Annual report 2000-2001

working with people and communities to protect and conserve natural and cultural heritage in the NSW landscape

NPWS mission
Contents

Director-General’s foreword 6

Overview 8
Mission statement 8
Role and functions 8
Partners and stakeholders 8
Legal basis 8
Organisational structure 8
Lands managed for conservation 8
Organisational chart 10
Key result areas 12

1 Conservation assessment 13
NSW Biodiversity Strategy 14
Regional assessments 14
Wilderness assessment 16
Assessment of vacant Crown land in north-east New South Wales 19
Vegetation surveys and mapping 19
Wetland and river system survey and research 21
Native fauna surveys and research 22
Threat management research 26
Cultural heritage research 28
Conservation research and assessment tools 29
Performance and future directions 30

2 Conservation planning 31
Biodiversity planning 32
Establishment of parks and reserves 34
Declaration of Aboriginal Areas and Places 36
Plans of management 37
Threatened species planning 39
Cultural heritage planning 40
Marine park planning 41
Other conservation planning 41
Performance and future directions 42

3 Conservation management 43
Working with Aboriginal communities 44
Joint management of national parks 44
Performance and future directions 45
Outside the reserve system 46
Voluntary conservation agreements 46
Biodiversity conservation programs 46
Wildlife management 47
Performance and future directions 48
Ecologically sustainable management of NPWS operations 48
Threatened species conservation 48
Southern Regional Forest Agreement 49
Caring for the environment 49
Waste management 49
Performance and future directions 50
Managing our built assets 51
Buildings 51
Roads and other access 51
Other park infrastructure 52
Thredbo Coronial Inquiry 53
Performance and future directions 54
Managing site use in protected areas 54
Performance and future directions 54
Contributing to communities 55
Contribution to sustainable rural and regional development 55
Tourism 55
Weed management programs 56
Pest animal management programs 58
Regional programs 59
Fire management 59
Performance and future directions 62
4 Conservation facilitation

**Fostering commitment to natural and cultural heritage**

- Acknowledging people’s contributions to conservation
- Educational programs
- Wildmaps of western New South Wales
- Wildlife management manual for the Riverine Plains
- NPWS library
- Visitor centres
- Media and promotions

**Increasing community involvement in conservation**

- Volunteer and community programs

**Enhancing people’s enjoyment of NPWS parks**

- Sydney 2000 Olympics
- Visitor and market research

**Supporting community conservation activities**

- Information services
- Support for community initiatives
- Conservation partnerships

5 Capacity building

**Attracting, developing and retaining a skilled workforce**

- Learning and development
- Aboriginal heritage training
- Performance management
- Workforce diversity and EEO
- Employment and industrial relations
- Occupational health and safety

**Working as a cohesive and informed team**

6 Appendices

A NPWS-managed lands at 30 June 2001
B Significant statutory bodies and committees
C Infringements and prosecutions
D Consultants engaged
E Employee statistics
F Performance statement: Director-General
G Statement of Affairs and Freedom of Information
H New NPWS publications
I Papers published by NPWS staff
J Overseas visits by NPWS staff

7 Financial statements

Notes to and forming part of financial statements
Other financial information

Index of statutory requirements

Contact information
The Hon. Bob Debus, MP  
Minister for the Environment  
Level 25  
59-61 Goulburn Street  
Sydney NSW 2000

Dear Minister  
I have pleasure in presenting the thirty-third Annual Report  
for the New South Wales National Parks and Wildlife  
Service for the year ended 30 June 2001, in accordance with  
the Annual Reports (Departments) Act 1985.

Yours sincerely

Brian Gilligan  
Director-General
Over the past year the NSW National Parks and Wildlife Service (NPWS) has renewed its focus on conservation planning and building better relationships with communities. Being located in regional centres and in country towns across the state enables us to actively assist community groups plan conservation programs and activities within a regional context, thus moving beyond the formal reserve system.

There is an increasing level of community interest in our work and the community justifiably has very high expectations of the NPWS with community concern about animal welfare and pest control a clear example of this interest. Involving local communities in the decision-making process facilitates the development of a shared vision for conservation in NSW.

In 1999-2000 a new NPWS corporate plan was established for the period 2000 to 2003. In this, the second year of the corporate plan, work on the priorities identified in the plan continued and a number of new programs were initiated.

