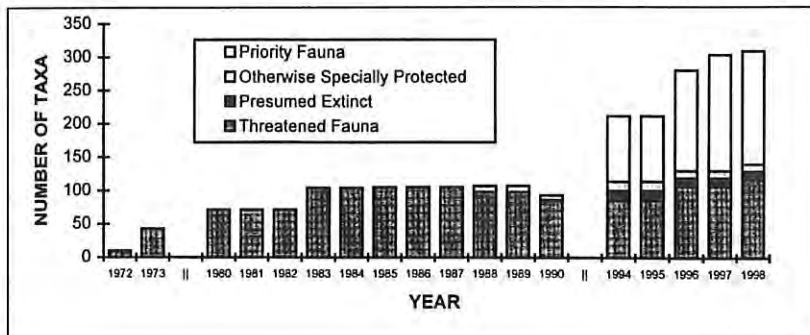
i) The Wongan Trigger Plant, *Styloidium coroniforme*, was first described in 1963 from a single locality (now referred to as population 1) where the plants were recorded as being locally abundant. In 1980 only a single plant was recorded at the site, and the species was subsequently included on the first list of declared rare flora in that year.

To manage the site, and try and encourage regeneration of the species, the then Department of Fisheries and Wildlife (now CALM) erected a stockproof fence around the site. Several individual plants were found in subsequent years, and in 1984, 22 seedlings emerged. The population had increased to 86 by 1986, with seed produced by hand pollination being collected for storage, and tissue culture propagation also being successfully undertaken ensuring

**Number of Declared Rare (DRF) and Priority Flora Taxa**



**Number of Threatened, Otherwise Specially Protected and Priority Fauna Taxa**



the conservation of this genotype. Intensive survey effort has also located four additional populations of the species.

The species is, however, relatively short-lived, with the number of plants in population 1 gradually declining since 1986, as shown in the figure opposite. Further recovery action is required, and a recovery plan was prepared for the species in 1991. The recovery plan includes actions for land acquisition, site rehabilitation, translocation, population enhancement, research, survey and monitoring.

- ii) The Quenda or Southern Brown Bandicoot, *Isodon obesulus fusciventer*, is a medium-sized mammal that had declined in its range due to loss of habitat and predation by foxes. While fox control under the Western Shield program has assisted the recovery of this species, it has also been the subject of translocation programs that have re-established the species in several nature conservation reserves.

The figures opposite show the results of two translocation programs, into Dongolocking and Tutanning Nature Reserves. The translocations have been successful in establishing replicating, viable populations of this species in these reserves, as shown by the large numbers of animals born in the reserves from the translocated animals.

As a result of the recovery of this species through fox control, the establishment of new populations through translocations, and habitat management, the Quenda was approved for removal from the list of threatened fauna this year. It will be retained on the priority fauna list, and will be monitored to ensure that populations do not decline. Should populations decline, the species will be reconsidered for listing as threatened fauna.

This example is typical of the type of response achievable with properly planned habitat management and fauna translocations. Further

examples have been presented in previous annual reports.

**Key Efficiency Indicators**

The key efficiency indicators are relating CALM management parameters to the Programs's key outputs introduced in the 1996-97 Budget process in accordance with Treasury guidelines.

**1. Wildlife and habitat management.**

*The cost per hectare of managing estate under the CALM Act.*

<b>Measure—Efficiency indicator</b>	
1996-97	\$1 434 per 1000 hectares
1997-98	\$1 163 per 1000 hectares

**2. Wildlife utilisation.**

*The cost of managing the harvesting and utilisation of wildlife per licence issued.*

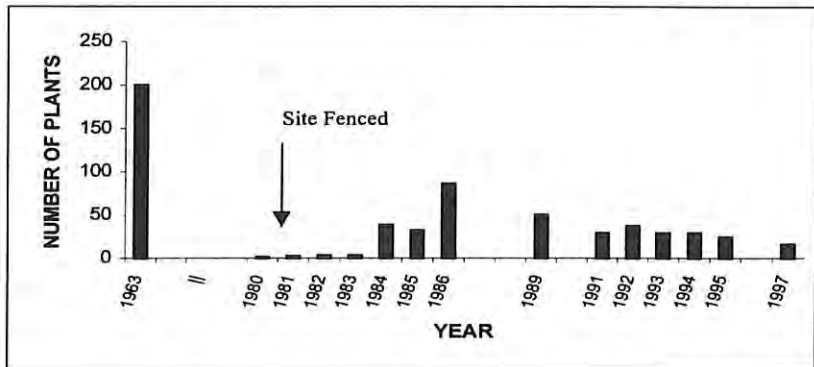
<b>Measure—Efficiency indicator</b>	
1996-97	\$388 per licence
1997-98	\$430 per licence

**3. Threatened species management.**

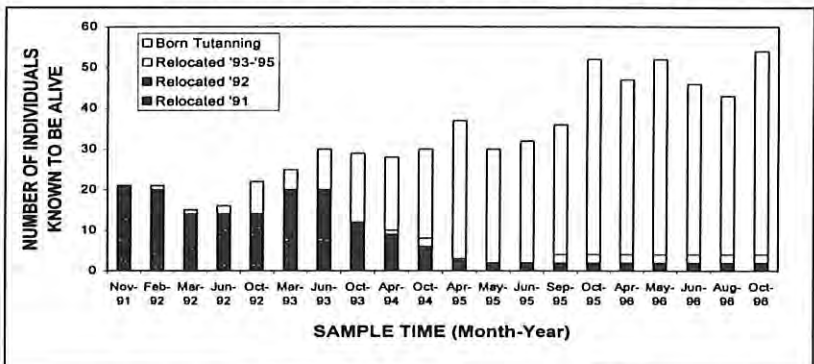
*The cost of management per listed taxon of threatened or other taxa requiring special conservation attention.*

<b>Measure—Efficiency indicator</b>	
1996-97	\$3 079 per taxon
1997-98	\$2 671 per taxon

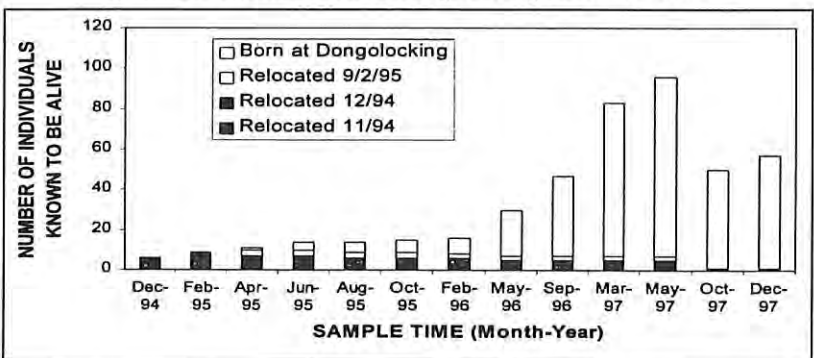
**Recovery of *Stylidium coroniforme* Population 1 following Fencing**



**Translocation of Quenda to Tutanning Nature Reserve**



**Translocation of Quenda to Dongolocking Nature Reserve**



**FOREST RESOURCES  
MANAGEMENT PROGRAM 2**

**Objective**

To sustain, regulate and profitably manage the forest resources entrusted to the Department in ways compatible with conservation and other management objectives.

**Key Effective Indicators**

1. The harvest from the native hardwood forest will be maintained at a sustainable level.

(a) Quantity of log timber harvested.

**Notes**

The sustainable level is the average quantity of timber available for harvest each year which can be continued in the long term.

Forest areas available for timber harvesting are measured using specially designed inventory plots to determine the quantity of timber available and the rate at which it is growing.

Based on independent analysis of this information, the Government determined the estimated sustainable level of harvest approved for the term of the current Forest Management Plan.

Harvest means the commercial extraction and sale of log timber for processing and value-adding.

**Measure**

The quantity of log timber harvested compared with the estimated sustained yield determined by Government.

Quantities for this year were jarrah 413 622 m<sup>3</sup>, marri 425 608m<sup>3</sup> and karri 403 345 m<sup>3</sup>. Trends over recent years are shown in the graph opposite.

(b) Area of forest regenerated.

**Notes**

Forest is harvested using a variety of silvicultural prescriptions, some of which involve thinning to increase growth, and others which involve removal of trees and renewing those areas of forest by regeneration.

**DEFINITIONS**

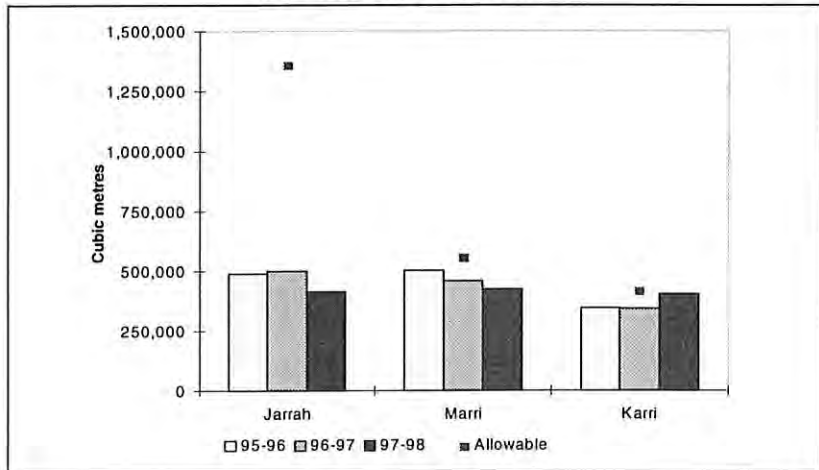
**Sustain** means to manage forest resources in a way which can be continued indefinitely.

**Regulate** means to control the average quantity of log timber sold such that the available sustainable resource is not exceeded over a period of time.

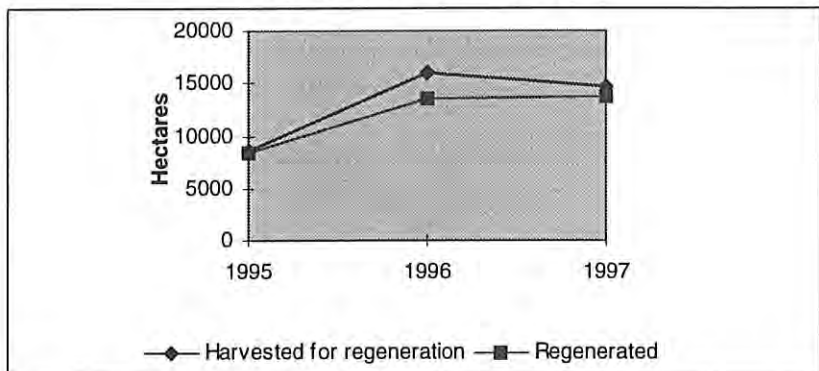
**Profitably manage** means to generate a level of revenue from the sale of forest resources which exceeds the program expenditure.

**Forest Resources** comprises native hardwood forest on State Forest and Timber Reserves, plantations on Crown Land, sharefarm plantations on private land and sandalwood resource on Crown Land.

**Key Effectiveness Indicator 1a**



**Key Effectiveness Indicator 1b**



Regeneration takes place over a period of time and regeneration actually completed in any one year may include parts of areas harvested over a number of preceding years.

**Measure**

The area of forest actually regenerated compared with the area of forest harvested for regeneration.

The area of forest harvested for regeneration this year was 14 717 ha, while a total of 13 714 ha was regenerated from this or previous year's cutting. Trends over recent years are shown in the lower graph above.

2. The quantities of sawlogs harvested each year from Crown land will be regulated by contractual agreements.

**Notes**

Regulate means to control the average quantity of log timber sold such that the available sustainable resource is not exceeded over a period of time.

The quantity of timber harvested is controlled by sale contracts.

**Measure**

The actual quantities of sawlogs harvested compared with the quantities specified in sale contracts.



Quantities for this year were jarrah 376 438 m<sup>3</sup>, marri 5 925m<sup>3</sup>, karri 215 529 m<sup>3</sup> and pine 262 333 m<sup>3</sup>. Comparisons with contracted quantities are shown in the top graph opposite.

**3. The Forest Resources management program will be managed profitably.**

**Notes**

Program expenditure comprises the capital and recurrent cost of managing, growing and protecting the forest resource, the cost of harvesting, delivering and sales of log timber. Corporate overheads are included.

Program revenue comprises the sales of log timber which includes royalties, stumpages and other log timber charges related to harvesting, delivery and log sales.

All figures reported are on an accrual basis.

**Measure**

Comparison between Program revenue and operating expenditure.

Total revenue this year was \$146 387 000 compared with expenditure of \$133 509 000. Trends over recent years are shown in the centre graph above.

**4. The area of plantations established will meet defined objectives.**

**Note**

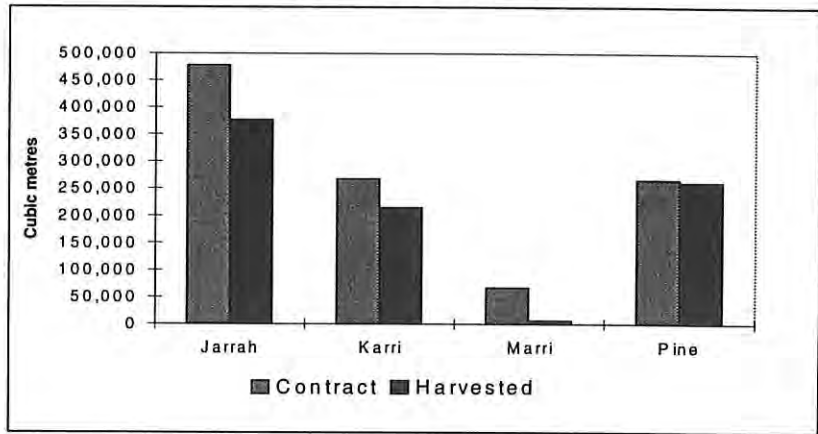
Plantations are established on both Crown land and Private land directly for the Government and acting as agents for private companies.

**Measure**

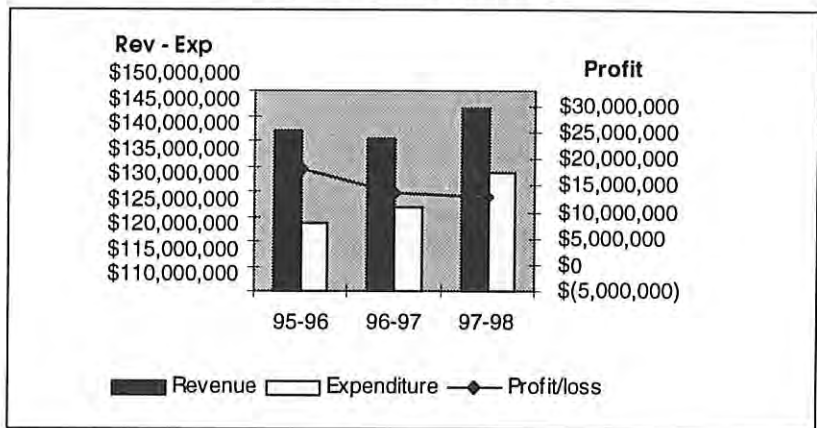
Area of plantations established compared with the target area planned for planting to meet the defined objectives. Figures are presented for the last complete planting year.

Total area planted this year was 9 309 ha compared with a target of 10 009 ha. Trends over recent years are shown in the bottom graph above.

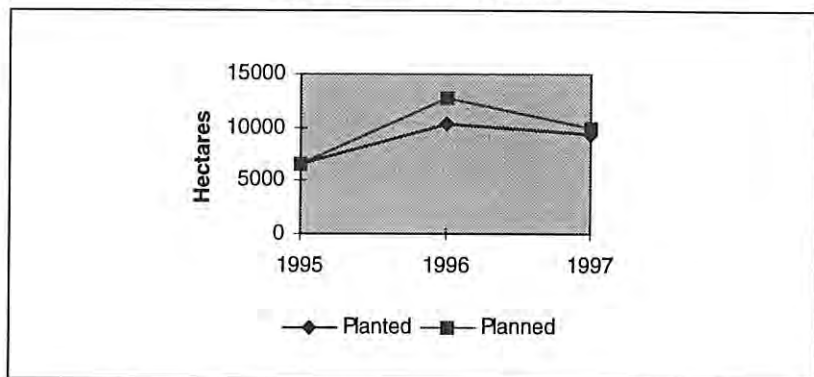
**Key Effectiveness Indicator 2**



**Key Effectiveness Indicator 3**



**Key Effectiveness Indicator 4**



**Key Efficiency Indicators**

**1. Cost of harvesting and sales compared with revenue generated.**

**Notes**

These are costs incurred in managing the harvesting delivery and sales of log timber and should be fully recouped from the revenue generated, equating to a ratio of not less than 1.0.

**Measure**

Ratio of revenue to expenditure for harvesting and sales (in-forest costs, roading, administration, harvesting and delivery).

Revenue for this year was \$61 559 000 compared with expenditure of \$61 412 000. Trends over recent years are shown in the top graph opposite.

2. *Cost of management compared with revenue from royalties and stumpages.*

**Notes**

Royalties and stumpages are the value per unit of log timber by which the forest owner recoups the cost of managing, growing and protecting the forest whilst achieving a profitable rate of return over time.

**Measure**

The ratio of revenue from royalties and stumpages to expenditure on managing, growing and protecting the forest.

Revenue for this year was \$84 828 000 compared with expenditure of \$72 097 000. Trends over recent years are shown in the centre graph above.

3. *Profit compared with total sales.*

**Notes**

The percentage profit is shown on an accrual basis.

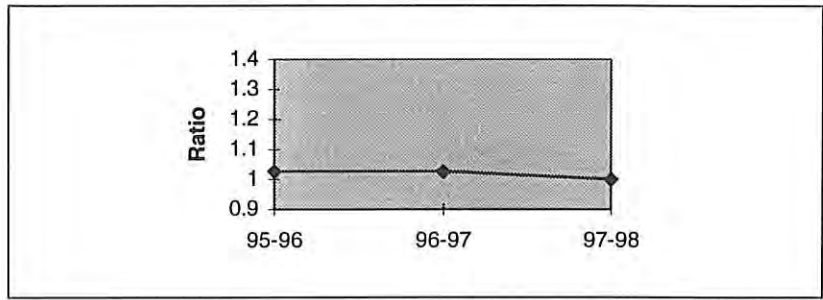
**Measure**

Profit as a percentage of total sales. Profit for the year was \$12 878 000 from sales of \$143 066 000. Trends over recent years are shown in the bottom graph above.

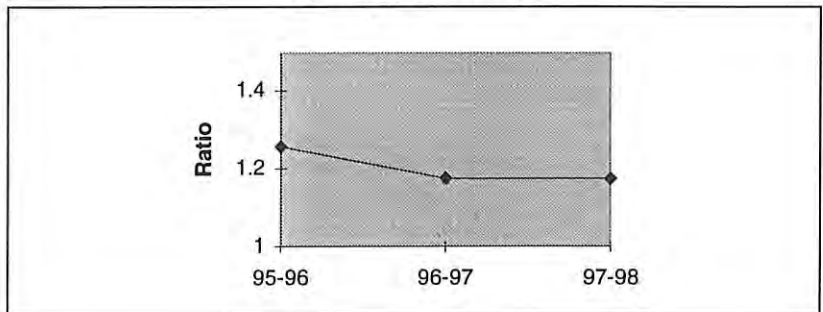
**General Note**

Comparison with other organisations is not possible for the whole Forest Resources Program due to the unique combination of resources and management requirements.

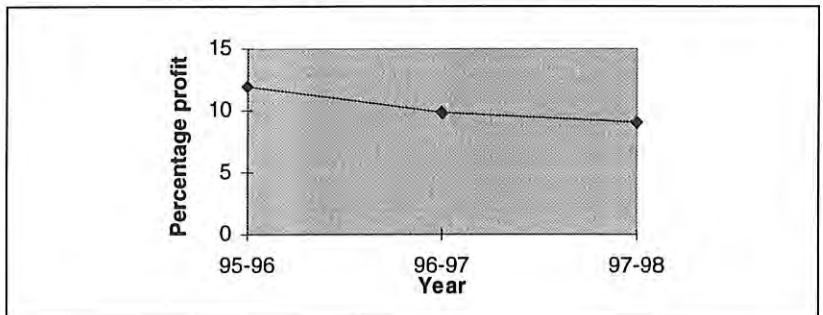
**Key Efficiency Indicator 1**



**Key Efficiency Indicator 2**



**Key Efficiency Indicator 3**



### TOURISM AND RECREATION MANAGEMENT PROGRAM 3

#### Objective

To identify, provide and maintain opportunities and services to the community which allows them to enjoy the wildlife, lands, waters and resources entrusted to the Department without compromising conservation and other management objectives.