This year’s range of achievements includes:

- contribution to the Sydney 2000 Olympic Games by hosting venues and providing logistical support, expertise and volunteers
- the inscription of the Greater Blue Mountains World Heritage Area
- continuing to build the reserve system in the west of the State
- completion of the Southern Comprehensive Region Assessment
- establishment of the Nature Conservation Trust
- management of the significantly increased Dunphy Wilderness Fund
- dedication of the Mount Drysdale Aboriginal Place
- publication of a handbook Pilaarrkiyalu of the Cobar Peneplain: Ngiyampaa traditional uses of plants and animals
- negotiation of the 100th voluntary conservation agreement
- implementation of the outcomes of Walker Report on Thredbo and the management of resorts in Kosciuszko National Park.
- production of A Resource Worth Protecting: An information kit for licensed tour operators and tour guides in national parks and reserves
- signing of a memorandum of understanding with recreational 4WD clubs.

The year 2000-2001 has also seen the consolidation of the new organisational structure, an increased focus on working with the community, and the integration of our three conservation themes into all strategic and operational plans. These themes are:

- movement beyond the formal reserve system, towards achieving conservation goals across the whole landscape
- management of the reserve system within a regional landscape context
- enhancement of the reserve system.

The scale and complexity of the role of the NPWS continues to grow and building our capacity to manage complex and constantly changing issues is becoming increasingly important. More than 5.5 million hectares is now in reserves managed by the NPWS. We are involved in more than 300 research programs and have thousands of cooperative conservation programs, including nearly 900 cooperative feral pest control programs.
The community and government require us to demonstrate cost effectiveness in our programs. The NPWS contributes valuable expertise and information to enhance the economic viability of programs and sites and to convey the important contribution conservation can make to the economy of the state.

To strengthen our capacity to plan and deliver strategic outcomes a management program to foster team building has been implemented with all managers and is now being tailored for other key staff. We are also using working groups to identify statewide issues of significance and provide policy and operational input.

Many staff received national and international recognition for the excellence of their work. For example Dr Bob Pressey, Principal Research Scientist, was awarded the Society of Conservation Biology Edward T. LaRoe III Award – for making an outstanding contribution to the application of science to nature conservation. This is the first time that the award has gone to a scientist outside the USA. Dr Richard Kingsford, Principal Research Scientist, was awarded the prestigious POL Eureka environmental research prize for his work on waterbirds and river ecology in the wetlands of western NSW.

The 2001 Energy Australia National Trust Heritage Awards commended the adaptive reuse of Fort Denison in Sydney Harbour National Park, and Smoky Cape Lighthouse in Hat Head National Park. The NPWS Blue Mountains Heritage Centre received an Award of Distinction in the State Tourism Awards and a number of other NPWS entries were finalists, including Montague Island Tours.

The NPWS is supported by many organisations and individuals, in particular by the efforts of the members of the National Parks and Wildlife Advisory Council and Advisory Committees. In this International Year of Volunteers, I would like to acknowledge the many thousands of people who contribute to conservation through their voluntary work with NPWS, and to thank our fundraising specialist, the Foundation for National Parks and Wildlife.

My thanks also go to all staff for their dedication and commitment throughout what has been for some a difficult year, and for all a busy year. In particular I wish to acknowledge those who have been involved in the investigation of the Ku-ring-gai fire tragedy, and in supporting the colleagues, friends and families of those who were injured and those who lost their lives.

The NPWS is a larger and stronger organisation than it was 12 months ago. We have consolidated many changes, rebuilt where we needed to, and extended our role in conservation across the landscape, working with communities to build a shared vision for natural and cultural heritage conservation in NSW. I look forward to continuing this process with staff and communities and I know that we will face the challenges of the next year with dedication and commitment, as well as an enhanced capacity to succeed.

Brian Gilligan
Director-General
Overview

Mission statement
Working with people and communities to protect and conserve natural and cultural heritage in the NSW landscape.

Role and functions
The role of the National Parks and Wildlife Service (NPWS) is to lead the community in the development of a system of ecologically sustainable and integrated landscape management which conserves nature and cultural heritage and has as its centrepiece the public reserve system.

The functions of the NPWS are:
- to ensure the conservation of protected native animals and plants throughout NSW
- to protect and manage Aboriginal sites, objects and places of special significance to Aboriginal people
- to promote community awareness, understanding and appreciation of the conservation of nature and our cultural heritage
- to investigate and acquire land for inclusion in a system of national parks and nature reserves to conserve a complete range of the natural environment of the state
- to manage historic places within the NPWS estate and to acquire historic places of significance
- to manage these areas and culturally significant features for enjoyment and conservation
- to identify, protect and manage wilderness throughout NSW.

Partners and stakeholders
NPWS partners and stakeholders are a large and diverse group. They include park visitors, educators, neighbours, rural landholders, industry, conservation groups, recreational use groups, Aboriginal communities, volunteers, the media, government departments and other agencies such as local councils and tourism associations.

Legal basis

Under the National Parks and Wildlife Act 1974 the Director-General of the National Parks and Wildlife Service is responsible for the care, control and management of all areas reserved or dedicated as national parks, historic sites, nature reserves, Aboriginal areas and state game reserves. State recreation areas, karst conservation reserves and regional parks are also administered under the Act. The Director-General is also responsible, under this Act and certain provisions of the Threatened Species Conservation Act 1995, for the protection and care of native fauna and flora and Aboriginal places and relics throughout NSW.

Under the Wilderness Act 1987 NPWS is responsible for the investigation, protection and management of wilderness in NSW.

In addition, the Marine Parks Act 1997 established the Marine Parks Authority, which comprises the Director-General of the Premier’s Department (chairperson), the Director-General of the National Parks and Wildlife Service and the Director of Fisheries. The Authority reports to the Minister for the Environment and the Minister for Fisheries, and undertakes functions imposed or conferred by the Marine Parks Act 1997, the National Parks and Wildlife Act 1974, and the Fisheries Management Act 1994. The Authority is responsible for declaring and managing activities in marine parks for the purposes of conserving marine biological diversity, maintaining the function of marine ecosystems and permitting ecologically sustainable use.

Organisational structure
The NPWS is a highly decentralised organisation, with some 75 per cent of staff based in the field. The NPWS structure comprises four corporate directorates based at Hurstville and four field directorates which have their main centres in Grafton, Queanbeyan, Parramatta and Dubbo.

The field directorates incorporate 19 regions, made up of more than 50 areas, with offices located in local towns. There are also a number of visitor information centres and works depots strategically located to meet the needs of the community and to manage protected areas.

Field directorates are responsible for achieving the conservation of natural, historic and Aboriginal heritage at a local and regional level, not only with respect to park and reserve planning and management, but across their geographic area of operation. To do this, field directorates develop partnerships with the community and other governments and agencies, and provide leadership and direction through conservation programs in accord with government initiatives and NPWS priorities.

Corporate directorates coordinate the development and review of Service-wide priorities, policies, standards, systems and procedures; provide policy advice to the executive and the Minister for the Environment; advise and support field directorates on policy, technical, educational, communication, marketing and administrative matters; and provide legal advice.

The NPWS organisational structure at 30 June 2001 is shown by the chart on page 10.

Lands managed for conservation
Under the National Parks and Wildlife Act 1974 there are eight categories of land managed for conservation – national parks, nature reserves, historic sites, Aboriginal areas, state game reserves, karst conservation areas, state recreation areas and regional parks.
National parks are relatively large areas of land set aside for their predominantly unspoiled natural landscape, flora and fauna. They are permanently reserved for conservation and for public education and recreation and, apart from essential management, are preserved in their natural state.

Nature reserves are areas of special scientific interest, containing wildlife or natural features. Management practices aim at maximising the value of the area for scientific investigation and educational purposes.

Historic sites are areas of national importance that are preserved, and include buildings, objects, monuments or landscapes.

Aboriginal areas are places of significance to Aboriginal people or sites containing relics of Aboriginal culture.

State game reserves are areas set aside for propagating game species.

Karst conservation reserves are areas managed to protect significant surface and underground land formations in karst regions.

State recreation areas are lands reserved for outdoor recreation and enjoyment.

Regional parks are areas substantially modified since European occupation that offer open space and recreational opportunities for major regional population centres.

National parks and historic sites are managed in such a way that their natural and cultural features are conserved while still allowing visitors to use and enjoy them. State recreation areas and regional parks are managed to maximise their recreational potential while preserving and protecting their natural features. Because nature reserves and Aboriginal sites are conserved for scientific and cultural values and are small in area, public access is often limited.

At 30 June 2001 5,387,102 hectares were reserved under the National Parks and Wildlife Act. This represents approximately 6.7 per cent of the total land area of NSW.