#### Key Effectiveness Indicators

1. The extent to which the community are satisfied with the condition and standard of CALM-managed recreation areas, facilities, services and programs.

#### Measure

CALM continued to survey visitors to areas under its management. These surveys are designed to measure the overall level of satisfaction and relative importance that visitors placed on the areas they visited, as well as the recreation facilities and services provided by the Department.

Eight hundred and eighty forms were returned from 26 parks, State forest areas and reserves throughout the State. Eighty nine percent of these respondents indicated they were either extremely or very satisfied with their visit overall while nine percent were moderately or somewhat satisfied. Only one per cent of the visitors surveyed were slightly or not at all satisfied (see Respondents Overall Level of Satisfaction diagram). Comparison with previous years results is not possible due to changes in survey procedures. Those facilities and services that respondents indicated were most important to them and which they found most and least satisfying are shown in Aspects of the Visit table.

2. The extent to which the public has shown interest/support for CALM's nature conservation and tourism and recreation program.

#### Measure

Twenty one new community volunteer projects were initiated in 1997-98. The number of volunteer hours spent on tourism, nature conservation and recreation this year was 104 684. The number of registered volunteers has increased to 4 966.

#### Note

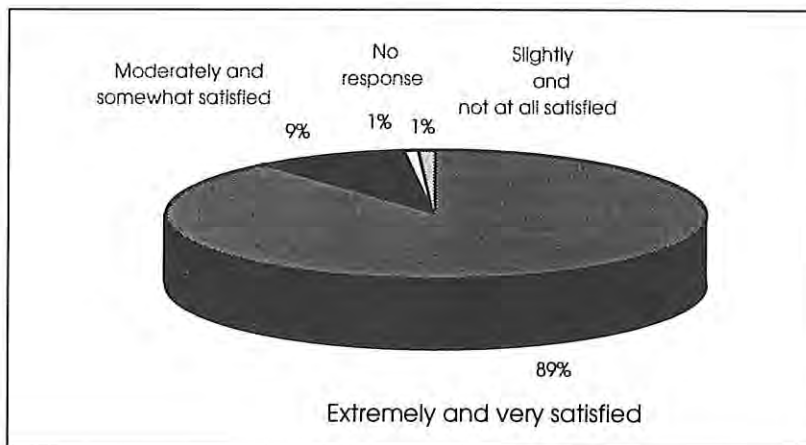
The level of volunteer involvement indicates continued public support for CALM's management programs and the agency's ability to balance competing landuses to aid public enjoyment and protect conservation values.

3. The number of visits to CALM managed areas

#### Measure

Visitor statistics indicate that the number of recorded visits to CALM lands and waters for 1997-98 was 7 115 000. This represents an increase of 31 per cent over last financial year's recorded visits of 5 438 000. This increase is in part due to more intensive sampling of some sites which better reflects usage of those sites. In particular, increased monitoring of marine areas has enabled the Department to develop more accurate measures of visitor use

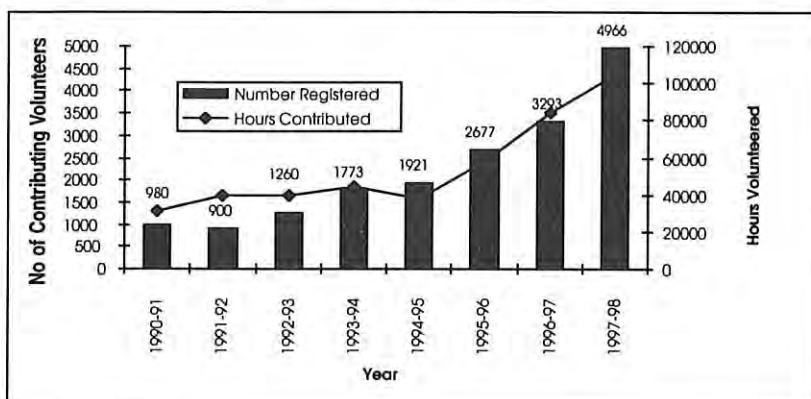
Respondents Overall Level of Satisfaction



Aspects of the Visit

Most Satisfying	Least Satisfying
Natural attractiveness of the area	Condition of roads
Location of facilities	Provision of Aboriginal information and interpretation
Condition/standard of sites/facilities	Provision of information, interpretation, signs and maps

Volunteer Involvement





levels in certain parks. In addition, 24 parks, State forest areas and reserves have shown increased visitor use, which also denotes increased interest by the public in visiting CALM-managed areas (see Visitor Use Levels diagram).

**Trends**

In order to more accurately monitor trends in visitor use levels and patterns, we report on the visitor levels of three 'indicator' parks. The parks selected are Cape Le Grand, Nambung and Purnululu. These parks were chosen because they represent (by WA standards) low, medium and high visitor numbers and all have controlled entry points and effective visitor recording systems in place.

Two of the three parks, Cape Le Grand and Nambung, have experienced a moderate increase in visitor numbers over the previous 12 months while visitation to Purnululu remains constant (see table opposite). It is still unclear as to what, if any impact, recent economic events will have on overseas visitation to WA's parks, reserves and State forest areas over the coming months. At Purnululu, the overseas segment of the market has decreased from 20 per cent to seven per cent and at Nambung from 31 per cent to 24 per cent in 1997 in comparison with the 1996 survey. However, the intrastate market component has increased since 1996, compensating for this downturn in overseas visitation.

**Key Efficiency Indicator**

1. *Cost per Visit*

**Measure**

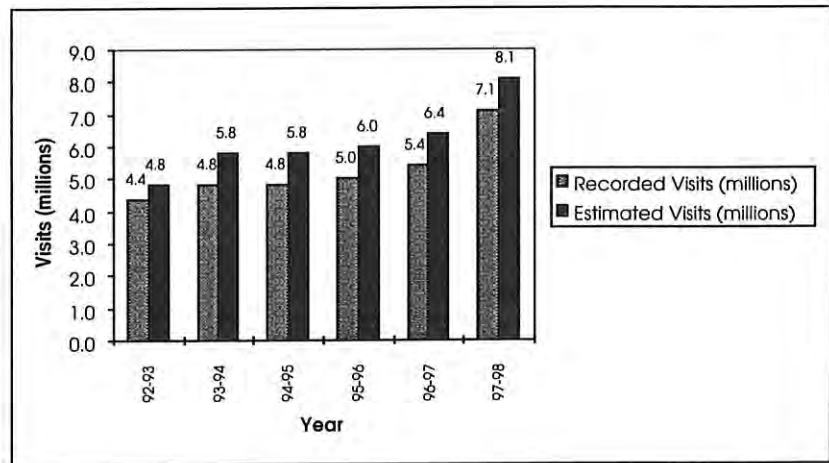
The cost of providing CALM's tourism and recreation services in 1997-98 was \$3.18 per visit. This represents a moderate decrease of \$0.46 per visit as compared to the 1996-97 figure of \$3.64 per visit. The primary reason for this decrease in per visit expenditure is due to a corresponding increase of 31 per cent in the number of recorded visits to CALM-managed lands and waters as reported in the section on key effectiveness indicators.

**Note**

The index of efficiency figures for 1997-98 and the previous two financial years are based on the net cost of services of the Program from the Program Schedule of Expenses and Revenues in relation to the total number of recorded visits to CALM-managed lands and waters. Prior to this, efficiency index figures were based on net total recurrent expenditure adjusted in line with the

Consumer Price Index. The 1996-97 index of efficiency figure has been adjusted since the 1996-97 Annual Report using updated visitor numbers. The 1997-98 figure is based on provisional visitor numbers and will likewise be adjusted in next year's Annual Report when final visitor figures have been recorded.

**Visitor Use Levels**

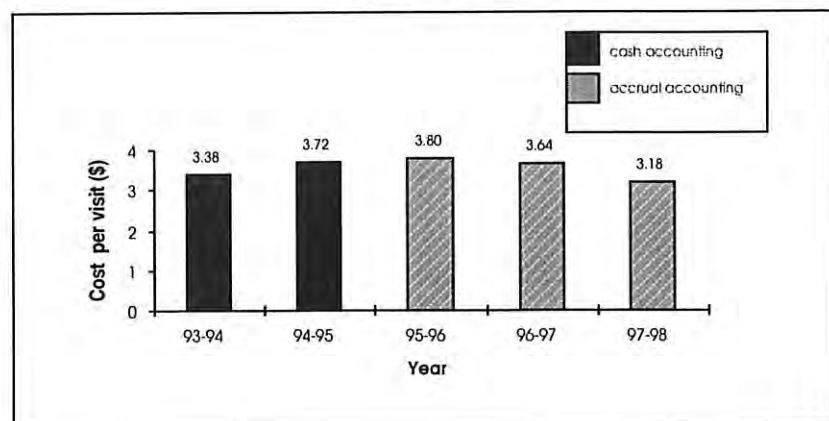


**Trends in Visitor Numbers to Three National Parks in the State**

National Parks	1994-95	1995-96	1996-97	1997-98
Cape Le Grand	57 000	71 000	57 000 <sup>(1)</sup>	65 000
Nambung	120 000	134 000	146 000 <sup>(1)</sup>	157 000
Purnululu	11 000	13 000	14 000	14 000

<sup>(1)</sup> Amended from last financial year as additional data became available.

**Cost per Visit**



## ASTRONOMICAL SERVICES Management program 4

### Objective

To meet the demand for general and specialised up-to-date astronomical information and services from the public, business and educational community while furthering scientific research in astronomy in conjunction with other observatories and local tertiary institutions.

### Effectiveness Indicators

1. The level of customer satisfaction with the services provided by the Observatory

During 1997–1998, 8 978 people visited the observatory, 2 545 people used the recorded information line and 11 914 people telephoned seeking information.

The level of customer satisfaction with the services provided by Perth Observatory was measured by survey. The survey asked questions on many areas of the Observatory's services with the overall satisfaction being determined by the answer to the question, 'How satisfied were you with the services provided by Perth Observatory?'

#### Note

The survey was a paper questionnaire distributed to visitors at the conclusion of their tour at the Observatory between October 1997 and May 1998. The number of respondents was 511.

2. The extent to which visitors perceive the information presented during their tour of the Observatory increased their knowledge and awareness of astronomy.

The indicator relates to the educational role of the Observatory in meeting the demand by the community for information on astronomy and measures the extent to which that demand is met.

The extent to which visitors perceived they had increased their knowledge

and awareness of astronomy was measured by survey. Results related to the question 'To what extent do you agree that the information presented on the tour increased your knowledge of and awareness of astronomy?'

3. Research findings published in internationally recognised journals

One of the aims of Perth Observatory is to further scientific research in astronomy. One method of measuring the contribution to scientific research is to determine the number of articles published in internationally recognised scientific journals. The publishers of these journals independently evaluate articles submitted to ensure they meet appropriate standards and criteria. To have articles published in these journals would indicate that the observatory is adding to the body of scientific knowledge and therefore furthering scientific research.

During 1997–98, the Observatory had 32 (28 in 1996–97) articles published. Of these 3 (5 in 1996–97)

were scientific papers in internationally recognised journals. The other articles were papers related to scientific data on astronomical objects, articles in educational journals or popular magazines, newsletters or internal reports.

### Efficiency Indicator

1. Average cost to the Observatory per visitor per tour type (before ticket sales).

This indicator only takes actual time taken for tours and contingency costs into account. The algorithm used in the calculation has remained static, with adjustments for salary and contingency charges.

The Perth Observatory conducts a very popular on-site educational program through its tours for school groups and the general public. The number of people visiting the Observatory and participating in tours in 1997–98 (1996–97) was 8 978 (8855)—there were 129 (120) night tours, 11 (87) day tours and 48 (49) Sunday afternoon tours.

### Overall Satisfaction with Perth Observatory

Response	1992-93 %	1993-94 %	1994-95 %	1995-96 %	1996-97 %	1997-98 %
Very satisfied	68.1	68.0	70.1	75.2	69.6	68.7
Satisfied	30.3	31.0	25.2	23.1	26.8	29.9
Neither satisfied or dissatisfied	1.2	1.0	2.9	1.7	3.0	1.2
Dissatisfied	0.4	0.0	1.3	0.0	0.4	0.2
Very dissatisfied	0.0	0.0	0.5	0.0	0.2	0.0

### Increased Knowledge and Awareness of Astronomy

Response	1992-93 %	1993-94 %	1994-95 %	1995-96 %	1996-97 %	1997-98 %
Strongly agree	55	46	45	50.4	48.7	45.4
Agree	43	52	51.3	47.9	46.1	50.9
Neither agree nor disaree	2	2	2.6	1.7	4.2	3.5
Disagree	0	0	0.5	0	1.0	0.2
Strongly disagree	0	0	0.3	0	0	0

### Cost per Visit

Response	1992-93 \$	1993-94 \$	1994-95 \$	1995-96 \$	1996-97 \$	1997-98 \$
Daily Tour	0.91	0.94	1.01	1.01	0.97	1.31
Night Tour	2.20	1.94	2.60	2.60	1.67	1.76
Weekend Tour	3.25	2.50	2.51	2.51	3.05	2.57



## Auditor General

**To the Parliament of Western Australia**

**DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT  
PERFORMANCE INDICATORS FOR THE YEAR ENDED JUNE 30, 1998**

**Scope**

I have audited the performance indicators of the Department of Conservation and Land Management for the year ended June 30, 1998 under the provisions of the Financial Administration and Audit Act 1985.

The Executive Director is responsible for developing and maintaining proper records and systems for preparing and presenting performance indicators. I have conducted an audit of the performance indicators in order to express an opinion on them to the Parliament as required by the Act.

My audit was performed in accordance with section 79 of the Act to form an opinion based on a reasonable level of assurance. The audit procedures included examining, on a test basis, evidence supporting the amounts and other disclosures in the performance indicators, and assessing the relevance of the performance indicators to the program objectives and the appropriateness of the performance indicators in assisting users to assess the Department's performance. These procedures have been undertaken to form an opinion as to whether, in all material respects, the performance indicators are relevant and appropriate having regard to their purpose and fairly represent the indicated performance.

The audit opinion expressed below has been formed on the above basis.

**Audit Opinion**

In my opinion, the performance indicators are relevant to the objectives of the Department of Conservation and Land Management. The indicators are appropriate for assisting users to assess the Department's performance and fairly represent the indicated performance for the year ended June 30, 1998.

A handwritten signature in black ink, appearing to read 'D D R Pearson'.

D D R PEARSON  
AUDITOR GENERAL  
August 31, 1998

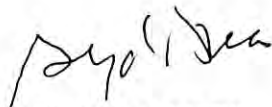


# FINANCIAL STATEMENTS

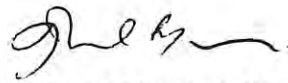
1997-98

*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 1998 and the state of affairs as at 30 June 1998.*

*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  
15 August 1998



PRINCIPAL ACCOUNTING OFFICER  
15 August 1998

**DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT  
OPERATING STATEMENT  
FOR THE YEAR ENDED 30 JUNE 1998**

	Note	1997-98 (\$ 000)	1996-97 (\$ 000)
<b>COST OF SERVICES</b>			
<b>OPERATING EXPENSES</b>			
Salaries and wages	4	59 384	55 218
Superannuation	2 (i)	5 568	4 360
Interest	5	9 679	10 461
Harvesting costs		61 412	59 014
Depreciation		7 709	4 793
Administration	2(k) & 6	6 208	6 481
Accommodation	2(k)	2 900	2 609
Other operating expenses	2(k) & 7	57 292	45 242
Net loss on sale of assets	8	-	1 348
<b>Total Cost of Services</b>		<u>210 152</u>	<u>189 526</u>
<b>REVENUES FROM SERVICES</b>			
<b>OPERATING REVENUE</b>			
Royalties and timber sales	9	119 481	116 820
National parks and recreation		4 322	4 131
Recoupable works	10	22 637	20 664
Grants - Commonwealth		11 421	5 131
- State	14	1 949	769
Interest on investments		1 182	535
Other revenue	11	7 682	5 963
Net profit on sale of assets	8	38	-
<b>Total Operating Revenue</b>		<u>168 712</u>	<u>154 013</u>
<b>Net Cost of Services</b>	24	<u>41 440</u>	<u>35 513</u>
<b>REVENUES FROM GOVERNMENT</b>			
Appropriations	12	43 565	37 293
Resources received free of charge	13	696	991
Liabilities assumed by Treasurer	2(i)	1 116	222
<b>Total Revenues from Government</b>		<u>45 377</u>	<u>38 506</u>
<b>Change in Net Assets as a result of operations</b>		3 937	2 993

**DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT**  
**STATEMENT OF FINANCIAL POSITION**  
**AS AT 30 JUNE 1998**

	Note	1997-98 (\$ 000)	1996-97 (\$ 000)
<b>CURRENT ASSETS</b>			
Cash and amounts in suspense	15	11 143	10 622
Restricted funds	16	2 136	1 833
Receivables	17	20 304	17 267
Inventories	2(h) & 18	5 975	5 589
Prepayments	19	323	219
		<u>39 881</u>	<u>35 530</u>
<b>NON-CURRENT ASSETS</b>			
Land	20	2 233 168	1 311 786
Timber and Infrastructure		456 600	-
Buildings, Plant & Equipment		39 003	37 736
Recreation and Tourism Facilities		54 266	-
		<u>2 783 037</u>	<u>1 349 522</u>
<b>Total Assets</b>		<u><u>2 822 918</u></u>	<u><u>1 385 052</u></u>
<b>CURRENT LIABILITIES</b>			
Accounts payable		6 522	2 210
Accrued salaries/wages		866	601
Accrued superannuation		788	1 037
Accrued logging costs		2 033	2 549
Borrowings	21	4 200	4 557
Accrued loan interest		1 921	2 149
Employee entitlements	2(i) & 22	11 208	9 457
Restricted funds	16	2 136	1 260
Unearned revenue		105	311
		<u>29 779</u>	<u>24 133</u>
<b>NON-CURRENT LIABILITIES</b>			
Borrowings	21	84 121	89 939
Employee entitlements	2(i) & 22	2 107	2 333
		<u>86 228</u>	<u>92 272</u>
<b>Total Liabilities</b>		<u>116 007</u>	<u>116 405</u>
<b>EQUITY</b>			
Reserves	23	2 248 217	1 327 916
Accumulated Surplus (Deficit)		458 694	(59 269)
		<u>2 706 911</u>	<u>1 268 647</u>
<b>TOTAL LIABILITIES AND EQUITY</b>		<u><u>2 822 918</u></u>	<u><u>1 385 052</u></u>



**DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT**  
**STATEMENT OF CASH FLOWS**  
**FOR THE YEAR ENDED 30 JUNE 1998**

	Note	1997-98 (\$ 000)	1996-97 (\$ 000)
<b>CASH FLOWS FROM OPERATING ACTIVITIES</b>			
Payments			
Employee entitlements		57 611	53 853
Superannuation		4 701	4 840
Interest		9 907	11 544
Harvesting costs		60 276	57 788
Administration		5 801	5 313
Accommodation		2 880	2 462
Other		<u>55 058</u>	<u>55 116</u>
Total Payments		196 234	190 916
Receipts			
Royalties		56 534	56 621
Commercial operations		60 655	59 123
Recoupable projects		22 042	19 826
Grant receipts - Commonwealth		11 171	5 143
- State		2 007	705
Interest on Investments		1 182	674
Other revenues		<u>11 792</u>	<u>14 028</u>
Total Receipts		165 383	156 120
<b>NET CASH USED IN OPERATING ACTIVITIES</b>	24	<u>30 851</u>	<u>34 797</u>
<b>CASH FLOWS FROM INVESTING ACTIVITIES</b>			
Payments for the creation of Forestry assets		2 236	-
Payments for the purchase of non-current assets		6 113	4 674
Less Proceeds from the sale of non-current assets		<u>2 331</u>	<u>15 228</u>
<b>NET CASH USED IN INVESTING ACTIVITIES</b>		<u>6 018</u>	<u>(10 554)</u>
<b>CASH FLOWS FROM FINANCING ACTIVITIES</b>			
Borrowing proceeds		-	5 479
Less Borrowing repayments		<u>6 175</u>	<u>17 275</u>
<b>NET CASH USED IN FINANCING ACTIVITIES</b>		<u>6 175</u>	<u>11 796</u>
<b>CASH FLOWS FROM GOVERNMENT AND OTHER</b>			
Receipts from appropriations			
Recurrent		32 325	25 790
Capital		<u>11 240</u>	<u>11 364</u>
<b>NET CASH PROVIDED BY GOVERNMENT</b>		<u>43 565</u>	<u>37 154</u>
Net increase in cash held		521	1 115
Cash at the beginning of the reporting period		<u>10 622</u>	<u>9 507</u>
Cash at the end of the reporting period	15	<u>11 143</u>	<u>10 622</u>

**DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT  
PROGRAM SCHEDULE OF EXPENSES AND REVENUES  
FOR THE YEAR ENDED 30 JUNE 1998**

	ASTRONOMICAL SERVICES (\$ 000)		NATURE CONSERVATION (\$ 000)		TOURISM AND RECREATION (\$ 000)		FOREST RESOURCES (\$ 000)		TOTAL (\$ 000)	
	1997-98	1996-97	1997-98	1996-97	1997-98	1996-97	1997-98	1996-97	1997-98	1996-97
<b>OPERATING EXPENSES</b>										
Salaries and wages	471	561	18 930	16 706	12 733	12 131	27 250	25 820	59 384	55 218
Superannuation	48	0	1 807	1 559	1 242	1 034	2 471	1 767	5 568	4 360
Interest	0	0	391	424	1 076	1 167	8 212	8 870	9 679	10 461
Harvesting costs	0	0	0	0	0	0	61 412	59 014	61 412	59 014
Depreciation	3	296	1 292	1 529	4 239	1 034	2 175	1 934	7 709	4 793
Administration	29	34	2 242	2 348	1 378	1 453	2 559	2 646	6 208	6 481
Accommodation	26	26	904	832	1 064	904	906	847	2 900	2 609
Other operating expenses	231	269	17 378	10 347	10 234	9 569	29 449	25 057	57 292	45 242
Net loss on sale of assets	0	0	458	458	310	310	134 434	126 535	210 152	189 526
<b>Total Cost of Services</b>	<b>808</b>	<b>1 186</b>	<b>42 944</b>	<b>34 203</b>	<b>31 966</b>	<b>27 602</b>	<b>134 434</b>	<b>126 535</b>	<b>210 152</b>	<b>189 526</b>
<b>OPERATING REVENUE</b>										
Royalties and timber sales	0	0	0	0	0	0	119 481	116 820	119 481	116 820
National park collections	0	0	0	0	4 322	4 131	0	0	4 322	4 131
Recoupable works	112	97	1 514	1 242	3 965	2 781	17 046	16 544	22 637	20 664
Grants - Commonwealth	0	0	8 028	3 080	1 303	258	2 090	1 793	11 421	5 131
- State	0	0	401	64	1 148	632	400	73	1 949	769
Interest on Investments	0	0	521	369	112	61	549	105	1 182	535
Other operating revenue	0	0	400	510	903	820	6 379	4 633	7 682	5 963
Net profit on sale of assets	0	0	11	0	9	0	18	0	38	0
<b>Total Operating Revenue</b>	<b>112</b>	<b>97</b>	<b>10 875</b>	<b>5 265</b>	<b>11 762</b>	<b>8 683</b>	<b>145 963</b>	<b>139 968</b>	<b>168 712</b>	<b>154 013</b>
<b>Net Cost of Services</b>	<b>-696</b>	<b>-1 089</b>	<b>-32 069</b>	<b>-28 938</b>	<b>-20 204</b>	<b>-18 919</b>	<b>11 529</b>	<b>13 433</b>	<b>-41 440</b>	<b>-35 513</b>
<b>REVENUES FROM GOVERNMENT</b>										
Appropriations	533	617	27 592	20 680	15 440	15 996	0	0	43 565	37 293
Resources received free of charge	3	5	356	351	155	217	282	418	696	991
Liabilities assumed by Treasurer	10	0	362	79	249	53	495	90	1 116	222
<b>Total Revenue From Government</b>	<b>546</b>	<b>622</b>	<b>28 210</b>	<b>21 110</b>	<b>15 844</b>	<b>16 266</b>	<b>777</b>	<b>508</b>	<b>45 377</b>	<b>38 506</b>
<b>Change in Net Assets as a result of operations.</b>	<b>-150</b>	<b>-467</b>	<b>-3 859</b>	<b>-7 828</b>	<b>-4 360</b>	<b>-2 653</b>	<b>12 306</b>	<b>13 941</b>	<b>3 937</b>	<b>2 993</b>

**DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT  
PROGRAM SCHEDULE OF ASSETS AND LIABILITIES  
AS AT 30 JUNE 1998**

	ASTRONOMICAL SERVICES (\$ 000)		NATURE CONSERVATION (\$ 000)		TOURISM AND RECREATION (\$ 000)		FOREST RESOURCES (\$ 000)		TOTAL (\$ 000)	
	1997-98	1996-97	1997-98	1996-97	1997-98	1996-97	1997-98	1996-97	1997-98	1996-97
<b>CURRENT ASSETS</b>										
Cash and amounts in suspense	7	19	6 473	8 464	2 772	437	1 891	1 702	11 143	10 622
Restricted Funds	5	6	190	173	128	126	1 813	1 528	2 136	1 833
Receivables	2	0	135	266	427	222	19 741	16 779	20 304	17 267
Inventories	0	0	577	0	346	868	5 052	4 722	5 975	5 589
Prepayments	0	1	44	55	70	48	209	114	323	219
<b>NON-CURRENT ASSETS</b>										
Land			2 233 168	144 296		209 886		957 604	2 233 168	1 311 786
Timber and Infrastructure							456 600		456 600	-
Buildings, Plant & Equipment	2 400	3 456	10 698	3 771	6 728	5 485	19 177	25 024	39 003	37 736
Recreation and Tourism Facilities					54 266				54 266	-
<b>Total Assets</b>	<b>2 414</b>	<b>3 482</b>	<b>2 251 285</b>	<b>157 026</b>	<b>64 737</b>	<b>217 072</b>	<b>504 483</b>	<b>1 007 472</b>	<b>2 822 918</b>	<b>1 385 052</b>
<b>CURRENT LIABILITIES</b>										
Accounts payable	32	27	1 091	542	836	368	4 563	1 273	6 522	2 210
Accrued salaries / wages	7	4	275	156	186	137	397	305	866	601
Accrued superannuation	6	0	255	351	176	242	351	445	788	1 037
Accrued logging costs	0	0	0	0	0	0	2 033	2 549	2 033	2 549
Borrowings	0	0	168	184	470	507	3 562	3 866	4 200	4 557
Accrued loan interest	0	0	77	87	215	239	1 629	1 823	1 921	2 149
Employee entitlements	90	90	3 564	3 032	2 410	2 116	5 144	4 219	11 208	9 457
Restricted Funds	5	0	190	0	128	0	1 813	1 260	2 136	1 260
Unearned revenue	0	0	0	0	0	0	105	311	105	311
<b>NON CURRENT LIABILITIES</b>										
Borrowings	0	0	3 365	3 634	9 422	10 001	71 335	76 305	84 121	89 939
Employee entitlements	17	22	670	748	453	522	967	1 041	2 107	2 333
<b>Total Liabilities</b>	<b>157</b>	<b>143</b>	<b>9 655</b>	<b>8 733</b>	<b>14 296</b>	<b>14 132</b>	<b>91 899</b>	<b>93 397</b>	<b>116 007</b>	<b>116 405</b>



**DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT**  
**STATEMENT OF APPROPRIATIONS AND REVENUE ESTIMATES (Note 31)**  
**FOR THE YEAR ENDED 30 JUNE 1998**

SOURCE OF FUNDS	1997-98 Estimates \$	1997-98 Actual \$	Variation \$	1996-97 Estimates \$	1996-97 Actual \$	Variation \$
Opening Balance	0	1 335 432	1 335 432	0	929 205	929 205
Item 66 Amount provided for Recurrent Services for the year	29 722 000	32 169 000	2 447 000	26 441 000	25 790 000	-651 000
Amount authorised by other Statutes						
--Salaries and Allowances Act 1975	133 000	156 000	23 000	133 000	139 183	6 183
Item 160 Amount provided for Capital Services for the year	11 240 000	11 240 000	0	11 364 000	11 364 000	0
Retained Revenues--Section 23A Financial Administration and Audit Act	121 400 000	119 717 572	-1 682 428	124 917 000	130 659 425	5 742 425
Contributions from industry and other sources	20 170 000	30 596 797	10 426 797	13 087 000	28 160 805	15 073 805
Commonwealth recoups	200 000	741 396	541 396	2 137 000	206 197	-1 930 803
Income from national and recreation parks	3 000 000	3 869 569	869 569	2 230 000	3 641 841	1 411 841
<b>EXPENDITURE</b>	<b>185 865 000</b>	<b>199 825 766</b>	<b>13 960 766</b>	<b>180 309 000</b>	<b>200 890 656</b>	<b>20 581 656</b>
<b>RECURRENT</b>						
Minister's Office	0		0	375 000	713 037	338 037
Astronomical Services Program	749 000	748 134	-866	739 000	794 380	55 380
Nature Conservation Program	26 657 000	32 494 706	5 837 706	24 059 000	28 148 854	4 089 854
Forest Resources Management Program	122 536 000	128 128 567	5 592 567	122 921 000	130 530 774	7 609 774
Management for Tourism and Recreation Program	22 983 000	24 516 151	1 533 151	19 151 000	24 559 253	5 408 253
<b>Total Recurrent Expenditure</b>	<b>172 925 000</b>	<b>185 887 558</b>	<b>12 962 558</b>	<b>167 245 000</b>	<b>184 746 298</b>	<b>17 501 298</b>
<b>CAPITAL</b>						
Astronomical Services Program	0	0	0	124 000	110 191	-13 809
Nature Conservation Program	200 000	185 977	-14 023	200 000	17 841	-182 159
Forest Resources Management Program	10 760 000	10 528 887	-231 113	10 760 000	10 754 210	-5 790
Management for Tourism and Recreation Program	1 500 000	506 361	-993 639	1 500 000	1 691 906	191 906
Plant and Equipment	480 000	2 716 983	2 236 983	480 000	2 234 778	1 754 778
<b>Total Capital Expenditure</b>	<b>12 940 000</b>	<b>13 938 208</b>	<b>998 208</b>	<b>13 064 000</b>	<b>14 808 926</b>	<b>1 744 926</b>
<b>GRAND TOTAL</b>	<b>185 865 000</b>	<b>199 825 766</b>	<b>13 960 766</b>	<b>180 309 000</b>	<b>199 555 224</b>	<b>19 246 224</b>
<b>CLOSING BALANCE</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1 335 432</b>	<b>1 335 432</b>
<b>REVENUE</b>						
Territorial	178 000	24 887	-153 113	178 000	140 424	-37 576
Departmental	400 000	68 035	-331 965	380 000	370 692	-9 308
	<b>578 000</b>	<b>92 922</b>	<b>-485 078</b>	<b>558 000</b>	<b>511 116</b>	<b>-46 884</b>

## NOTES TO THE FINANCIAL STATEMENTS

## 1. DEPARTMENTAL OBJECTIVES AND FUNDING

## (a) Objectives and Funding

The mission of the Department of Conservation and Land Management is to conserve and manage Western Australia's wildlife and the lands, waters and resources entrusted to the Department for the benefit of present and future generations.

The Department is predominantly funded by Parliamentary appropriations and retained revenues from timber sales and other activities. It provides the programs as disclosed at Note 3. Prevailing market forces and Government policy determine the fees charged. The financial statements encompass all funds through which the Department controls resources to carry on its functions.

In the process of reporting on the Department as a single entity, all intra-entity transactions and balances have been eliminated.

## (b) Funds Held in Trust

The Department holds some moneys in a trust capacity. Where these moneys are used by the Department for the achievement of its objectives, the transactions are included in the financial statements.

Other moneys are held in an administrative capacity as performance deposits from contractors and payroll and taxation deductions from both employees and contractors.

## 2. SIGNIFICANT ACCOUNTING POLICIES

## (a) General

The financial statements constitute a general purpose financial report which has been prepared in accordance with Australian Accounting Standards and Urgent Issues Group (UIG) Consensus Views as applied by the Treasurer's Instructions. Several of these are modified by the Treasurer's Instructions to vary application, disclosure, format and wording. The Financial Administration and Audit Act and the Treasurer's Instructions are legislative provisions governing the preparation of financial statements and take precedence over Australian Accounting Standards and UIG Consensus Views. The modifications are intended to fulfil the requirements of general application to the public sector together with the need for greater disclosure and also to satisfy accountability requirements.

If any such modification has a material or significant financial effect on the reported results, details of that modification and where practicable, the resulting financial effects are disclosed in the notes to these financial statements.

## (b) Basis of Accounting

The financial statements have been prepared in accordance with Treasurer's Instruction 1101A and are based on the

provisions of Australian Accounting Standard AAS 29 'Financial Reporting by Government Departments' as if the relevant aspects were applicable to the department as an accounting standard.

The statements have been prepared on the accrual basis of accounting using historical cost accounting, with the exception of certain non-current assets that have been introduced at valuation. Additions to non-current physical assets since valuation are stated at cost.

## (c) Appropriations

Appropriations whether recurrent or capital are recognised as revenues in the period in which the Department gains control of the appropriated funds.

The Department gains control of appropriated funds at the time those funds are drawn down by the Department.

The Department operates under a Net Appropriation Agreement. This agreement pursuant to Section 23A of the Financial Administration and Audit Act, between the Treasurer and the Accountable Officer of the Department for the financial year ending 30 June 1998 provided for the retention of the following moneys received by the Department:

- Proceeds from contract of sale of forest products - Sections 88(1)(b) and 92(2) Conservation and Land Management Act
- Proceeds from sale of land assets
- Proceeds from the disposal of equipment and non-real property
- Certain minor fees and charges

The moneys received and retained are to be applied to the Department's Output Groups as specified in the budget statements for the financial year, and for the purposes of:

- (i) in respect to the revenue from the sale of land assets, to Salinity Eutrophication Amelioration Commercial Afforestation and/or reduce loan liabilities; and
- (ii) in respect of other revenue sources, to be applied in the first instances to the purposes and functions authorised by the Conservation and Land Management Act and to apply surpluses over and above this requirement to the retirement of debt.

Disclosure of the information requirements of Treasurer's Instruction 952 (10) is to be found in the Statement of Appropriations and Revenue Estimates.

## (d) Depreciation of Non-Current Assets

Depreciation has been provided for on a straight-line basis, using rates which are reviewed annually. Major depreciation periods are:

• Buildings	20 - 40 years
• Furniture	10 years
• Office equipment	6 - 7 years
• Computer equipment	4 years
• Aircraft	5 - 6 years
• Boats	5 years
• Plant and machinery	5 - 10 years
• Heavy fleet vehicles	5 years
• Recreation/Tourism assets	10 - 20 years

## (e) Valuation of Assets

*Timber and Infrastructure Valuation*

The estimated commercial value of timber and infrastructure has been brought into the Statement of Financial Position for the first time for the 1997/98 financial year. Pending the release of an Australian Accounting Standard addressing the accounting treatment of Self-Generating and Regenerating Assets, the valuation proposals of Exposure Draft 83 have been followed. A Net Present Value method has generally been used to estimate the commercial value of the cash flows expected to be generated by the sustainable yield, standing timber and supporting infrastructure in native forests, plantations and sandalwood on Crown land. The Department's rights in Pinus pinaster sharefarming contracts have been initially valued on an historic cost basis due to the young age of these plantings to reflect most accurately their current market value. The Department's rights in bluegum and pine sharefarming contracts in the Albany region have been valued on a market value basis as tenders were called in 1997/98 offering these rights for sale. Non-commercial values are not accounted for in timber valuations determined using Exposure Draft 83.

*Land Valuation*

Crown land in the conservation estate and vested State Forest is valued in the Government Property Register by the Valuer General on an adjusted unimproved rural land value basis. The Valuer General revalued this Crown land during the 1997/98 financial period and the revised values have been included in the Statement of Financial Position as provided by Treasurer's Instruction 1103.

Crown land is reserved for or held by the Department for the conservation and land management purposes prescribed by the Conservation and Land Management Act 1984. Section 17(7) of the Act provides that should the land no longer be reserved or held for these purposes the land shall become Crown land within the meaning of the Land Administration Act 1997 and thus would no longer be vested in the Department. Therefore land of this nature cannot be liquidated by the Department to meet liabilities or fund activities.

The value of land including land in Nature Reserves, National Parks and State Forest has been ascribed to the Nature Conservation Program in the 1997/98 Program Schedule of Assets and Liabilities. In previous years land was allocated

in the Program Schedule of Assets and Liabilities on the basis of tenure. The change in allocation reflects the inherent nature and value of the conservation estate underlying assets now separately reported and the introduction of output based management.

The commercial values of timber and of recreation and tourism facilities standing on the land are reported separately from the Valuer General's land valuation.

## (f) Recognition of Revenue

The Department's general policy is to recognise revenue when an invoice is issued.

Other revenues such as proceeds from the sale of motor vehicles, land sales and miscellaneous revenue are recognised at the time of receipt.

## (g) Leases

The Department has entered into operating lease agreements for buildings, office equipment and motor vehicles where the lessors effectively retain all of the risks and benefits incidental to ownership of the items held under the operating leases. Equal instalments of the lease payments are charged to the operating statement over the lease term as this is representative of the pattern of benefits to be derived from the leased property.

The Department had no finance lease commitments during 1997-98.

## (h) Inventories

Inventories have been valued at the lower of cost and net realisable value.

## (i) Employee Entitlements

*Annual and long service leave*

Employee entitlements are calculated at current remuneration rates. A liability for long service leave is recognised after an officer has completed four years service of a seven year long service leave term and six years service of a ten year long service leave term.

The provisions of Australian Accounting Standard AAS30 'Accounting for Employee Entitlements' have been complied with.

In respect to long service leave this has not been discounted as the Department believes that the application of discount factors and ancillary changes to the non current long service leave liability is likely to have an insignificant impact on the financial results.

The Department has carried out an exercise based on AAS30. The figure calculated was found to be not materially different from the figures described in these statements.



*Superannuation*

The contributions made to superannuation funds are charged against net income from services.

Staff contribute to the Superannuation and Family Benefits Act Scheme (a pension scheme closed to new entrants) or the Gold State Employees Superannuation Scheme (a lump sum benefit scheme also closed to new entrants) which are both defined benefit schemes. All staff who do not contribute to either of these schemes become non contributory members of the West State Superannuation Scheme, an accumulation fund complying with the Commonwealth Government's Superannuation Guarantee (Administration) Act 1992. The Department is responsible for employer contributions under both lump sum schemes.

Employer contributions have been paid to the Gold State Superannuation Scheme since the inception of the scheme in 1987.

The statements include the Department's contributions plus the increase in the unfunded liability assumed by the Treasurer for pre 1987 service for current employees in the Gold State Superannuation Scheme.

The total unfunded liability assumed by the Treasurer for current employees in the Gold State Superannuation Scheme for pre 1987 service is \$16.5M.

The total unfunded liability assumed by the Treasurer in respect for pensions that will be payable to current employees when they retire is \$2.28M

The superannuation expense does not include payment of pensions to former employees who have retired as this does not constitute part of the cost of services provided by the Department in the current year.

(j) Financial Instruments – Accounts Receivable, Accounts Payable, Accrued Salaries, Accrued Logging Costs, and other accrued expenses

Accounts Receivable are carried at the amounts due less any provision for doubtful debts. Provision for doubtful debts is recognised to the extent that recovery of the outstanding debts is considered less than likely. Settlement terms are 30 days. The Department charges 15% interest on overdue debts.