**Summary of land reserved at 30 June 2001**

<table>
<thead>
<tr>
<th>Category</th>
<th>How many</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National parks</td>
<td>161</td>
<td>4,442,200</td>
</tr>
<tr>
<td>Nature reserves</td>
<td>359</td>
<td>794,877</td>
</tr>
<tr>
<td>Historic sites</td>
<td>13</td>
<td>2,635</td>
</tr>
<tr>
<td>Aboriginal areas</td>
<td>11</td>
<td>11,643</td>
</tr>
<tr>
<td>State recreation areas</td>
<td>22</td>
<td>126,368</td>
</tr>
<tr>
<td>Regional parks</td>
<td>10</td>
<td>4,970</td>
</tr>
<tr>
<td>Karst conservation areas</td>
<td>4</td>
<td>4,409</td>
</tr>
<tr>
<td><strong>Total area</strong></td>
<td></td>
<td><strong>5,387,102</strong></td>
</tr>
</tbody>
</table>

A full list of lands managed for conservation and other NPWS lands appears at Appendix A.
Organisational chart
Structure of the NSW National Parks and Wildlife Service as at 30 June 2001
| Director Policy and Science  
| ---  
| **MICHAEL WRIGHT**  
|  
| Manager Biodiversity Research & Management Division  
| Caroline Lemere  
| Units  
| Biodiversity Research Group  
| Biodiversity Management  
| Pest Management Coordination  
| Wildlife Management Coordination  
| Scientific Committee/BDAC  
| Support  
|  
| Manager Strategic Policy Division  
| Angela Langdon  
| Units  
| Conservation Economics  
| Major Programs  
| Policy Development Group  
|  
| Manager Cultural Heritage Division  
| Jason Ardler  
| Units  
| Cultural Heritage Policy & Programs  
| Cultural Heritage Information Systems  
| Cultural Heritage Research  
| Central Aboriginal Heritage  
| Northern Aboriginal Heritage  
| Southern Aboriginal Heritage  
| Western Aboriginal Heritage  
|  
| Manager Geographic Information Systems Group  
| Malcolm Stephens  
|  
| Manager Landscape Conservation Division  
| Jo White  
| Units  
| Conservation Assessment & Priorities  
| Conservation Management  
| Conservation Planning  
| Fire Management  
|  
| Manager Education and Community Programs  
| **SALLY BARNES**  
|  
| Manager Education & Community Involvement Unit  
| Lynn Wobber  
|  
| Manager Marketing & Information Division  
| Andrew Mitchell  
| Units  
| Library  
| National Parks Centre  
| Publications  
| Visitor & Tourism Marketing  
|  
| Manager Strategic Policy Division  
| Angela Langdon  
| Units  
| Conservation Economics  
| Major Programs  
| Policy Development Group  
|  
| Manager Cultural Heritage Division  
| Jason Ardler  
| Units  
| Cultural Heritage Policy & Programs  
| Cultural Heritage Information Systems  
| Cultural Heritage Research  
| Central Aboriginal Heritage  
| Northern Aboriginal Heritage  
| Southern Aboriginal Heritage  
| Western Aboriginal Heritage  
|  
| Manager Geographic Information Systems Group  
| Malcolm Stephens  
|  
| Manager Landscape Conservation Division  
| Jo White  
| Units  
| Conservation Assessment & Priorities  
| Conservation Management  
| Conservation Planning  
| Fire Management  
|  
| Manager Education and Community Programs  
| **SALLY BARNES**  
|  
| Manager Education & Community Involvement Unit  
| Lynn Wobber  
|  
| Manager Marketing & Information Division  
| Andrew Mitchell  
| Units  
| Library  
| National Parks Centre  
| Publications  
| Visitor & Tourism Marketing  
|  
| Manager Strategic Policy Division  
| Angela Langdon  
| Units  
| Conservation Economics  
| Major Programs  
| Policy Development Group  
|  
| Manager Cultural Heritage Division  
| Jason Ardler  
| Units  
| Cultural Heritage Policy & Programs  
| Cultural Heritage Information Systems  
| Cultural Heritage Research  
| Central Aboriginal Heritage  
| Northern Aboriginal Heritage  
| Southern Aboriginal Heritage  
| Western Aboriginal Heritage  
|  
| Manager Geographic Information Systems Group  
| Malcolm Stephens  
|  
| Manager Landscape Conservation Division  
| Jo White  
| Units  
| Conservation Assessment & Priorities  
| Conservation Management  
| Conservation Planning  
| Fire Management  
|  
| Manager Education and Community Programs  
| **SALLY BARNES**  
|  
| Manager Education & Community Involvement Unit  
| Lynn Wobber  
|  
| Manager Marketing & Information Division  
| Andrew Mitchell  
| Units  
| Library  
| National Parks Centre  
| Publications  
| Visitor & Tourism Marketing  
|  
| Manager Strategic Policy Division  
| Angela Langdon  
| Units  
| Conservation Economics  
| Major Programs  
| Policy Development Group  
|  
| Manager Cultural Heritage Division  
| Jason Ardler  
| Units  
| Cultural Heritage Policy & Programs  
| Cultural Heritage Information Systems  
| Cultural Heritage Research  
| Central Aboriginal Heritage  
| Northern Aboriginal Heritage  
| Southern Aboriginal Heritage  
| Western Aboriginal Heritage  
|  
| Manager Geographic Information Systems Group  
| Malcolm Stephens  
|  
| Manager Landscape Conservation Division  
| Jo White  
| Units  
| Conservation Assessment & Priorities  
| Conservation Management  
| Conservation Planning  
| Fire Management  
|  
| Director Corporate Services  
| **ARTHUR DIAKOS**  
|  
| Manager Business Development Division  
| David Roman  
| Units  
| Business Analysis  
| Business Operations  
| New Business Projects  
|  
| Manager Finance Division  
| Clare Castagnet  
| Units  
| Administrative Services  
| Corporate Finance  
| Management Accounting  
| System Support  
| Finance Service Centres  
|  
| Manager Information Management & Technology Division  
| Muhammad Khan  
| Units  
| Information Systems  
| Operations & Support  
| User Support  
| Records Management  
|  
| Manager Workforce Services Division  
| Helen Anderson  
| Units  
| Employee Relations & Conditions  
| Human Resource Information Systems  
| Occupational Health & Safety  
| Workforce Development  
| Workforce Planning  
| Human Resources Service Centres  
|  
| Director Legal Services  
| **VIVIENNE INGRAM**  
|  
| Units  
| Legal Operations  
| Policy & Law  
|  
|
Other protected areas

Six other types of areas are identified for protection under the provisions of the National Parks and Wildlife Act 1974.

Aboriginal places are areas of significance to Aboriginal culture which, after gazettal, have the full protection of the National Parks and Wildlife Act 1974.

Protected archaeological areas contain significant Aboriginal relics and are declared with the consent of the owner or occupier of the land on which they occur. They may be opened for public inspection with the owner’s consent, under conditions designed to protect the Aboriginal relics they contain.

Wildlife refuges are declared over Crown land and privately owned land with the owner’s consent to preserve, conserve, propagate and study wildlife and to conserve, study and simulate natural environments.

Wildlife management areas (formerly game reserves) are declared over private or Crown land for game conservation in its broadest sense, including game hunting for recreation during a proclaimed period.

Conservation areas may cover privately or publicly owned land with the consent of the owner and, in accord with the conservation agreement for the area, may protect natural or cultural features, wilderness or areas of special scientific interest. Conservation agreements are registered and run with the title of the land.

Wilderness protection agreement areas under the Wilderness Act 1987 may cover land owned or controlled by a statutory authority or government department to protect and provide for management of wilderness outside the park and reserve system.

Key result areas

The NPWS Corporate Plan 2000-2003 adopts a holistic approach to conservation which integrates natural, cultural and community values. This approach to conservation is described as ‘landscape conservation’, and involves working to achieve conservation outcomes across all lands, not only those managed by NPWS.

Achievement of landscape conservation is dependent on outcomes in four key areas: assessment, planning, management and facilitation. A fifth key result area – capacity building – is an essential prerequisite. These five key result areas provide the framework for the planning and programming of activities, for annual budget submissions to Treasury and for the evaluation of NPWS performance.

Conservation assessment covers the gathering of knowledge, and the development and application of tools and techniques for assessing and monitoring both natural and cultural heritage across the landscape and community conservation attitudes and values.

Conservation planning covers the making of judgments about what to conserve (priorities for conservation) and how best to do this, and the development of processes by which this is done.