Accounts Payable (including accrued logging costs) in commercial operations are normally settled on 30 day terms reflecting general contract requirements in the timber industry. 30 day terms are also applied to general creditor payments or shorter terms may be applied where discounts are made available. Obligations to creditors, including accruals not yet billed, are recognised as amounts to be paid in the future for goods and services received, whether or not an invoice has been received prior to balance date.

Accrued salaries in suspense (\$806,000 – see note 15) consists of amounts paid annually into a suspense account at Treasury over a period of 10 financial years to largely meet the additional cash outflow in each eleventh year when 27 pay days occur in that year instead of the normal 26. No interest is received on this account.

Accrued salaries/wages represents the amount due to staff but unpaid at the end of financial year, as the end of the last pay period for that financial year does not coincide with the end of the financial year.

Restricted funds consist of cash deposits lodged with the Department by contractors pending satisfactory performance of the contract and collections for the Australian Tax Office under the PAYE and Prescribed Payments systems. The contractor's deposits are invested with the Reserve Bank at the same interest rate as the Department's other cash balances (see note 15) with the proceeds from the investment being returned to the contractor together with the deposit on completion of the contract. The Tax Office collections are forwarded to that organisation within 7 days of their collection.

(k) Net Fair Values of Financial Assets and Liabilities

Net fair values of financial instruments (as disclosed in the financial statements) are determined on the following bases:

Monetary financial assets and liabilities not traded in an organised financial market – cost basis carrying amounts of debtors, accounts payable, and accruals (which approximate net market value):

Fixed rate borrowings and leave liabilities – current risk adjusted market rates.

(l) Amendments to 1996–97 financial statements

Presentation enhancements to the current year's financial statements have resulted in a number of adjustments to the comparative figures presented in the 1996–97 financial statements :

(i) Administration Expenses / Other Expenses

Loan Guarantee Fees previously accounted for under 'Administration Expenses' are now accounted for under 'Other Expenses' and the 1996–97 comparative figures have been adjusted by \$142 000 accordingly.

(ii) Accommodation / Other Expenses

Water, Sewerage and Drainage expenses previously accounted for under 'Other Expenses' are now accounted for under 'Accommodation Expenses' and the 1996–97 comparative figures have been adjusted by \$114 000 accordingly.

The net effect of (i) and (ii) is to increase 'Other Expenses' by \$28,000.

## 3. PROGRAMS OF THE DEPARTMENT

The objectives of each program undertaken by the Department during the reporting period are:

**Nature Conservation**

To conserve indigenous plants, animals and ecological processes in natural habitats throughout the lands and waters of the State.

**Forest Resources Management**

To sustain, regulate and profitably manage the forest resources entrusted to the Department in ways compatible with conservation and other management objectives.

**Management for Tourism and Recreation**

To identify, provide and maintain opportunities and services to the community which allows them to enjoy the wildlife, lands, waters and resources entrusted to the Department without compromising conservation and other management objectives.

**Astronomical Services**

To meet the demand for general and specialised up to date astronomical information and services from the public, business and educational community while furthering scientific research in astronomy in conjunction with other observatories and local tertiary institutions.

Information about the expenses, revenues, assets and liabilities are set out in the Program Schedules.

	1997-98 (\$ 000)	1996-97 (\$ 000)
<b>4. SALARIES AND WAGES</b>		
Salaries and Wages	57 657	53 854
Change in Annual and Long Service leave entitlements	1 727	1 364
	<u>59 384</u>	<u>55 218</u>
<b>5. INTEREST</b>		
WA Treasury Corporation	9 620	10 299
Commonwealth Dept. of Finance	59	162
	<u>9 679</u>	<u>10 461</u>
<b>6. ADMINISTRATION</b>		
Administration expenses for the reporting period include :		
Resources received free of charge	696	991
Bad debts	28	4
Telephones postage communications	2 052	1 978
Travel expenses	1 731	1 911
Other	1 701	1 597
	<u>6 208</u>	<u>6 481</u>

1997-98  
(\$ 000)

1996-97  
(\$ 000)

## 7. OTHER OPERATING EXPENSES

Other operating expenses for the reporting period include :

Maintenance costs	2 319	2 911
Operating lease costs	8 750	6 731
Materials	21 774	9 407
Services and contracts	23 879	18 371
Forest management work	485	2 295
Other	85	5 528
	<u>57 292</u>	<u>45 242</u>

## 8. NET (LOSS) / PROFIT ON SALE OF ASSETS

Land	(42)	-
Motor Vehicles & Vessels	124	(1 050)
Plant & Equipment	(44)	(298)
	<u>38</u>	<u>(1 348)</u>

## 9. ROYALTIES AND TIMBER SALES

Hardwood royalties	32 399	36 264
Softwood stumpages	17 171	12 337
Sandalwood sales	8 352	7 530
Hardwood logging cost recovery	42 335	46 377
Softwood logging cost recovery	19 224	14 312
	<u>119 481</u>	<u>116 820</u>

## 10. RECOUPABLE WORKS

Sharefarming income	14 183	12 707
Other recoups	8 454	7 957
	<u>22 637</u>	<u>20 664</u>

## 11. OTHER REVENUE

Mining compensation	3 593	2 781
Sale of publications	694	615
Proceeds from nurseries	2 335	1 215
Royalties and fees	93	522
Other revenues	967	831
	<u>7 682</u>	<u>5 963</u>

## 12. APPROPRIATIONS

Consolidated Fund		
Recurrent	32 169	25 790
Capital Works	11 240	11 364
Salaries & Allowances Tribunal	156	139
	<u>43 565</u>	<u>37 293</u>

## 13. RESOURCES RECEIVED FREE OF CHARGE

Resources received free of charge have been determined on the basis of the following estimates provided by agencies:

Office of the Auditor General	160	180
Treasury Department	17	120
Department of Land Administration	286	690
State Repository	1	1
Contract & Management Services	232	-
	<u>696</u>	<u>991</u>

	1997-98 (\$ 000)	1996-97 (\$ 000)
<b>14. GRANTS - STATE</b>		
Commissioner of Main Roads	947	545
Other	1 002	224
	<u>1 949</u>	<u>769</u>
<b>15. CASH AND AMOUNTS IN SUSPENSE</b>		
Cash on hand (CALM Fund)	10 264	9 616
Petty Cash	40	37
Lane Poole Memorial Trust	13	13
Cash in suspense	20	371
Accrued Salaries Suspense Account	806	585
	<u>11 143</u>	<u>10 622</u>
<p>All cash balances are invested with the Reserve Bank on call at competitive rates of interest. For 1997-98 the rate of interest declined steadily from 6.327% for the 2 months to August 1997 to 5.414% for the quarter to May 1998 reflecting market conditions.</p>		
<b>16. RESTRICTED FUNDS</b>		
Contractors' Deposits	1 533	1 255
Payroll Deductions	596	573
Withholding Tax	7	5
	<u>2 136</u>	<u>1 833</u>
<b>17. RECEIVABLES</b>		
Receivables	20 504	17 467
Less provision for doubtful debts	(200)	(200)
	<u>20 304</u>	<u>17 267</u>
<p>The major debtor category was log buyers (sawmills) representing \$M14.935 at 30 June 1998.</p>		
<b>18. INVENTORIES</b>		
Publications	1 154	868
Nursery stock	2 287	2 733
Sandalwood	2 235	1 696
Timber technology stocks	299	293
	<u>5 975</u>	<u>5 589</u>
<b>19. PREPAYMENTS</b>		
Motor vehicle licences & insurance	249	171
Accommodation	5	5
Administration	3	4
Asset Purchases	14	-
Other	52	37
	<u>323</u>	<u>219</u>

	1997-98 (\$ 000)	1996-97 (\$ 000)
<b>20. NON CURRENT ASSETS</b>		
Land - at valuation 1 July 1997 a.)	<u>2 233 168</u>	<u>1 311 786</u>
Timber and Infrastructure at valuation 30 June 1998 b.)		
Native Forest Standing Timber and Infrastructure	190 391	-
Standing Sandalwood	69 004	-
Plantations and Infrastructure	193 426	-
	<u>452 821</u>	
Timber and Infrastructure at cost b.)		
Maritime Pine	3 779	-
	<u>3 779</u>	
Buildings at valuation 1996-97 and 1997-98	19 901	17 508
less : Accumulated depreciation	(1 062)	(127)
	<u>18 839</u>	<u>17 381</u>
Buildings at cost	3 039	2 476
less : Accumulated depreciation	(211)	(81)
	<u>2 828</u>	<u>2 394</u>
Plant and Equipment at valuation 1996 c.)	7 107	7 343
less : Accumulated depreciation	(4 906)	(3 878)
	<u>2 201</u>	<u>3 465</u>
Plant and Equipment at cost c.)	13 517	10 651
less : Accumulated depreciation	(4 374)	(2 417)
	<u>9 143</u>	<u>8 234</u>
Vehicles at cost	10 859	9 943
less : Accumulated depreciation	(5 314)	(3 810)
	<u>5 545</u>	<u>6 133</u>
Work In Progress	447	129
Total Property Plant and Equipment	<u>39 003</u>	<u>37 736</u>
Recreation and Tourism Facilities at valuation d.)	57 426	-
less : Accumulated depreciation	(3 160)	-
	<u>54 266</u>	

a.) Land

The Valuer General's Office provided a revised land valuation of all land under the Department's control as at 1 July 1997 and this valuation, plus the value of land purchased, less the value of land sold since then has been used for 30 June 1998.

Land was valued on an adjusted unimproved basis. Refer to note 2 (e) for accounting policies on Land valuation



	1997-98 (\$ 000)	1996-97 (\$ 000)		1997-98 (\$ 000)	1996-97 (\$ 000)
b.) Timber and Infrastructure			22. EMPLOYEE ENTITLEMENTS		
This is the first year that these assets have been included in the financial statements.			Current		
Refer to the note 2 (e) for the basis for valuation.			Provision for annual leave		
Infrastructure includes roads, bridges, dams and firebreaks.			Provision for long service leave		
			<u>11 208</u>		
			<u>9 457</u>		
			Non current		
			Provision for long service leave		
			<u>2 107</u>		
			<u>2 333</u>		
c.) Plant and equipment			23. EQUITY		
Plant and equipment has been brought to account at cost.			Equity represents the residual interest in the net assets of the Department. The Government holds the equity interest in the Department on behalf of the community.		
Where cost amounts were not known at the time of implementing reporting on an accrual basis they have been brought to account at independent valuation.			(a) Accumulated Surplus/(Deficit)		
			Balance at the beginning of the year		
			(59 269)		
			(62 262)		
			Change in net assets resulting from operations		
			3 937		
			2 993		
			Initial takeover of Forestry assets		
			456 600		
			Initial takeover of Recreation and Tourism assets		
			57 426		
			<u>458 694</u>		
			<u>(59 269)</u>		
			(b) Reserves		
			Asset Revaluation Reserve		
			Balance at beginning of year		
			1 327 916		
			1 314 707		
			Increase resulting from initial application of AAS 29		
			13 209		
			Revaluation of land during year		
			920 301		
			<u>2 248 217</u>		
			<u>1 327 916</u>		
21. BORROWINGS			24. RECONCILIATION OF NET CASH USED IN OPERATING ACTIVITIES TO NET COST OF SERVICES		
Current			(a) For the purposes of the statement of cash flows cash includes cash at bank and cash equivalents as shown in note 15.		
Commonwealth Dept. of Finance			(b) Net cash (used in) operating activities		
115			Statement of Cash Flows		
132			30 851		
4 085			34 797		
4 425			Depreciation		
<u>4 200</u>			7 709		
<u>4 557</u>			4 793		
Non-Current			Superannuation Liability Assumed by Treasurer		
Commonwealth Dept. of Finance			1 116		
763			222		
WA Treasury Corporation			1 727		
83 358			1 364		
<u>84 121</u>			(249)		
<u>89 939</u>			(702)		
			Accrued interest		
			(228)		
			(1 083)		
			Other accrued expenditure		
			3 809		
			(7 333)		
			Net profit on sale of assets		
			38		
			1 348		
			Other accrued revenue		
			(3 333)		
			<u>2 107</u>		
			Net Cost of Services		
			41 440		
			<u>35 513</u>		
			(Operating Statement)		
			<u>41 440</u>		
			<u>35 513</u>		



Consequently large variations can occur between the estimates and the actual amount received.

Commonwealth Recoups are grants provided by the Commonwealth Government mainly for wildlife and other research projects. Opportunities for these grants arise during the year and amounts involved are not easily predicted. They do not bear any comparison in dollar terms to previous years.

Under the Net Appropriation agreement CALM's expenditure program is reliant on revenue collected. Consequently any variation to revenue collected is reflected in the expenditure programs of the Department.

#### SIGNIFICANT VARIATIONS TO BUDGET

Significant variations are considered to be those greater than 10% of budget.

#### RECURRENT EXPENDITURE

##### *Nature Conservation and Forest Resources Management Programs*

These programs were over budget by \$5.8M and \$5.6M respectively.

The main reason for this was expenditure funded by additional external funds as indicated against the 'Contributions from Industry and other Sources' and 'Commonwealth Recoups' items.

In addition supplementary funds of \$2.447M were approved for CALM to offset the unusually high expenditure of over \$4M incurred on wildfire suppression and, by way of re-appropriating sundry land sales.

#### CAPITAL EXPENDITURE

##### *Management for Tourism and Recreation Program*

Planned work on recreation facilities at Peron Homestead and Moora were unable to be completed within the financial year resulting in a saving of \$0.4M. Other savings within this program were reallocated to meet other Departmental priorities. These measures also accounted for the variation to the 1996-97 out-turns.

##### *Plant and Equipment*

The original estimate of \$480,000 is not consistent with the accounting policy of capitalising asset purchases over \$1 000 in value with an economic life of at least 2 years.

A majority of asset purchases in the past had been made from the Recurrent Account and the statements now reflect this change. Corresponding changes to the Treasury Estimates were omitted in the budget process.

#### SIGNIFICANT VARIATIONS TO 1996-97 OUT-TURNS

##### *Salaries and Wages*

The \$4.166M increase is mainly due to overtime payments of \$2M above normal due to wildfires and an increase of \$1.5M for employee leave entitlements.

The balance is due to the full year flow on effect of pay increases granted during the 1996-97 financial year.

##### *Interest*

The \$0.8M drop in interest payments is the benefit of the Department's debt repayment program and decline in interest rates.

##### *Depreciation*

The increase is the result of including Recreation and Tourism assets for the first time.

##### *Other Operating Expenses*

A number of factors contributed to the increase of \$12M in expenditure on this item:

An increase in Operating lease costs of \$2M as mentioned in note 30.

An increase in Commonwealth Grants of \$6M and State Grants of \$1M resulting in a corresponding increase in expenditure on contracts and materials.

Refer to note 31 regarding these increases.

Materials for 1996-97 were abnormally low because of an incorrect adjustment for inventories at the beginning of the year.

Forest management work that relates to Maritime Pine planting has now been capitalised resulting in a reduction in operating expenses refer note 2(e)

Other - The reduction of \$5M in this figure represents more accurate costing of expenses which is reflected in the increases for materials and services and contracts items.





## Auditor General

To the Parliament of Western Australia

### DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT FINANCIAL STATEMENTS FOR THE YEAR ENDED JUNE 30, 1998

#### Scope

I have audited the accounts and financial statements of the Department of Conservation and Land Management for the year ended June 30, 1998 under the provisions of the Financial Administration and Audit Act 1985.

The Executive Director is responsible for keeping proper accounts and maintaining adequate systems of internal control, preparing and presenting the financial statements, and complying with the Act and other relevant written law. The primary responsibility for the detection, investigation and prevention of irregularities rests with the Executive Director.

My audit was performed in accordance with section 79 of the Act to form an opinion based on a reasonable level of assurance. The audit procedures included examining, on a test basis, the controls exercised by the Department to ensure financial regularity in accordance with legislative provisions, evidence to provide reasonable assurance that the amounts and other disclosures in the financial statements are free of material misstatement and the evaluation of accounting policies and significant accounting estimates. These procedures have been undertaken to form an opinion as to whether, in all material respects, the financial statements are presented fairly in accordance with applicable Accounting Standards, other mandatory professional reporting requirements (Urgent Issues Group Consensus Views) and the Treasurer's Instructions.

The audit opinion expressed below has been formed on the above basis.

#### Audit Opinion

In my opinion,

- (i) the controls exercised by the Department of Conservation and Land Management 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 Operating Statement, Statement of Financial Position, Statement of Cash Flows, Program Schedules and Statement of Appropriations and Revenue Estimates and the Notes to and forming part of the financial statements are based on proper accounts and present fairly in accordance with applicable Accounting Standards, other mandatory professional reporting requirements and the Treasurer's Instructions, the transactions for the year ended June 30, 1998 and the financial position at that date.

D D R PEARSON  
AUDITOR GENERAL  
August 31, 1998

# APPENDICES

## 1997-98

1. Trend in the Area of Native Forest Harvested .....	79
2. Areas of Even-Aged Karri Regeneration .....	80
3. Area of State-Owned Coniferous Plantations .....	81
4. Area of State-Owned Broadleaved Plantations .....	82
5. Trends in Log Production .....	82
6. Trend in Chiplog Production .....	83
7. Trends in the Production and Use of Sawn Timber .....	84
8. Trend for WA Overseas Imports & Exports of Forest Produce .....	84
9. Offences Under the CALM Act and Forest Management Regulations .....	85
10. Area of Prescribed Burns 1989-90 to 1995-96 .....	85
11. Number of Wildfires and Areas by Land Categories .....	86
12. Area and Number of Wildfires .....	86
13. Purpose for Prescribed Burning by Forest Region .....	87
14. Number of Prescribed Burns Conducted in Native Forests .....	87
15. Wildlife Licences Issued in 1997-99 .....	88
16. Summary of Damage Licences Issued in 1997-98 .....	89
17. Offences Under the Wildlife Conservation Act and Regulations .....	89
18. Publications .....	90

### APPENDIX 1 TREND IN THE AREA OF NATIVE FOREST HARVESTED

	Jarrah Forest	Jarrah/Wandoo Forest	Karri Forest	
	ha	ha	Clearfelled or cut to seed trees ha	Thinned ha
1976-77	32 320	1 170	2 610	-
1977-78	26 020	740	4 450	-
1978-79	25 540	530	2 710	-
1979-80	25 150	860	2 110	60
1980-81	22 930	1 440	2 080	180
1981-82	24 680	610	2 180	320
1982-83	23 740	330	990	190
1983-84	21 540	580	1 490	260
1984-85	20 010	1 440	2 360	500
1985-86	22 640	650	1 590	340
1986	19 340	1 150	1 090	490
1987	17 180	1 380	1 310	700
1988	23 400	490	1 180	840
1989	15 130	200	1 510	910
1990	12 960	100	1 560	340
1991	10 910	-	1 920	230
1992	13 990	30	1 540	310
1993	14 250	40	1 630	80
1994	14 050	50	1 440	-
1995	17 830	30	2 410	-
1996	22 320	50	1 300	60
1997	18 240	60	1 870	60

**APPENDIX 2  
AREAS OF EVEN-AGED KARRI REGENERATION**

Year of Regeneration Area (ha)	Multiple Use Forest		Conservation Forest		Totals	
	Annual Total (ha)	Cumulative Area (ha)	Annual Total (ha)	Cumulative Area (ha)	Annual Total (ha)	Cumulative (ha)
Before 1900	60	60	1 200	1 200	1 260	1 260
1900-09	-	60	-	1 200	-	1 260
1910-19	140	200	30	1 230	170	1 430
1920-29	170	370	50	1 280	220	1 650
1930-39	5 800	6 170	460	1 740	6 260	7 910
1940-49	710	6 880	460	2 200	1 170	9 080
1950-59	560	7 440	160	2 360	720	9 800
1960-65	230	7 670	-	2 360	230	10 030
1966	160	7 830	-	2 360	160	10 190
1967	210	8 040	80	2 440	290	10 480
1968	690	8 730	130	2 570	820	11 300
1969	1 290	10 020	310	2 880	1 600	12 900
1970	80	10 100	-	2 880	80	12 980
1971	80	10 180	10	2 890	90	13 070
1972	1 110	11 290	1 380	4 270	2 490	15 560
1973	190	11 480	-	4 270	190	15 750
1974	140	11 620	30	4 300	170	15 920
1975	630	12 250	430	4 730	1 060	16 980
1976	1 770	14 020	50	4 780	1 820	18 800
1977	1 630	15 650	220	5 000	1 850	20 650
1978	1 630	17 280	310	5 310	1 940	22 590
1979	1 920	19 200	310	5 620	2 230	24 820
1980	2 090	21 290	120	5 740	2 210	27 030
1981	2 950	24 240	300	6 040	3 250	30 280
1982	2 310	26 550	150	6 190	2 460	32 740
1983	1 930	28 480	370	6 560	2 300	35 040
1984	1 750	30 230	470	7 030	2 220	37 260
1985	2 400	32 630	-	7 030	2 400	39 660
1986	1 910	34 540	-	7 030	1 910	41 570
1987	1 110	35 650	-	7 030	1 110	42 680
1988	1 460	37 110	-	7 030	1 460	44 140
1989	1 110	38 220	-	7 030	1 110	45 250
1990	1 300	39 520	-	7 030	1 300	46 550
1991	1 270	40 790	-	7 030	1 270	47 820
1992	1 400	42 190	-	7 030	1 400	49 220
1993	1 930	44 120	-	7 030	1 930	51 150
1994	2 300	46 420	-	7 030	2 300	53 450
1995	1 530	47 950	-	7 030	1 530	54 980
1996	1 560	49 510	-	7 030	1 560	56 540
1997	1 570	51 080	-	7 030	1 570	58 110
<b>Totals</b>	<b>51 080</b>	<b>51 080</b>	<b>7 030</b>	<b>7 030</b>	<b>58 110</b>	<b>58 110</b>



**APPENDIX 3**  
**AREA OF STATE-OWNED CONIFEROUS PLANTATIONS AS AT 31-12-97**

Planting Year	Pinus Radiata			Pinaster & Other Species			All Species	
	First Rotation (ha)	Replanted Areas (ha)	Cumulative Total (ha)	First Rotation (ha)	Replanted Areas (ha)	Cumulative Total (ha)	Year Total (ha)	Cumulative Total (ha)
<1959	341	(2)	341 (2)	3 467	7	3 474	3 815 (2)	3 815 (2)
1959	28	-	369 (2)	260	-	3 734	288 -	4 103 (2)
1960	66	-	435 (2)	315	-	4 049	381 -	4 484 (2)
1961	43	-	478 (2)	436	-	4 485	479 -	4 963 (2)
1962	85	-	563 (2)	397	-	4 882	482 -	5 445 (2)
1963	114	-	677 (2)	302	-	5 184	416 -	5 861 (2)
1964	271	-	948 (2)	583	9	5 776	863 -	6 724 (2)
1965	236	-	1 184 (2)	455	-	6 231	691 -	7 415 (2)
1966	448	-	1 632 (2)	736	-	6 967	1 184 -	8 599 (2)
1967	561	-	2 193 (2)	931	-	7 898	1 492 -	10 091 (2)
1968	636	-	2 829 (2)	1 273	-	9 171	1 909 -	12 000 (2)
1969	944	(4)	3 773 (6)	1 478	2	10 651	2 424 (4)	14 424 (6)
1970	992	(9)	4 766 (16)	1 260	-	11 911	2 252 (9)	16 677 (16)
1971	920	(10)	5 685 (25)	833	-	12 744	1 753 (10)	18 429 (25)
1972	1 013	(104)	6 698 (31)	685	-	13 429	1 698 (6)	20 127 (31)
1973	1 193	(67)	7 927 (98)	547	-	13 976	1 776 (67)	21 903 (98)
1974	1 464	(6)	9 394 (203)	333	-	14 309	1 799 (104)	23 703 (203)
1975	1 297	(27)	10 691 (230)	1 239	-	15 548	2 536 (27)	26 239 (230)
1976	1 481	(86)	12 172 (316)	1 124	-	16 672	2 605 (86)	28 844 (316)
1977	1 358	(6)	13 534 (322)	864	-	17 536	2 226 (6)	31 070 (322)
1978	2 013	(9)	15 556 (330)	455	-	17 991	2 478 (9)	33 547 (330)
1979	1 419	(5)	17 349 (335)	556	-	18 547	2 349 (5)	35 896 (335)
1980	1 501	-	18 863 (335)	901	-	19 448	2 415 -	38 311 (335)
1981	1 355	-	20 332 (335)	876	5	20 329	2 350 -	40 661 (335)
1982	1 393	-	21 801 (335)	480	6	20 815	1 955 -	42 616 (335)
1983	1 308	-	23 157 (335)	674	-	21 489	2 030 -	44 646 (335)
1984	1 836	-	24 996 (335)	512	9	22 010	2 360 -	47 006 (335)
1985	1 674	(22)	26 795 (358)	480	2	22 492	2 280 (22)	49 287 (358)
1986	1 051	-	27 846 (358)	487	-	22 979	1 538 -	50 825 (358)
1987	1 434	(747)	29 439 (1 105)	670	76	23 725	2 339 (747)	53 164 (1 105)
1988	1 911	(1 481)	31 490 (2 585)	221	-	23 946	2 273 (1 481)	55 436 (2 585)
1989	944	(391)	32 867 (2 976)	-	43	23 989	1 420 (391)	56 856 (2 976)
1990	745	(600)	33 979 (3 576)	-	6	23 995	1 118 (600)	57 974 (3 576)
1991	1 323	(1 206)	35 840 (4 783)	5	16	24 016	1 881 (1 206)	59 856 (4 783)
1992	1 782	(1 769)	38 190 (6 552)	131(118)	342	24 489 (118)	2 824 (1 888)	62 679 (6 670)
1993	746	(661)	39 940 (7 213)	-	296	24 785 (118)	2 046 (661)	64 725 (7 331)
1994	275	(275)	40 915 (7 488)	-	182	24 967 (118)	1 157 (275)	65 882 (7 606)
1995	65	(33)	42 110 (7 521)	266(266)	150	25 383 (384)	1 611 (299)	67 493 (7 905)
1996	7	-	43 414 (7 521)	647(647)	37	26 068(1 032)	1 988 (647)	69 482 (8 553)
1997	100	-	44 643 (7 521)	1 183(1 183)	107	27 358(2 215)	2 519 (1 183)	72 001 (9 736)
<b>TOTAL</b>	<b>36 374</b>	<b>(7 521)</b>	<b>44 643 (7 521)</b>	<b>26 063(2 215)</b>	<b>1 295</b>	<b>27 358 (2 215)</b>	<b>72 001 (9 736)</b>	<b>72 001 (9 736)</b>

Areas shown in brackets have been established under sharefarm agreements. They are included in the totals.

**APPENDIX 4  
AREA OF STATE-MANAGED BROADLEAVED PLANTATIONS  
AS AT 31-12-97**

PLANTING YEAR	CALM-OWNED		CALM-MANAGED		TOTAL			
	<i>E. globulus</i> (ha)	Other Eucs. (ha)	Owned by other Govt.	Privately owned	Year Total		Cumulative Total	
			<i>E. globulus</i> (ha)	<i>E. globulus</i> (ha)	<i>E. globulus</i> (ha)	Other Eucs. (ha)	<i>E. globulus</i> (ha)	Other (ha)
<1987	31	6 790 (0)	502	0	533	6 790	533	6 790
1987	0	67 (0)	58	0	58	67	591	6 857
1988	1 421 (1 417)	23 (0)	24	0	1 445	23	2 036	6 880
1989	2 864 (2 847)	5 (0)	25	0	2 890	5	4 925	6 885
1990	443 (389)	24 (0)	78	44	565	24	5 490	6 909
1991	693 (689)	69 (0)	66	0	759	69	6 249	6 978
1992	1 076 (1 067)	4 (1)	66	0	1 142	4	7 391	6 982
1993	382 (357)	0 (0)	66	1 372	1 821	0	9 212	6 982
1994	81 (81)	0 (0)	21	1 855	-1 958	0	11 170	6 982
1995	6 (3)	0 (0)	4	3 567	3 577	0	14 747	6 982
1996	0 (0)	0 (0)	0	6 324	6 324	0	21 071	6 982
1997	37 (37)	0 (0)	0	6 501	6 538	0	27 609	6 982
<b>Total</b>	<b>7 035 (6 888)</b>	<b>6 982 (1)</b>	<b>911</b>	<b>19 664</b>	<b>27 609</b>	<b>6 982</b>	<b>27 609</b>	<b>6 982</b>

*Plantation areas have been adjusted to account for areas harvested, replanting and renegotiations of plantation boundaries. Areas in brackets have been established under sharefarm agreements. They are included in the total.*

**APPENDIX 5  
TRENDS IN LOG PRODUCTION**

Year Ended 30 June	HARDWOOD			SOFTWOOD			TOTAL		
	Crown Land	Private Property	Total	Crown Land	Private Property	Total	Crown Land	Private Property	Total
	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )
1829-1916*									18 783 700
1917-1969							46 841 700	15 844 500	62 686 200
1970	1 040 100	174 170	1 214 270	81 280	1 500	82 780	1 121 380	175 670	1 297 050
1971	1 058 910	160 400	1 219 310	86 250	1 590	87 840	1 145 160	161 990	1 307 150
1972	1 005 480	105 680	1 111 160	90 760	1 310	92 070	1 096 240	106 990	1 203 230
1973	959 940	101 980	1 061 920	100 420	1 010	101 430	1 060 360	102 990	1 163 350
1974	961 070	90 710	1 051 780	123 390	1 170	124 560	1 084 460	91 880	1 176 340
1975	967 270	87 890	1 055 160	129 090	60	129 150	1 096 360	87 950	1 184 310
1976	1 089 100	111 760	1 200 860	105 570	-	105 570	1 194 670	111 760	1 306 430
1977	1 308 630	106 520	1 415 150	120 860	330	121 190	1 429 490	106 850	1 536 340
1978	1 319 910	118 030	1 437 940	125 550	1 680	127 230	1 445 460	119 710	1 565 170
1979	1 312 570	123 540	1 436 110	176 940	6 130	183 070	1 489 510	129 670	1 619 180
1980	1 390 660	160 240	1 550 900	191 360	4 830	196 190	1 582 020	165 070	1 747 090
1981	1 391 960	158 980	1 550 940	201 550	2 990	204 540	1 593 510	161 970	1 755 480
1982	1 218 750	112 990	1 331 740	173 480	14 830	188 310	1 392 230	127 820	1 520 050
1983	1 049 180	97 290	1 146 470	176 620	5 650	182 270	1 225 800	102 940	1 328 740
1984	1 134 760	131 360	1 266 120	198 280	3 560	201 840	1 333 040	134 920	1 467 960
1985	1 290 010	169 930	1 459 940	225 950	18 040	243 990	1 515 960	187 970	1 703 930
1986	1 331 830	127 010	1 458 840	247 640	29 120	276 760	1 579 470	156 130	1 735 600
1987	1 338 700	158 860	1 497 560	266 770	24 830	291 600	1 605 470	183 690	1 789 160
1988	1 427 620	174 520	1 602 140	302 450	31 160	333 610	1 730 070	205 680	1 935 750
1989	1 432 530	135 380	1 567 910	318 530	56 750	375 280	1 751 060	192 130	1 943 190
1990	1 319 250	80 560	1 399 810	312 520	105 860	418 380	1 631 770	186 420	1 818 190
1991	1 170 230	116 580	1 286 810	301 250	85 640	386 890	1 471 480	202 220	1 673 700
1992	1 247 730	120 560	1 368 290	363 420	85 410	448 830	1 611 150	205 970	1 817 120
1993	1 258 250	116 070	1 374 320	412 540	94 660	507 200	1 670 790	210 730	1 881 520
1994	1 261 130	88 940	1 350 070	509 390	115 220	624 610	1 770 520	204 160	1 974 680
1995	1 406 840	102 340	1 509 180	578 850	146 710	725 560	1 985 690	249 050	2 234 740
1996*	1 369 510	136 220	1 505 730	564 290	211 150	775 440	1 933 800	347 370	2 281 170
1997	1 308 140	104 760	1 412 900	586 950	176 880	763 830	1 895 090	281 640	2 176 730
1998**	1 365 792	116 825	1 482 617	618 162	187 627	805 789	1 983 954	304 452	2 288 406

\* 1996 figures have been amended. \*\* Includes firewood/charcoal logs.

**APPENDIX 6  
TREND IN CHIPLOG PRODUCTION FROM NATIVE AND PLANTATION FORESTS**

Year Ended 30 June	CROWN LAND										Total Private Property (m <sup>3</sup> )	Combined Crown land & Private Property (m <sup>3</sup> )	Percentage Private Property to Total (%)	
	Sawmill		Residue		Subtotal		Marri	Bolewood + Branchwood		Other				Total Crown land (m <sup>3</sup> )
	(t)	(t)	(t)	(t)	(t)	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(m <sup>3</sup> )	(%)
cumulative* total:	1 711 215	68 278	1 779 493	6 667 278	2 164 279	5 150	8 836 707	1 020 104	9 856 811	10.3				
1994	82 684	5 690	88 374	405 111	164 949		570 060	74 395	644 455	11.5				
1995	91 410	10 251	101 661	505 655	166 919	2 076	674 650	92 219	766 869	12.0				
1996	72 666	34 498	107 164	492 484	161 206	13 519	667 209	119 104	786 313	15.1				
1997	69 544	14 663	84 207	449 439	160 749	6 729	616 917	93 574	710 491	13.2				
1998**	73 060	10 093	83 153	413 327	187 799	10 803	611 929	91 417	703 346	13.0				
<b>Total</b>	<b>2 100 579</b>	<b>143 473</b>	<b>2 244 052</b>	<b>8 933 294</b>	<b>3 005 901</b>	<b>38 277</b>	<b>11 977 472</b>	<b>1 490 813</b>	<b>13 468 285</b>	<b>11.1</b>				

\* 1976 to 1993 inclusive.

\*\* 1998 branchwood includes 206 tonnes (166 m<sup>3</sup>) from Private Property.

\*\*\* 1998 Total Private Property includes 44 648 tonnes (38 160 m<sup>3</sup>) Plantation Hardwood.

Note: figures include native hardwood and plantation hardwood chiplogs



**APPENDIX 7  
TRENDS IN THE PRODUCTION AND USE OF SAWN TIMBER**

Year Ended 30 June	Sawn Production		Total (m <sup>3</sup> )	Overseas Timber Exports (m <sup>3</sup> )	Apparent Local Use (m <sup>3</sup> )
	Hardwood (m <sup>3</sup> )	Softwood (m <sup>3</sup> )			
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
1993	230 945	65 564	296 509	16 644	279 865
1994	256 112	86 657	342 769	18 119	324 650
1995	264 390	124 070	388 460	20 346	368 114
1996	244 135	124 698	368 833	18 589	350 244
1997	253 950	131 590	385 540	28 943	356 597

Source of export statistics: Australian Bureau of Statistics

**APPENDIX 8  
TRENDS FOR W.A. OVERSEAS IMPORTS AND EXPORTS OF FOREST PRODUCE**

Year Ended 30 June	Timber and Wood Manufacture*		Essential Oils and Tannin	
	Imports (\$)	Exports** (\$)	Imports (\$)	Exports (\$)
1970	10 968 170	9 568 246	447 015	317 553
1971	6 761 806	6 914 644	279 188	343 512
1972	5 578 819	8 809 273	371 749	348 762
1973	8 326 939	9 640 753	592 249	337 736
1974	11 738 861	11 136 170	691 723	433 627
1975	14 053 751	9 212 370	1 107 743	479 019
1976	19 960 421	10 816 236	504 846	214 918
1977	24 857 792	10 355 198	642 962	45 767
1978	24 039 952	13 434 413	913 289	41 422
1979	18 200 508	18 682 636	614 676	61 525
1980	26 801 716	12 857 407	643 045	255
1981	28 691 997	13 746 212	512 254	2 361
1982	26 068 548	11 270 550	572 629	NIL
1993	35 873 000	14 391 000	658 000	N/A
1994	44 095 000	20 091 000	858 000	N/A
1995	53 451 000	25 648 000	740 000	1 400
1996	42 734 000	26 220 000	523 000	3 000
1997	45 177 000	32 595 000**	376 000	3 000

\* Total rough sawn wood and wood manufacture items

\*\* Excludes fuelwood and woodchips; \$79 432 000 in 1996-97

**APPENDIX 9  
OFFENCES UNDER THE CALM ACT AND FOREST MANAGEMENT REGULATIONS**

Charges	Prosecution Recommended	Letter of Warning	Prosecutions Pending
<b>CONSERVATION AND LAND MANAGEMENT ACT</b>			
Without authority cut and removed forest produce	4	10	4
Refused to give name and address to an authorised officer	1		1
Aiding an offence	1		1
<b>FOREST MANAGEMENT REGULATIONS</b>			
Planting of plants prohibited in State forest or timber reserve	1		1
Without authority took a potential carrier into a disease risk area	11	28	8
Failed to comply with a disease risk area signpost or gate	1		1
Removed log timber without a completed log delivery note	1		1
Failed to ensure an original and 3 copies of a log delivery note were made	1	2	1
Without authority had possession of a firearm	3	2	2
Unregistered person employed in the timber industry	1	13	1
Camping in State forest without authority	1		
<b>Totals</b>	<b>26</b>	<b>55</b>	<b>22</b>

**APPENDIX 10  
AREA OF PRESCRIBED BURNS 1995-96 TO 1997-98**

	1995-96	1996-97	1997-98
<b>Indigenous Vegetation - Hand Burning (ha)</b>			
State forest			
• handburns	25 961	11 468	10 488
• clearing burns	-	-	-
National parks	28 611	31 866	31 683
Nature reserves	7 048	12 735	7 410
Other Crown land and private property	3 580	4 040	133
<b>Total</b>	<b>65 200</b>	<b>60 109</b>	<b>49 714</b>
<b>Indigenous Vegetation - Aerial Burning (ha)</b>			
State forest	126 825	112 695	86 637
National parks	38 023	110 434	16 355
Nature reserves	91 830	16 955	2 700
Other Crown land and private property	-	97 750	4 671
<b>Total</b>	<b>256 678</b>	<b>337 834</b>	<b>110 363</b>
<b>Indigenous Vegetation - Silviculture Burning (ha)</b>			
• Jarrah	32 212	43 752	39 842
• Karri	2 144	1 845	926
• Wandoo	-	-	-
<b>Total</b>	<b>34 356</b>	<b>45 597</b>	<b>40 768</b>
<b>Softwood Plantation - Burning (ha)</b>			
State forest			
• fuel reduction	6 909	4 712	4 384
• second rotation clearing burns	66	949	268
<b>Total</b>	<b>6 975</b>	<b>5 661</b>	<b>4 652</b>
<b>Grand Total</b>	<b>363 209</b>	<b>449 201</b>	<b>205 497</b>

**APPENDIX 11**  
**WILDFIRES 1995-96 TO 1997-98**  
**NUMBER AND AREA BY LAND CATEGORY**  
**NUMBER AND PERCENT BY CAUSE**

	Number			Area Burnt (ha)		
	1995-96	1996-97	1997-98	1995-96	1996-97	1997-98
State forest						
• native hardwood	121	76	115	2 978	5 675	18 816
• softwood plantation	96	39	74	349	70	797
National parks	45	50	74	184 199	110 241	576 966
Nature reserves	23	16	37	65 900	26 774	64 311
Other CALM reserves	**	**	6	**	**	7 036
Other Crown lands	66	51	62	143 638	8 183	543 790
Private property	83	61	102	3 835	17 250	285 059
<b>Total</b>	<b>434</b>	<b>293</b>	<b>470</b>	<b>400 899</b>	<b>168 192</b>	<b>1 496 775</b>

<b>CAUSES</b>						
	Number			Per cent		
	1995-96	1996-97	1997-98	1995-96	1996-97	1997-98
Deliberately/illegally lit	145	85	174	33	29	37
Escapes—CALM burns	22	12	25	5	4	5
Escapes—other burning	47	20	44	11	7	9
Accidental—timber industry	4	1	2	1	0	0
Accidental—other industries	21	23	33	5	8	7
Accidental—recreationists	26	27	22	6	9	5
Lightning	50	38	52	12	13	11
Unknown	83	67	102	19	23	22
Other causes	36	20	16	8	7	3
<b>Total</b>	<b>434</b>	<b>293</b>	<b>470</b>	<b>100</b>	<b>100</b>	<b>100</b>

\*\* Not available previously.

**APPENDIX 12**  
**AREA AND NUMBER OF WILDFIRES 1997-98**

Region		State forest	State forest	National parks	Nature reserves	Crown lands and private property	Total
		native hardwood	softwood plantation				
Swan	Area (ha)	3 599	794	76	1 776	30 818	37 063
	Number	64	70	12	16	80	242
Central Forest	Area (ha)	3 726	3	5	11	553	4 298
	Number	27	4	3	1	20	55
Southern Forest	Area (ha)	11 491	-	16 917	27	7 002	35 438
	Number	24	-	7	4	12	47
<b>Totals</b>	<b>Area (ha)</b>	<b>18 816</b>	<b>797</b>	<b>16 998</b>	<b>1 814</b>	<b>38 374</b>	<b>76 798</b>
	<b>Number</b>	<b>115</b>	<b>74</b>	<b>22</b>	<b>21</b>	<b>112</b>	<b>344</b>
Kimberley	Area (ha)	-	-	6	6 000	-	6 006
	Number	-	-	2	1	-	3
Pilbara	Area (ha)	-	-	473 266	32 070	687 206	1 192 542
	Number	-	-	36	1	10	47
Midwest	Area (ha)	-	-	13 550	3 560	12 355	29 465
	Number	-	-	3	3	9	15
Goldfields	Area (ha)	-	-	2 250	-	250	2 500
	Number	-	-	1	-	-	1
Wheatbelt	Area (ha)	-	-	-	10 032	32 113	42 145
	Number	-	-	-	4	7	11
South Coast	Area (ha)	-	-	70 986	10 835	65 588	147 319
	Number	-	-	10	7	32	49
<b>Totals</b>	<b>Area (ha)</b>	<b>-</b>	<b>-</b>	<b>559 968</b>	<b>62 497</b>	<b>797 512</b>	<b>1 419 977</b>
	<b>Number</b>	<b>-</b>	<b>-</b>	<b>52</b>	<b>16</b>	<b>58</b>	<b>126</b>
<b>Totals</b>	<b>Area (ha)</b>	<b>18 816</b>	<b>797</b>	<b>576 966</b>	<b>64 311</b>	<b>835 886</b>	<b>1 496 775</b>
	<b>Number</b>	<b>115</b>	<b>74</b>	<b>74</b>	<b>37</b>	<b>170</b>	<b>470</b>



**APPENDIX 13  
PURPOSES FOR PRESCRIBED BURNING BY FOREST REGION FOR 1997-98**

Dominant purpose	Region	Winter		Spring		Summer		Autumn		Years since last burnt
Fuel reduction*	Swan	2 910		21 220		-		562		3 - 23
	Central Forest	-		30 713		507		8 384		4 - 12
	Southern Forest	-		31 200		172		10 701		5 - 26
		<b>2 910</b>		<b>83 133</b>		<b>679</b>		<b>19 647</b>		
Silviculture **	Swan	-		4 471		-		5 005		1 - 18
	Central Forest	-		12 270		-		9 434		6 - 11
	Southern Forest	-		8 499		58		1 031		2 - 31
		-		<b>25 240</b>		<b>58</b>		<b>15 470</b>		
Nature *** Conservation	Swan	-		300		-		-		8
	Central Forest	-		-		-		2 400		9
	Southern Forest	-		-		-		-		N/A
		-		<b>300</b>		-		<b>2 400</b>		
Tourism and Recreation	Swan	-		2 410		-		-		10
	Central Forest	-		-		-		109		7
	Southern Forest	-		14 665		-		130		7 - 15
		-		<b>17 075</b>		-		<b>239</b>		
<b>Grand Total (ha)</b>		<b>2 910</b>		<b>125 748</b>		<b>737</b>		<b>37 756</b>		

Notes \* Fuel reduction burning also protects nature conservation values.

\*\* Years since last burnt applies to jarrah silviculture only.

\*\*\* Nature conservation burning also provides community protection benefits.

Data supplied pursuant to the Minister's Statement (24.12.92) under the Environmental Protection Act (1986) that the proposed amendments to the 1987 Forest Regional Management Plan and Timber Strategy may proceed.

**APPENDIX 14  
NUMBER OF PRESCRIBED BURNS CONDUCTED IN NATIVE FORESTS  
WITHIN FOREST REGIONS IN EACH SEASON FOR VARIOUS PURPOSES—1997-98**

Dominant purpose	Region	Winter		Spring		Summer		Autumn		No. of escapes
		Aero	Hand	Aero	Hand	Aero	Hand	Aero	Hand	
Fuel reduction	Swan	6	18	13	25	-	-	1	11	-
	Central Forest	-	-	7	6	-	3	2	8	-
	Southern Forest	-	-	12	7	-	6	2	7	7
		<b>6</b>	<b>18</b>	<b>32</b>	<b>38</b>	-	<b>9</b>	<b>5</b>	<b>26</b>	<b>7</b>
Silviculture	Swan	-	-	4	-	-	-	3	2	-
	Central Forest	-	-	6	-	-	-	7	-	4
	Southern Forest	-	-	2	26	-	3	-	27	5
		-	-	<b>12</b>	<b>26</b>	-	<b>3</b>	<b>10</b>	<b>29</b>	<b>9</b>
Nature Conservation	Swan	-	-	1	-	-	-	-	-	-
	Central Forest	-	-	-	-	-	-	1	-	-
	Southern Forest	-	-	-	-	-	-	-	-	-
		-	-	<b>1</b>	-	-	-	<b>1</b>	-	-
Tourism and Recreation	Swan	-	-	1	-	-	-	-	-	-
	Central Forest	-	-	-	-	-	-	-	1	-
	Southern Forest	-	-	6	3	-	-	-	2	4
		-	-	<b>7</b>	<b>3</b>	-	-	-	<b>3</b>	<b>4</b>
<b>Total</b>		<b>6</b>	<b>18</b>	<b>52</b>	<b>67</b>	-	<b>12</b>	<b>16</b>	<b>58</b>	<b>20</b>
<b>Aero Burns (% by season)</b>		<b>8</b>		<b>70</b>		-		<b>22</b>		
<b>Hand Burns (% by season)</b>			<b>12</b>		<b>43</b>		<b>8</b>		<b>37</b>	

Data supplied pursuant to the Minister's Statement (24.12.92) under the Environmental Protection Act (1986) that the proposed amendments to the 1987 Forest Regional Management Plan and Timber Strategy may proceed.

**APPENDIX 15  
WILDLIFE LICENCES ISSUED IN 1997-98**

<b>Fauna Licences</b>	<b>Licences Issued</b>	<b>Fauna Licences (Cont.)</b>	<b>Licences Issued</b>
<b>SCIENTIFIC</b>		<b>CROCODILES</b>	
Scientific Collection (Reg 17)	319	Crocodile Farming (Reg 14)	3
Bird/Bat Banding (Reg 23)	125	Processing (Reg 7)	3
<b>EDUCATION &amp; PUBLIC</b>		<b>KANGAROO</b>	
(to take) (Reg 15)	232	Take Kangaroos for sale (Reg 6)	212
<b>EDUCATION &amp; PUBLIC</b>		Deal in carcasses (Reg 8)	26
(to hold) (Reg 16)	152	Skin Dealing (Reg 10)	18
		Processing (Reg 7)	23
<b>AVIAN FAUNA</b>		<b>EXPORTS INTERSTATE</b>	
Keep & breed in captivity (Reg 12)	3 768	Skins of fauna (or other dead fauna)	74
Deal (Reg 13)	76	Fauna (live) other than emus	221
Breed for Commercial Purposes (Reg 14)	3		<b>295</b>
Trap (Reg 11)	4	<b>EXPORT OVERSEAS</b>	
		Skins of fauna (or other dead fauna) from WA	112
<b>SPECIES TRAPPED COMMERCIALY</b>	<b>No. Taken</b>	Emu eggs or products (personal items) from WA	14
Twenty-eight Parrot	635	Fauna (avian) from WA (live)	9
Red-capped Parrot	347		<b>135</b>
Western Rosella	184	<b>IMPORTS INTERSTATE</b>	
Red-browed finch	14	Skins of fauna (or other dead fauna) into WA	12
Galah	5	Australian fauna (live)	410
		Live exotic birds and other animals	246
<b>FAUNA</b>			<b>668</b>
Keep in Captivity (Reg 12A)	140	<b>Flora Licences</b>	
		<b>COMMERCIAL PURPOSES</b>	562
<b>EMUS</b>		<b>COMMERCIAL PRODUCERS</b>	481
Emu Farming (Reg 14)	64	<b>SCIENTIFIC/PREScribed PURPOSES</b>	874
Dealing (Reg 8)	5	<b>PERMITS TO TAKE DECL. RARE FLORA</b>	102
Dealing (Emu eggshells Reg 13)	14		<b>2 019</b>
Skin Dealing (Reg 10)	1		
Processing (Reg 7)	8		

**APPENDIX 16  
SUMMARY OF DAMAGE LICENCES ISSUED IN 1997-98**

	No. of Licences Issued	Total No. of Each Species Authorised to be Taken		No. of Licences Issued	Total No. of Each Species Authorised to be Taken
<b>WATERFOWL</b>			<b>OTHER AVIAN FAUNA</b>		
Black Duck	3	32 trap/relocate	Australian Raven	26	340 + 3 trap/relocate
Coots	1	200 trap/relocate	Black-faced Cuckoo-shrike	1	trap/relocate
Little Black Cormorant	1	20	Brown Goshawk	2	scare/trap/relocate
Little Pied Cormorant	2	26	Galah	18	1 915
Mountain Duck	5	115 + scare only	Laughing Kookaburra	2	4 + trap/relocate
Wood Duck	24	558 + 22 trap/relocate	Little Corella	12	785
<b>EMUS</b>	59	2 875	Silver Gull	7	2 090
<b>MAMMALS</b>			Twenty Eight Parrot	26	1 052
Australian Sealion	1	scare only	Wedged-tailed Eagle	1	scare only
Grey Kangaroo	558	46 292	Welcome Swallow	2	trap/relocate
Red Kangaroo	18	3 172	Western King Parrot	2	40
Euro	17	970	Western Long-billed Corella	14	555 + trap/relocate
Agile Wallaby	1	10	White-tailed Black Cockatoo	7	10 + scare only
<b>DANGEROUS FAUNA</b>			Willy Wagtail	1	trap/relocate
Australian Raven	1	2			
Butcher Bird	1	2			
Laughing Kookaburra	1	3			
Magpie	67	81			
Red Wattlebird	1	1			

Note In some cases licences are issued to trap and release birds from warehouses, where they can damage stock and trip alarms. This is the case for the Willy Wagtail and the Black-faced Cuckoo-shrike.

**APPENDIX 17  
OFFENCES UNDER THE WILDLIFE CONSERVATION ACT AND REGULATIONS  
1997-98**

Charges	Recomm'd Charges	Con-victions	Fines \$	Cost \$	Dismissed	Letter of Warning	No. Further Action	Pending
<b>WILDLIFE CONSERVATION ACT</b>								
Use of illegal devices in taking fauna.	8	0	-	-	0	8	0	0
Illegal taking or possession of protected fauna.	59	11	1 800.00	245.00	0	16	1	31
Illegal importation, selling or taking for sale of fauna.	10	1	150.00	283.50	0	2	1	6
Offences relating to the taking or possession of rare or threatened fauna.	6	0	-	-	0	0	0	6
Illegal taking of protected flora.	255	23	5 200.00	679.50	0	19	93	120
Offences relating to the sale of protected flora.	5	1	100.00	60.00	0	2	0	2
Taking declared rare flora without the Minister's consent.	14	1	4 000.00	92.50	0	6	2	5
Offences against wildlife officers.	4	0	-	-	0	0	2	2
Failing to comply with licence conditions.	41	4	400.00	140.00	0	8	6	23
<b>WILDLIFE CONSERVATION REGULATIONS</b>								
Offences relating to the possession, control and disposal of avian fauna.	26	1	150.00	283.50	0	12	0	8
Offences relating to activities on Nature Reserves.	29	2	250.00	186.00	0	8	2	17
<b>TOTALS</b>	<b>457</b>	<b>44</b>	<b>\$12 050.00</b>	<b>\$1 970.00</b>	<b>0</b>	<b>86</b>	<b>107</b>	<b>220</b>



**APPENDIX 18**  
**PUBLICATIONS PRODUCED IN 1997-98**

**GENERAL**

Canning River Regional Park—Management Plan  
Canning River Regional Park—Management Plan—Analysis for Public Submission  
Land Managed by CALM (leaflet)  
Safety in Bushfire Control  
Shark Bay Terrestrial Draft Management Plan  
Annual Report of the Department of Conservation and Land Management 1996-97  
CALM Book News (leaflet, 4 issues)  
CALM Internal Telephone Directory 1998  
CALM News (newspaper, 6 issues)  
CALM Volunteers (leaflet)  
CALM Science supplement (journal)  
CALM Science Vol 2 No 3 (journal)  
Jurabi and Bundegi Coastal Parks Draft Management Plan  
LANDSCOPE advertising insert (numerous)  
LANDSCOPE Calendar 1998  
LANDSCOPE Expedition Procedures Manual  
LANDSCOPE Expeditions Program 1998  
LANDSCOPE Magazine (4 issues)  
National Parks and Nature Conservation Authority Annual Report 96-97  
Operation Firebird (report)  
Our Observatory (leaflet)  
Perth Observatory (poster)  
Project Vesta Information Sheet  
Sharing the Dreaming (education kit)  
Stars and Telescopes (leaflet)  
Training and Development Manual '98

**NATURE CONSERVATION**

A Representative Marine Reserve System (report)  
Australian Birds of Prey — Bush Book  
Aviary Birds — Information Sheet 1-97  
Book that Bird (booklet reprint)  
Black Swan (flyer)  
Bugs In the Backyard—Bush Book  
Experience Whale Sharks in Ningaloo (leaflet)  
Forrestdale Lake Nature Reserve (leaflet)  
Halt the Salt (leaflet)  
How to Build a Local Herbarium (book)  
How to Manage Your Granite Outcrops (book)  
Land for Wildlife (leaflet)  
Marine Life of Coral Bay and Ningaloo Marine Park (book)  
Marine Plants and Animals on South West Beaches — Bush Book  
Marine Reserves (poster)  
Native Animal Encounters (flyer)  
New Horizons: The Way Ahead in Marine Conservation and Management (reprint)  
No Take (booklet)  
Nuytsia 11, No 3 (journal)  
Nuytsia 12, No 1 (journal)  
Nuytsia Vol 2 No 3 1997 (journal)  
Oceans of Wealth (leaflet)  
Operation Western Shield Newsletter (3 issues)  
Pacific Black Duck (flyer)  
Penguin Island Junior Ranger Kit (education kit)  
Protecting our Flora — Information Sheet 2/97  
Roadsides, the Vital Link (leaflet)  
WATSCU Threatened Flora Posters 1-13  
Western Australian Roadside Handbook (booklet)  
Western Long-necked Tortoise (flyer)  
Western Wildlife (3 issues)  
Whale Shark Interaction Management Plan 1997-2001

Wildlife Notes Nos 4 and 5 (leaflets)  
Win a Night Out with the Woylies (poster)

**TOURISM AND RECREATION**

Exploring the Hills Forest (leaflet)  
Aboriginal Culture Excursions (flyer)  
Avon Descent (flyer)  
Avon Valley National Park (leaflet)  
Bibbulmun Track Pack (maps)  
Building a Better Bibbulmun Track (leaflet)  
Bushwalks in the South West (book)  
Cape Arid and Eucla National Park (leaflet)  
Coastal Plain Walk Trail (poster)  
Coastal Plain Walk Trail (leaflet)  
Discovering the Valley of the Giants (Discovery book)  
Dive and Snorkel Sites of Western Australia (book reprint)  
Dreamtime Stories (folder)  
Dreamtime Stories (leaflet)  
Dryandra Ecology Course (poster)  
Dryandra Trail Guide (leaflet)  
Dryandra Visitor Guide (leaflet)  
Dryandra Woodland (poster)  
Dryandra Woodland Ecology (leaflet)  
Dryandra Woodland Ecology Course (leaflet)  
Dwellingup and Lane Poole Reserve (leaflet)  
Dwellingup Forest Heritage Festival (leaflet)  
Esperance National Parks (leaflet)  
Fitzgerald River National Park (leaflet)  
Forest Walk 1997 (flyer)  
Forest Walk 1997 (poster)  
Francois Peron National Park (leaflet)  
Go Bush (leaflet)  
Go Bush Gets Adventurous July 1997 (leaflet)  
Kalbarri National Park (leaflet)  
Karakamia (leaflet)  
Karijini National Park (leaflet)  
Kennedy Range National Park (leaflet)  
Kimberley Recreation Guide (leaflet)  
Leeuwin-Naturaliste National Park (Magpaper)  
Leseur National Park (leaflet)  
Magnificent 7 (poster)  
Mitchell Plateau Visitor Guide (leaflet)  
Monkey Mia (leaflet)  
Mount Augustus National Park (leaflet)  
Nambung National Park (leaflet)  
National Park Pass (flyer)  
Pemberton Bush Walks (booklet reprint)  
Penguin Island (leaflet)  
Perth Outdoors (book reprint)  
Perup Ecology Centre (leaflet)  
Purnululu National Park (leaflet)  
Serrurier Island Recreation Guide (leaflet)  
Shannon National Park Great Forest Drive (leaflet)  
Stirling Range and Porongurups National Park (leaflet)  
Sights and Sounds of the Night (leaflet)  
Touring Western Australia (newsletter, 4 issues)  
Tourism Marketing Manual  
Valley of the Giants (flyer)  
Welcome to Forest Walk 1997 (flyer)  
Wonders of Our South Seas (leaflet)  
Yanchep National Park Visitor Guide (leaflet)  
Yanchep Sun and Stars Festival (flyer)  
Yanchep Sun and Stars Festival (poster)  
Your Guide to WA's National Parks and Forests (leaflet)

## FOREST RESOURCES MANAGEMENT

Branch out with CALM – South Coast Sharefarms  
 Call for Expressions of Interest in the Purchase of Wood Resources from Western Australian Plantations and Regrowth Forests (report)  
 CALM Sharefarms Maritime Pine (folder)  
 Catchment Carers Trail Guide 1998 (flyer)  
 Diploma of Arts Wood Graduate Catalogue  
 A Woodworker's Dream (leaflet)  
 Arbor Day Poster 1998  
 Breeding Better Bluegums (leaflet)  
 Creative Workshops inspired by the Jarrah Forest (leaflet)  
 From the Forest to Finewood (leaflet)  
 Growing Western Australian Sandalwood (booklet)  
 Have Your Say in the Future of our Forests (leaflet)  
 Seed Price List 1997–1998  
 South Coast Sharefarms Calendar  
 Specialty Timbers of the Goldfields (leaflet)

## SCIENTIFIC PUBLICATIONS AND REPORTS

- Abbott, I. (1997). CALM defends position on species extinction. The Greener Times. Mar. p. 18.
- Abbott, I. (1997). Censoring CALM. Nature Australia 25 (10). p. 5.
- Abbott, I. (1997). Counting cockatoos: the status of the forest red-tailed black-cockatoo. LANDSCOPE 13 (2). pp. 10–16.
- Abbott, I. (1997). [Deforestation and logging]. The West Australian, 29 Sep 1997. p. 12.
- Abbott, I. (1997). Extinctions in Western Australia. LANDSCOPE 12 (4). pp. 49–53.
- Abbott, I. (1998). Detecting Areas with High Levels of Faunal Species Richness: A Preliminary Study: Report Prepared for the Regional Forest Agreement, Western Australia, 1998. Department of Conservation and Land Management, Western Australia.
- Algar, D. (1997). Exotic predators. In: 1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997. Department of Conservation and Land Management, Western Australia. pp. 1–8.
- Algar, D. and Smith, R. (1998). Approaching Eden. LANDSCOPE 13 (3). pp. 28–34.
- Baczocha, N. (1997). Status and Ecology of the Dibbler (*Parantechinus apicalis*) in Western Australia: Final Report. Department of Conservation and Land Management, Western Australia.
- Bayliss, K.L., Stukely, M.J.C. and Sivasithamparam, K. (1997). Resistance of jarrah (*Eucalyptus marginata*) to *Phytophthora citricola* and *P. cryptogea* (POSTER ABSTRACT). In: Programme and Summaries: Australasian Plant Pathology Society, 11th Biennial Conference: Perth, 29 Sep.–2 Oct. 1997. Australasian Plant Pathology Society, Perth. p. 291.
- Bennalick, R.A., Colquhoun, I.J., Shearer, B.L. and Hardy, G.E. St. J. (1997). Phosphite: its phytotoxicity and effectiveness in the protection of *Eucalyptus marginata* forest from *Phytophthora cinnamomi* (POSTER ABSTRACT). In: Programme and Summaries: Australasian Plant Pathology Society, 11th Biennial Conference: Perth, 29 Sep.–2 Oct. 1997. Australasian Plant Pathology Society, Perth. p. 186.
- Biggs, J. (1997). Volunteers: the bright stars in Observatory firmament. CALM News May/June. p. 3.
- Biggs, J., Liddelow, G. and Lowe, G. (1997). Under desert skies 1997. LANDSCOPE Expeditions 25.
- Blyth, J., Burbidge, A. and Boles, W. (1997). Another night parrot search. Western Australian Bird Notes 81. p. 13.
- Blyth, J., Burbidge, A. and Boles, W. (1997). Report on an expedition to the western desert and east Pilbara areas in search of the night parrot *Pezoporus occidentalis*. Eclectus 2. pp. 25–30.
- Brennan, G.K. and Baggetta, C.E. (1997). Dimensional changes of pine timber exposed to different environmental conditions. CALM Science 2. pp. 191–197.
- Broadhurst, L., Coates, D. and Tan, B. (1997). Genetic diversity in the monotypic Western Australian endemic, *Geleznovia verrucosa* Turcz. (Rutaceae) (ABSTRACT). In: Conference Abstracts: Proceedings of the 44th Annual Conference of the Genetics Society of Australia Inc.: University of Western Australia, Nedlands, 28th Sep–1st Oct, 1997. Genetics Society of Australia, Perth. p. 22.
- Brooksbank, K., Crombie, D.S. and Butcher, T. (1997). Early identification of drought tolerance in *Eucalyptus globulus* families. In: Proceedings of the IUFRO Conference on Silviculture and Improvements of Eucalypts: Salvador, Brazil, August 24 to 29, 1997. Embrapa, Colombo. pp. 125–128.
- Brown, A., Young, A., Burdon, J., Christidis, L., Clarke, G., Coates, D. and Sherwin, W. (1997). Genetic Indicators for State of the Environment Reporting. Environment Australia, Canberra.
- Burbidge, A. (1997). Action for spider near extinction. Watsnu: the Newsletter of the Western Australian Threatened Species and Communities Unit 4 (2). p. 2.
- Burbidge, A. (1997). Conservation status and threatening processes. In: Mammal Conservation in Western Australia: Course Notes. Perth Zoo, pp. 1–5.
- Burbidge, A. (1997). Mammalogy in Western Australia. Australian Mammal Society Newsletter May. pp. 4–9.
- Burbidge, A. (1997). Mammals of Western Australia and their conservation status. In: 1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997. Department of Conservation and Land Management, Western Australia. pp. 1–22.
- Burbidge, A. (1997). Management of birds in southern Western Australia. In: 1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997. Department of Conservation and Land Management, Western Australia. pp. 1–9.
- Burbidge, A. (1997). New schedule of threatened fauna. Watsnu: the Newsletter of the Western Australian Threatened Species and Communities Unit 4(2). p. 1.
- Burbidge, A. (1997). The role of recovery plans in fauna conservation. In: 1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997. Department of Conservation and Land Management, Western Australia. pp. 1–2.
- Burbidge, A.H. (1997). Western bristlebird annual report, 1996. In: South Coast Threatened Birds Recovery Team Annual Report, 1996. Department of Conservation and Land Management, Western Australia. pp. 16–24.
- Burbidge, A.H. (1997). Western ground parrot annual report, 1996. In: South Coast Threatened Birds Recovery Team Annual Report, 1996. Department of Conservation and Land Management, Western Australia. pp. 26–29.
- Burbidge, A. (1997). Western ringtail possum. LANDSCOPE 13 (2). p. 49.
- Burbidge, A.H. and Baker, J. (1997). Southern heathlands and the ground parrot. Wingspan 7 (1). p. 11.
- Burbidge, A.H. and Blyth, J. (1997). Pizzey and Knight field guide (BOOK REVIEW). Western Australian Bird Notes 83. pp. 7–8.
- Burbidge, A., Blyth, J. and Boles, W. (1997). Barn swallow near Canning Stock Route. Western Australian Bird Notes 81. pp. 13–14.
- Burbidge, A., Blyth, J. and Boles, W. (1997). Interesting observations in the western deserts. Western Australian Bird Notes 81. p. 14.
- Burbidge, A.H., Cale, P. and Danks, A. (1997). Post-Release Behaviour of Translocated Noisy Scrub-Birds, Samson Brook, Darling Range, June 1997: Report to the South Coast Threatened Birds Recovery Team and Alcoa of Australia Limited. Department of Conservation and Land Management, Western Australia.
- Burbidge, A., Kuchling, G., Mutter, L. and Burford, D. (1997). Western Swamp Tortoise Recovery Team: Annual Report, 1996. Department of Conservation and Land Management, Western Australia.
- Burbidge, A., Kuchling, G., Mutter, L. and Burford, D. (1998). Western Swamp Tortoise Recovery Team: Annual Report, 1997. Department

- of Conservation and Land Management, Western Australia.
- Burbidge, A. and Morris, K. (1997). Marsupial conservation: status updated. *LANDSCOPE* 12 (4), pp. 22–27.
- Burbidge, A. & Stanley, F. (1997). Rat baiting successful. *CALM News* Sep.–Oct., p. 6.
- Burbidge, A.A., Williams, M.R. and Abbott, I. (1997). Mammals of Australian islands: factors influencing species richness. *Journal of Biogeography* 24, pp. 703–715.
- Burgman, M., Ades, P., Hickey, J., Williams, M., Davies, C. and Maillardet, R. (1997). Methodological Guidelines for the Utility and Statistical Validity of Survey and Monitoring Programs. University of Melbourne, Melbourne.
- Burrown, N. and Christensen, P. (1997). Desert Dreaming and Project Eden: a second chance for threatened species. *The Greener Times*, Aug. p. 19.
- Burrows, N.D. (1997). Fire Regimes and Biodiversity. Draft. Department of Conservation and Land Management, Western Australia.
- Burrows, N. (1997). Predicting canopy scorch height in jarrah forests. *CALM Science* 2, pp. 267–274.
- Burrows, N. (1998). A fire for all reasons. *LANDSCOPE* 13 (3), pp. 17–22.
- Burrows, N. and Sneeuwjagt, R. (1997). Better to burn now. *The West Australian* 15 Dec. p. 10.
- Butcher, T.B. and Stukely, M.J.C. (1997). Field response of *Pinus radiata* selected for resistance to *Phytophthora cinnamomi*. In: *IUFRO '97: Genetics of Radiata Pine: Proceedings of Conference 1–4 December 1997, Workshop 5 December 1997, IUFRO Working Party S2.02.19 Pinus radiata Provenances and Breeding, Rotorua, New Zealand*. Forest Research Institute, Rotorua, pp. 250–251.
- Butcher, T.B. and Stukely, M.J.C. (1997). Variation in natural populations of *Pinus radiata* in resistance to *Phytophthora cinnamomi*. In: *IUFRO '97: Genetics of Radiata Pine: Proceedings of Conference 1–4 December 1997, Workshop 5 December 1997, IUFRO Working Party S2.02.19 Pinus radiata Provenances and Breeding, Rotorua, New Zealand*. Forest Research Institute, Rotorua, pp. 105–107.
- Byrne, M. and Coates, D. (1997). More than meets the eye: our flora's hidden diversity. *LANDSCOPE* 13 (1), pp. 19–22.
- Byrne, M., Moran, G.F., Stukely, M., Emebiri, L.C. and Williams, E.R. (1997). Identification of QTL for resistance to *Phytophthora cinnamomi* in *Eucalyptus marginata* (ABSTRACT). In: *Programme and Summaries: Australasian Plant Pathology Society, 11th Biennial Conference: Perth, 29 Sep.–2 Oct. 1997*. Australasian Plant Pathology Society, Perth, p. 111.
- Byrne, M., Moran, G.F., Stukely, M., Emebiri, L.C. and Williams, E.R. (1997). Identification of QTL for resistance to *Phytophthora cinnamomi* in *Eucalyptus marginata* (ABSTRACT). In: *Conference Abstracts: Proceedings of the 44th Annual Conference of the Genetics Society of Australia Inc.: University of Western Australia, Nedlands, 28th Sep–1st Oct, 1997*. Genetics Society of Australia, Perth, p. 24.
- Chalmers, L. and Wheeler, J. (1997). Native Vegetation of Estuaries and Saline Waterways in South Western Australia. Water & Rivers Commission, Perth.
- Chalmers, L. and Wheeler, J. (1997). Native Vegetation of Freshwater Rivers & Creeks in South Western Australia. Water & Rivers Commission, Perth.
- Chapman, A.R. (1997). *HISCOM 97, Adelaide 24–26 September 1997: Herbarium Information Systems Committee (HISCOM): Report and Proceedings*. Herbarium Information Systems Committee, Perth.
- Chapman, A. and Lane, J.A.K. (1997). Waterfowl usage of wetlands in the south-east arid interior of Western Australia, 1992–93. *Emu* 97, pp. 51–59.
- Christensen, P. (1997). Fauna conservation in production forests in Western Australia. In: *Conservation Outside Nature Reserves*. Centre for Conservation Biology, Brisbane, pp. 466–470.
- Christensen, P., Evans, J. and Liddelow, G. (1997). Gibson Desert: buckshot and breakaways, 1997. *LANDSCOPE Expeditions* 24.
- Coates, D. and Atkins, K. (1997). Threatened flora of Western Australia: a focus for conservation outside reserves. In: *Conservation Outside Nature Reserves*. Centre for Conservation Biology, Brisbane, pp. 432–441.
- Coates, D.J. and Sampson, J.F. (1997). Mating system patterns of genetic variation and the conservation of animal pollinated rare and threatened Western Australian plants (ABSTRACT). In: *Pollination Ecology in Western Australia: Abstracts of Talks at a One Day Meeting Held at Kings Park Administration Centre, Perth, 4 July 1997*. Kings Park and Botanic Garden, Perth, p. 5.
- Coates, D. and van Leeuwen, S. (1997). Delineating seed provenance areas for revegetation from patterns of genetic variation. In: *Proceedings of the Second Australian Workshop on Native Seed Biology for Revegetation*. Australian Centre for Minesite Rehabilitation Research, Brisbane.
- Cochrane, A. (1997). Anne fired up by Churchill Fellowship experience. *CALM News* Nov.–Dec., p. 12.
- Cochrane, A. (1997). Threatened Flora Seed Centre (PAMPHLET). Department of Conservation and Land Management, Western Australia.
- Cochrane, A. (1997). The Winston Churchill Memorial Trust of Australia Project: To Study Genebanks in the UK and USA for Conservation of Rare Flora: Final Report. Department of Conservation and Land Management, Western Australia.
- Courtenay, J. (1998). Gilbert's Potoroo Recovery Team: Annual Report, 1997. Department of Conservation and Land Management, Western Australia.
- Courtenay, J. and Gillen, K. (1997). Gilbert's Potoroo Recovery Team: Annual Report, 1996. Department of Conservation and Land Management, Western Australia.
- Cranfield, R.J. (1997). RFA Species List. Department of Conservation and Land Management, Western Australia.
- Cranfield, R.J. and Sage, L.W. (1997). *Goodenia katabudjar* (Goodeniaceae), a new species from south-west Western Australia. *Nuytsia* 11, pp. 297–299.
- Crombie, D.S. (1997). Water relations of jarrah (*Eucalyptus marginata*) regeneration from the seedling to the mature tree and of stump coppice. *Forest Ecology and Management* 97, pp. 293–303.
- D'Souza, N., Webster, J. and Tay, F. (1997). First record of *Phytophthora boehmeriae* in Western Australia. *SID News* 3(2), pp. 10–11.
- D'Souza, N.K., Webster, J.L. and Tay, F.C.S. (1997). *Phytophthora boehmeriae* isolated for the first time in Western Australia. *Australasian Plant Pathology* 26, p. 204.
- Danks, A. and Burbidge, A.H. (1997). Birds of the western heathlands. *Wingspan* 7(1), p. 9.
- Daw, B., Walley, T. and Keighery, G. (1997). Bush Tucker Plants of the South-West. Department of Conservation and Land Management, Western Australia.
- Dawes, G., Wallace, K. and Northfield, P. (1997). *Astronomy 1998: A Practical Guide to the Night Sky*. -Western Australian edn.. Quasar, Strathfield, N.S.W.
- De Laurentiis, P., Pesce, G.L. and Halse, S.A. (1997). Discovery of the first representative of the genus *Neocyclops* Gurney in Australia, and description of *Neocyclops* (*Neocyclops*) *petkovskii* n.sp. (Copepoda: Halicyclopinae). *Bulletin Zoologisch Museum, Universiteit van Amsterdam* 16(3), pp. 15–19.
- De Tores, P. (1997). Prey response to 1080 baiting over large areas: Project 3.4 west. In: *Co-operative Research Centre for Biological Control of Vertebrate Pest Populations: Fifth Year Review*. Department of Conservation and Land Management, Western Australia, pp. 102–106.
- De Tores, P. (1998). Controlling the red fox. In: *Exploring CRC research: highlights of environmental Cooperative Research Centres in Australia*. Department of Industry, Science and Tourism, Australia, p. 11.



- De Tores, P. and Rosier, S. (1997). Harvey Basin Allocation Plan: Western Ringtail Possum Survey: Report on Western Ringtail Possum Survey Within Part of the Inundation Area of Proposed Harvey Dam: Report Prepared for Water and Rivers Commission. Department of Conservation and Land Management, Western Australia.
- Ecologia and Pearson, D. (1997). Mulgara, *Dasyiscercus cristicauda*, Regional Survey: Marymia Gold Project. Ecologia, Perth.
- Edmonds, J.S., Shibata, Y., Prince, R.I.T., Preen, A.R. and Morita, M. (1997). Elemental composition of a tusk of a dugong, *Dugong dugon*, from Exmouth, Western Australia. *Marine Biology* 129. pp. 203–214.
- Eldridge, M.D.B. and Pearson, D.J. (1997). Chromosomal rearrangements in rock wallabies, *Petrogale* (Marsupialia: Macropodidae). IX, further G-banding studies of the *Petrogale lateralis* complex: *P. lateralis pearsoni*, the west Kimberley race and a population heterozygous for a centric fusion. *Genome* 40. pp. 84–90.
- Eldridge, M. and Pearson, D. (1997). Identification of a rock-wallaby hybrid zone in Western Australia (ABSTRACT). In: Conference Abstracts: Proceedings of the 44th Annual Conference of the Genetics Society of Australia Inc.: University of Western Australia, Nedlands, 28th Sep–1st Oct, 1997. Genetics Society of Australia, Perth. p. 28.
- Farr, J. (1997). Insects in the garden. *LANDSCOPE* 12(4). pp. 28–35.
- Farr, J.D. and Wheeler, I.B. (1997). Sex determination in the bulls eye borer, *Phoracantha acanthocera* (Macleay) (Coleoptera: Cerambycidae). *CALMScience* 2. pp. 199–201.
- FitzSimmons, N.N., Moritz, C., Limpus C.J., Pope, L. and Prince, R. (1997). Geographic structure of mitochondrial and nuclear gene polymorphisms in Australian green turtle populations and male-biased gene flow. *Genetics* 147. pp. 1843–1854.
- Friend, G.R., Johnson, B.W., Mitchell, D.S. and Smith, G.T. (1997). Breeding, population dynamics and habitat relationships of *Sminthopsis dolichura* (Marsupialia: Dasyuridae) in semi-arid shrublands of Western Australia. *Wildlife Research* 24. pp. 245–262.
- Friend, T. (1997). Ecology and management of the numbat, *Myrmecobius fasciatus*. In: 1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997. Department of Conservation and Land Management, Western Australia. pp. 1–10.
- Friend, T. (1997). Ecology and management of the southern brown bandicoot or quenda, *Isodon obesulus*. In: 1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997. Department of Conservation and Land Management, Western Australia. pp. 1–5.
- Friend, T. (1997). Implementation of the Numbat Recovery Plan: Progress Report, July 1997: Environment Australia, Biodiversity Section, Threatened Species and Communities Unit, Project 351. Department of Conservation and Land Management, Western Australia.
- Friend, T. (1997). Numbat Recovery Team: Annual Report, 1996. Department of Conservation and Land Management, Western Australia.
- Friend, J.A. (1997). Recovery Plan for the Numbat: Endangered Species Program, Project no. 351: Review of the Recovery Process: Prepared for Environment Australia, November 1997. Department of Conservation and Land Management, Western Australia.
- Froend, R.H., Halse, S.A. and Storey, A.W. (1997). Planning for the recovery of Lake Toolibin, Western Australia. *Wetlands Ecology and Management* 5. pp. 73–85.
- Gibson, N. (1997). A critically threatened ironstone community joins the conservation estate. *Watsnu: the Newsletter of the Western Australian Threatened Species and Communities Unit* 4(1). p. 1.
- Gibson, N. and Burbidge, A. (1997). Assessment of Conservation Values at Blackboy Hollow (Leeuwin-Naturaliste National Park) Adjacent to Location 1295. Department of Conservation and Land Management, Western Australia.
- Gibson, N., Keighery, G.J. and Keighery, B.J. (1997). Contributions of N.H. Speck to the biogeography of Proteaceae in Western Australia. *Journal of the Royal Society of Western Australia* 80. pp. 73–77.
- Gibson, N. and Lyons, M.N. (1997). Floristic Survey of Middle and Southern Ironcap, Digger Rocks and Hatter Hill of the Eastern Goldfields of Western Australia. Department of Conservation and Land Management, Western Australia.
- Gibson, N. and Lyons, M.N. (1997). Floristic Survey of the Highclere Hills of the Eastern Goldfields of Western Australia. Department of Conservation and Land Management, Western Australia.
- Gibson, N. and Lyons, M.N. (1997). Floristic Survey of the Hunt Range, Yendilberin and Watt Hills of the Eastern Goldfields of Western Australia. Department of Conservation and Land Management, Western Australia.
- Gibson, N. and Lyons, M.N. (1997). Floristic Survey of the Mt. Manning Range of the Eastern Goldfields of Western Australia. Department of Conservation and Land Management, Western Australia.
- Gibson, N., Lyons, M.N. and Lepschi, B.J. (1997). Flora and vegetation of the eastern goldfield ranges. Part 1, Helena and Aurora Range. *CALMScience* 2. pp. 231–246.
- Gillen, K., Danks, A., Courtenay, J. and Hickman, E. (1997). Threatened species management on the south coast of Western Australia. *Parks* 7. pp. 23–30.
- Gioia, P., Pigott, J.P., Cranfield, R.J. and Chapman, A.R. (1998). Distribution Mapping and Key Ecological Attributes of Plant Species in the South-West Forest Region: Final Report: Western Australian Regional Forest Assessment. Department of Conservation and Land Management, Western Australia.
- Groves, R.H., Bishop, A., Carr, G.W., Carter, R.J., Corey, S., Csurhes, S.M., Hosking, J.R. and Keighery, G.J. (1997). Recent Incursions of Weeds into Australia: 1971–1995. CRC for Weed Management Systems, Adelaide.
- Hall, L., Richards, G., McKenzie, N. and Dunlop, N. (1997). Importance of abandoned mines as habitat for bats. In: Conservation Outside Nature Reserves. Centre for Conservation Biology, Brisbane. pp. 326–333.
- Hibsch-Jetter, C., Soltis, D. and Macfarlane, T.D. (1997). Phylogenetic relationships of *Eremosyne pectinata* Endl. (Saxifragaceae sensu lato) based on rbcL sequence data. *Plant Systematics and Evolution* 204. pp. 225–232.
- Hussey, B.M.J., Keighery, G.J., Cousens, R.D., Dodd, J. and Lloyd, S.G. (1997). Western Weeds: A Guide to the Weeds of the Western Australia. Plant Protection Society of Western Australia, Perth.
- Johnson, B. (1997). Possums and dasyurids. In: 1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997. Department of Conservation and Land Management, Western Australia. pp. 1–16.
- Keighery, G. (1997). Arum lily as an environmental weed in Western Australia: overview of distribution and threat to natural systems. In: Proceedings of a Workshop on Arum Lily (*Zantedeschia aethiopica*): HMAS Stirling, Garden Island, Western Australia, Thursday, 7 August, 1997. CRC for Weed Management Systems, Adelaide. pp. 17–19.
- Keighery, G. (1997). Botany of the Ningbing Range. *Boab Bulletin* Oct 1997. p. 7.
- Keighery, G. (1997). Overview of pollination ecology in southwestern Australia (ABSTRACT). In: Pollination Ecology in Western Australia: Abstracts of Talks at a One Day Meeting Held at Kings Park Administration Centre, Perth, 4 July 1997. Kings Park and Botanic Garden, Perth. pp. 8–9.
- Keighery, G. (1997). Salinity Action Plan: biological survey of the agricultural zone. *Western Wildlife: Newsletter of the Land for Wildlife Scheme* 1(2). p. 11.
- Keighery, G.J. (1998). Colonial plants: red flowering gum, *Eucalyptus ficifolia*. *Australian Garden History* 9(6). p. 16.

- Keighery, G.J., Keighery, B.J. and Gibson, N. (1997). Flora and Vegetation of Dardanup Forest Block. Department of Conservation and Land Management, Western Australia.
- Kinnear, J. (1997). Rock-wallaby population genetics and the Caughley paradigms. *SID News* 3(1). pp. 1–5.
- Kinnear, J.E., Onus, M.L. and Sumner, N.R. (1998). Fox control and rock wallaby population dynamics: an update. *Wildlife Research* 25. pp. 81–88.
- Komorek, B.M., Shearer, B.L., Blumberg, M.V. and Fairman, R.G. (1997). Potassium phosphite: effective chemical tool in the protection of native flora threatened by *Phytophthora* (ABSTRACT). In: Programme and Summaries: Australasian Plant Pathology Society, 11th Biennial Conference: Perth, 29 Sep.–2 Oct. 1997. Australasian Plant Pathology Society, Perth. p. 34.
- Kusnander, D., Galwey, N.W., Hertzler, G.L. and Butcher, T.B. (1997). Age trends in variances and heritabilities for height and diameter in marilime pine (*Pinus pinaster* Ait.) (ABSTRACT). In: Conference Abstracts: Proceedings of the 44th Annual Conference of the Genetics Society of Australia Inc.: University of Western Australia, Nedlands, 28th Sep–1st Oct, 1997. Genetics Society of Australia, Perth. p. 42.
- Lane, J. (1997). Les lacs du désert = Lakes in the desert. *Antipode AFA : News Francais et Australien* 5. p. 22.
- Lane, J.A.K. (1997). Redshank revelry. *Western Australian Bird Notes* 82. pp. 1–2.
- Lane, J.A.K., Hardcastle, K.A., Tregonning, R.J. and Holtfreter, G.J. (1997). Management of the Vasse-Wonnerup Wetland System in Relation to Sudden, Mass Fish Deaths: A Technical Report. Vasse Estuary Technical Working Group.
- Lepschi, B. (1997). Rare tangle wattle, *Acacia volubilis*. *SID News* 3(2). p. 11.
- Lepschi, B.J. (1997). A revision of *Pithocarpa* (Asteraceae: Gnaphalioideae) and an assessment of its phylogeny. Thesis (Postgrad. Dip. Nat. Res.) -- Curtin University of Technology.
- Lepschi, B.J. and Macfarlane, T.D. (1997). *Digitaria aequiglumis* (Poaceae), a new weed for Western Australia. *Nuytsia* 11. pp. 425–427.
- Liddelow, G., Christensen, P., Morris, K., Speldewinde, P., Smith, R. & Triton, S. (1997). Beyond the dreaming: Project Eden, 1997. *LANDSCOPE Expeditions* 20.
- Lowrie, A., Coates, D.J. and Kenneally, K.R. (1998). A taxonomic review of the *Stylidium caricilloium* complex (Stylidiaceae), from south-west Western Australia. *Nuytsia* 12. pp. 43–57.
- Majer, J.D., Delabie, J.H.C. and McKenzie, N.L. (1997). Ant litter fauna of forest, forest edges and adjacent grassland in the Atlantic rain forest region of Bahia, Brazil. *Insectes Sociaux* 44. pp. 255–266.
- Maly, E.J., Halse, S.A. and Maly, M.P. (1997). Distribution and incidence patterns in *Boeckella*, *Calamoecia*, and *Hemiboeckella* (Copepoda: Calanoida) in Western Australia. *Marine and Freshwater Research* 48. pp. 615–621.
- Marchant, N. (1997). Flower structures, taxonomy and the CALM Herbarium (ABSTRACT). In: Pollination Ecology in Western Australia: Abstracts of Talks at a One Day Meeting Held at Kings Park Administration Centre, Perth, 4 July 1997. Kings Park and Botanic Garden, Perth. p. 20.
- Maslin, B.R., Thomson, L.A.J., McDonald, M.W. and Hamilton-Brown, S. (1998). Edible Wattle Seeds of Southern Australia: A Review of Species for Use in Semi-Arid Regions. CSIRO, Collingwood.
- McDonald, M.W. and Maslin, B.R. (1997). A reappraisal of *Acacia cowleana* and allied taxa: including the description of a new species, *A. elachantha*, from the tropical dry-zone of Australia. *Australian Systematic Botany* 10. pp. 303–320.
- McKenzie, N.L. (1997). Forest bats. In: 1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997. Department of Conservation and Land Management, Western Australia. pp. 1–8.
- Moro, D. (1997). Removal of a feral cat from Serrurier Island. *The Western Australian Naturalist* 21. pp. 153–156.
- Moro, D. (1997). Thevenard Island Mouse Recovery Team: Annual Report, 1996. Department of Conservation and Land Management, Western Australia.
- Moro, D., Campbell, N.J.H., Elphinstone, M.S. and Baverstock, P.R. (1997). Thevenard Island mouse: taxonomic and conservation implications from mitochondrial DNA sequence variation (ABSTRACT). In: Conference Abstracts: Proceedings of the 44th Annual Conference of the Genetics Society of Australia Inc.: University of Western Australia, Nedlands, 28th Sep–1st Oct, 1997. Genetics Society of Australia, Perth. p. 50.
- Morris, K. (1997). Chuditch Recovery Team: Annual Report, 1996. Department of Conservation and Land Management, Western Australia.
- Morris, K. (1997). Conservation case studies: the chuditch. In: Mammal Conservation in Western Australia: Course Notes. Perth Zoo, pp. 1–5.
- Morris, K. (1997). Conservation case studies: the greater stick nest rat. In: Mammal Conservation in Western Australia: Course Notes. Perth Zoo, pp. 1–2.
- Morris, K. (1997). Fox control in the northern jarrah forest and beyond. In: 1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997. Department of Conservation and Land Management, Western Australia. pp. 1–5.
- Morris, K. (1997). Rodents. In: 1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997. Department of Conservation and Land Management, Western Australia. pp. 1–6.
- Morris, K. (1997). Translocation of threatened species. In: Mammal Conservation in Western Australia: Course Notes. Perth Zoo, pp. 1–4.
- O'Gara, E., McComb, J.A., Colquhoun, I.J., Williams, M.R. and Hardy, G.E. St. J. (1997). Disease development in *Eucalyptus marginata*, inoculated with zoospores of *Phytophthora cinnamomi*: the role of isolate virulence and season of inoculation (ABSTRACT). In: Programme and Summaries: Australasian Plant Pathology Society, 11th Biennial Conference: Perth, 29 Sep.–2 Oct. 1997. Australasian Plant Pathology Society, Perth. p. 26.
- Obbens, F. and Coates, D. (1997). Conservation Biology and Management of Endangered *Lambertia* Species: Project no. 443: Final Report Submitted to the Commonwealth Threatened Species and Communities Section, Biodiversity Group, Environment Australia. Department of Conservation and Land Management, Western Australia.
- Patrick, S.J. (1997). Geraldton District Threatened Flora Recovery Team: Annual Report, 1996. Department of Conservation and Land Management, Western Australia.
- Patrick, S. (1997). How to Create a Local Herbarium. Department of Conservation and Land Management, Western Australia.
- Patrick, S. (1997). Mount Bakewell, an important remnant of natural vegetation in the York area. *CALMScience* 2. pp. 225–229.
- Patrick, S. (1997). Rare and priority flora. In: Information Booklet for the Latham Land Conservation District. Agriculture Western Australia, Three Springs, W.A.. pp. 92–94.
- Patrick, S.J. (1998). Geraldton District Threatened Flora Recovery Team: Annual Report, 1997. Department of Conservation and Land Management, Western Australia.
- Patrick, S., Brand, J. and Meinema, M. (1997). Murchison haven. *LANDSCOPE* 13(2). pp. 42–48.
- Patrick, S., Edinger, D. and Toole, S. (1997). Wildflowers and rare plants of the Murchison, Burnerbinmah Station, 1997. *LANDSCOPE Expeditions* 23.
- Pearson, D.J. and Kinnear, J.E. (1997). A review of the distribution, status and conservation of rock-wallabies in Western Australia. *Australian Mammalogy* 19. pp. 137–152.



- Perth Observatory (1998). Perth Observatory Strategic Plan. Department of Conservation and Land Management, Western Australia.
- Pigott, P. and Armstrong, R. (1997). Garden plants gone wild. *LANDSCOPE* 13(1). pp. 23–27.
- Radomiljac, A.M. (1998). The influence of pot host species, seedling age and supplementary nursery nutrition on *Santalum album* Linn. (Indian sandalwood) plantation establishment within the Ord River Irrigation Area, Western Australia. *Forest Ecology and Management* 102. pp. 193–201.
- Roberts, J.D., Horwitz, P., Wardell-Johnson, G., Maxson, L.R. and Mahony, M.J. (1997). Taxonomy, relationships and conservation of a new genus and species of myobatrachid frog from the high rainfall region of southwestern Australia. *Copeia* 2/1997. pp. 373–381.
- Robinson, C.R. and Keighery, G.J. (1997). Vegetation and flora of Scott National Park and adjacent recreation reserves. *The Western Australian Naturalist* 21. pp. 213–233.
- Robinson, R. and Rayner, M. (1998). *Armillaria luteobubalina* in Regrowth Karri Stands: A Report on the State of Knowledge of *Armillaria* Root Disease in Karri Regrowth Forests in the Southwest of Western Australia and Recommendations for Future Research. Department of Conservation and Land Management, Western Australia.
- Rye, B.L. (1997). A synopsis of the annual species of Cyperaceae from central and southern Western Australia. *Nuytsia* 11. pp. 383–423.
- Sage, L.W. (1997). A Year as Botanist in the Plant Identification Unit: A Report to Dr. Neville Marchant, Director, Western Australian Herbarium. Department of Conservation and Land Management, Western Australia.
- Science and Information Division, Department of Conservation and Land Management, Western Australia (1997). *CALMScience: Western Australian Journal of Conservation and Land Management*. - Volume 2, no. 3. Department of Conservation and Land Management, Western Australia. pp. 191–274.
- Science and Information Division, Department of Conservation and Land Management, Western Australia (1997). *Nuytsia*. - Volume 11, no. 2. Department of Conservation and Land Management, Western Australia. pp. 147–295.
- Science and Information Division, Department of Conservation and Land Management, Western Australia (1997). *Nuytsia*. - Volume 11, no. 3. Department of Conservation and Land Management, Western Australia. pp. 297–430.
- Science and Information Division, Department of Conservation and Land Management, Western Australia (1997). *SID News: Newsletter of the Science and Information Division, Department of Conservation and Land Management*. - Volume 3, issue 2. Department of Conservation and Land Management, Western Australia.
- Shea, S.R., Abbott, I., Armstrong, J.A. and McNamara, K.J. (1997). Sustainable conservation: a new integrated approach to nature conservation in Australia. In: *Conservation Outside Nature Reserves*. Centre for Conservation Biology, Brisbane. pp. 39–48.
- Shearer, B.L., Crane, C.E., Fairman, R.G. and Grant, M.J. (1997). Occurrence of *Armillaria luteobubalina* and pathogen mediated changes in coastal dune vegetation of south-western Australia. *Australian Journal of Botany* 45. pp. 905–917.
- Shearer, B.L. and Fairman, R.G. (1997). Foliar application of phosphite delays and reduces the rate of mortality of three *Banksia* species in communities infested with *Phytophthora cinnamomi* (POSTER ABSTRACT). In: *Programme and Summaries: Australasian Plant Pathology Society, 11th Biennial Conference: Perth, 29 Sep.–2 Oct. 1997*. Australasian Plant Pathology Society, Perth. p. 180.
- Shearer, B.L. and Fairman, R.G. (1997). Phosphite inhibits lesion development of *Phytophthora cinnamomi* for at least four years following trunk injection of *Banksia* species and *Eucalyptus marginata* (POSTER ABSTRACT). In: *Programme and Summaries: Australasian Plant Pathology Society, 11th Biennial Conference: Perth, 29 Sep.–2 Oct. 1997*. Australasian Plant Pathology Society, Perth. p. 181.
- Smith, M. (1997). Aquatic invertebrates and river health. *Western Wildlife: Newsletter of the Land for Wildlife Scheme* 1(3). p. 13.
- Speldewinde, P. (1998). Djoongari (Shark Bay Mouse) Recovery Team: Annual Report, 1997. Department of Conservation and Land Management, Western Australia.
- Speldewinde, P. and Morris, K. (1997). Djoongari (Shark Bay Mouse) Recovery Team: Annual Report, 1996. Department of Conservation and Land Management, Western Australia.
- Start, T. (1997). Bats, the forgotten insect eaters. *Western Wildlife: Newsletter of the Land for Wildlife Scheme* 1(2). pp. 3–4.
- Start, A.N. (1997). The dibbler. In: *Mammal Conservation in Western Australia: Course Notes*. Perth Zoo, pp. 1–7.
- Start, A.N. (1997). The macropods. In: *1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997*. Department of Conservation and Land Management, Western Australia. pp. 1–21.
- Start, A.N. (1998). The Dibbler (*Parantechinus apicalis*): Status and Ecology in Western Australia: Annual Report 1997 and Final Report for the Three-Year Research Plan. Department of Conservation and Land Management, Western Australia. pp. 1–11.
- Start, A.N. and Falconer, F. (1997). Chirruping by southern boobooks. *Western Australian Bird Notes* 81. p. 7.
- Stukely, M.J.C. (1997). Selection and deployment of jarrah (*Eucalyptus marginata*) resistant to *Phytophthora cinnamomi* (POSTER ABSTRACT). In: *Programme and Summaries: Australasian Plant Pathology Society, 11th Biennial Conference: Perth, 29 Sep.–2 Oct. 1997*. Australasian Plant Pathology Society, Perth. p. 290.
- Stukely, M.J.C., Shearer, B.L., Tay, F.C.S., Hart, R.M. and Hart, R.P. (1997). *Phytophthora* species in natural vegetation in Western Australia (POSTER ABSTRACT). In: *Programme and Summaries: Australasian Plant Pathology Society, 11th Biennial Conference: Perth, 29 Sep.–2 Oct. 1997*. Australasian Plant Pathology Society, Perth. p. 199.
- Tay, F. (1997). New *Phytophthora* strain found. *CALM News* Sep.–Oct. p. 5.
- Van Leeuwen, S.J. (1997). Reproductive Biology and Mating System of *Banksia tricuspis* (Proteaceae). Thesis (Ph.D.) -- Curtin University of Technology.
- Ward, B. and Robinson, A. (1997). Field Trip to Western Mining Corporation (Pty Ltd) Nifty Copper Operation Lease Area, May 5–9, 1997. Department of Conservation and Land Management, Western Australia.
- Ward, D. (1998). Fire, Flogging, Measles and Grass: Nineteenth Century Land Use Conflict in South-Western Australia: An Essay on Human Ecology. Department of Conservation and Land Management, Western Australia.
- Ward, D. and Van Didden, G. (1997). Reconstructing the Fire History of the Jarrah Forest of South-Western Australia: A Report to Environment Australia under the Regional Forest Agreement. Department of Conservation and Land Management, Western Australia.
- Wardell-Johnson, G.W., Williams, J.E., Hill, K.D. and Cumming, R. (1997). Evolutionary biogeography and contemporary distribution of eucalypts. In: *Eucalypt Ecology: Individuals to Ecosystems*. Cambridge University Press, Cambridge. pp. 92–128.
- Wayne, A. (1997). Impacts of forest management on native fauna. In: *1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997*. Department of Conservation and Land Management, Western Australia. pp. 1–8.
- Wheeler, I. (1997). Bird censusing. In: *1997 Fauna Conservation Course: Batalling Field Study Centre, 20–24th October, 1997*. Department of Conservation and Land Management, Western Australia. pp. 1–3.
- Wheeler, J. and Keighery, G. (1997). Wildflowers of Shark Bay. Department of Conservation and Land Management, Western Australia.



- Whitford, K. (1998). Progress Report: Tree and Log Hollows in the Jarrah Forest. Department of Conservation and Land Management, Western Australia.
- Whitford, K.R. and Williams, M.R. (1997). Survival of Hollow-Bearing Jarrah (*Eucalyptus marginata* Sm.) and Marri (*Corymbia calophylla*) Trees in the South-West Region of W.A.. Department of Conservation and Land Management, Western Australia.
- Wilkinson, C., Hardy, G.E. St. J. and Shearer, B.L. (1997). The effect of phosphite (phosphonate) on *Phytophthora cinnamomi* zoospore production in planta (ABSTRACT). In: Programme and Summaries: Australasian Plant Pathology Society, 11th Biennial Conference: Perth, 29 Sep.–2 Oct. 1997. Australasian Plant Pathology Society, Perth. p. 36.
- Williams, A.A.E. (1997). The butterflies (Lepidoptera) of Garden and Rottneest islands, Western Australia. *Australian Entomologist* 24. pp. 27–34.
- Williams, M.R. and Atkins, A.F. (1997). The life history of *Trapezites waterhousei* Mayo & Atkins (Lepidoptera: Hesperiiidae: Trapezitinae). *Australian Entomologist* 24. pp. 1–4.
- Williams, M.R. and Faunt, K. (1997). Factors affecting the abundance of hollows in logs in the jarrah forest of south-western Australia. *Forest Ecology and Management* 95. pp. 153–160.
- Williams, M.R., Williams, A.A.E. and Lundstrom, T. (1998). Jewels of the west. *LANDSCOPE* 13(3). pp. 49–53.
- Wilson, P.G. (1997). Brief notes on the genus *Crowea* (Rutaceae). *Nuytsia* 11. pp. 429–430.
- Wilson, P.G. (1998). *Diplolaena* (Rutaceae), a new taxa and nomenclatural notes. *Nuytsia* 12. pp. 107–118.
- Wilson, P.G. (1998). *Illecebrum verticillatum* (Caryophyllaceae), a new record for Australia. *Nuytsia* 12. pp. 155–156.
- Wilson, P.G. (1998). New names and new taxa in the genus *Boronia* (Rutaceae) from Western Australia, with notes on seed characters. *Nuytsia* 12. pp. 119–154.
- Wilson, P.G. (1998). Nomenclatural notes and new taxa in the genera *Asterolasia*, *Drummondita* and *Microcybe* (Rutaceae: Boronieae). *Nuytsia* 12. pp. 83–88.
- Wilson, P.G. (1998). Notes on the genus *Correa* (Rutaceae). *Nuytsia* 12. pp. 89–105.
- Woinarski, J. and Start, T. (1997). Comparison of Fauna Recorded at Two Sites in Drysdale River National Park, 1975 and 1997. Department of Conservation and Land Management, Western Australia.
- Wood, C., Walker, D.I. and Byrne, M. (1997). Genetic variation within and between populations of *Posidonia sinuosa* Cambridge and Kuo (POSTER ABSTRACT). In: Conference Abstracts: Proceedings of the 44th Annual Conference of the Genetics Society of Australia Inc.: University of Western Australia, Nedlands, 28th Sep–1st Oct, 1997. Genetics Society of Australia, Perth. p. 87.