Conservation management covers the management of natural and cultural heritage values across the state, incorporating:

- conservation incentives, education and advice
- regulation and enforcement
- the nurture and rehabilitation of the natural and cultural heritage landscape, including protected areas and beyond
- the establishment of appropriate reserves
- the ecologically sustainable use of protected areas.

Conservation facilitation covers the encouragement and support of community stewardship of the natural and cultural heritage across the landscape, and the sharing of appreciation and enjoyment of this heritage.

Capacity building covers the development and retention of committed and skilled staff, and the development and implementation of policies, systems and procedures to ensure that NPWS is an effective organisation focused on the achievement of conservation outcomes for NSW.

Allocation of resources to key result areas

Net cost of services 2000-2001

<table>
<thead>
<tr>
<th>Key Result Area</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation facilitation</td>
<td>41%</td>
</tr>
<tr>
<td>Conservation assessment</td>
<td>14%</td>
</tr>
<tr>
<td>Conservation planning</td>
<td>12%</td>
</tr>
<tr>
<td>Conservation management</td>
<td>33%</td>
</tr>
</tbody>
</table>

Net cost of services in relation to capacity building is subsumed under other key result areas.
The gathering of knowledge, and the development and application of tools and techniques for assessing and monitoring both natural and cultural heritage across the landscape and community conservation attitudes and values.
Conservation assessment is undertaken to increase understanding of the values and status of natural and cultural heritage resources in New South Wales. It enables informed decision making by government authorities, land owners and managers, and the community across New South Wales. The key objective of NPWS conservation assessment activities is to ensure the use of rigorous and systematic policy, science and assessment as the basis for conservation planning and management. The emphasis is on relevant, adaptive approaches to the management of natural and cultural resources, linking community and conservation values.

**NSW Biodiversity Strategy**

The NSW Biodiversity Strategy is a whole-of-government initiative which establishes a framework for coordinating and integrating government and community efforts for the conservation of biodiversity across all landscapes in New South Wales. The NPWS is responsible for coordinating the implementation of this strategy, and provides secretariat support to the Biodiversity Strategy Implementation Group, an interagency committee which oversees the implementation of projects across government.

The Biodiversity Strategy focuses on five key themes, around which are organised several priority actions, supporting actions and performance targets. The themes addressed in the Strategy are:

1. Community consultation, involvement and ownership
2. Conservation and protection of biodiversity
3. Threatening processes and their management
4. Natural resource management
5. Improving our knowledge

Funding of $5.268 million has been allocated by the government over the three years 1998-1999, 1999-2000 and 2000-2001 for projects addressing eight of the priority actions under the NSW Biodiversity Strategy, with $1.7 million allocated in 2000-2001. This included funds for NPWS projects to address the following priority actions:

- improve the accessibility of biodiversity information
- bioregional planning and assessment
- improve cooperative approaches to weed and pest management
- manage fire in accordance with ecologically sustainable development (ESD) principles
- develop local Biodiversity Action Plans
- implement the Biodiversity Survey Program

Detail on these projects is provided throughout this report. A copy of the Biodiversity Strategy can be downloaded from the NPWS website at: www.npws.nsw.gov.au/wildlife/biodiversity.html. Copies can also be obtained from the NPWS Information Centre at The Rocks, telephone 1300 361 967 within NSW, or 02 9253 4600.

**Regional assessments**

**Integrated Biodiversity Conservation Assessment Program**

Funds of $2.718 million have been allocated over three years through the NSW Biodiversity Strategy for a package of projects under the Integrated Biodiversity Conservation Assessment (IBCA) Program. This program aims to establish conservation priorities at the bioregional level through the use of a conservation assessment framework. The resulting priorities will be used to guide reserve establishment and for a range of off-reserve conservation programs, including the integration of conservation priorities into natural resource plans. The IBCA program also includes a number of projects at the statewide level that will enable conservation assessment across a broader scale. Some of these IBCA projects are listed below.

**Framework for bioregional assessment**

A framework was finalised during the year to guide practitioners through the stages of a bioregional or other regional conservation assessment. The framework identifies the fundamental processes which form the basis of these assessments. It also indicates the current state of knowledge, any standards which exist, and, because the situations confronting those undertaking this work will differ, discusses alternative paths to an assessment.

The framework is targeted at those responsible for undertaking bioregional assessments or contributing to processes such as regional vegetation management or environmental plans, and catchment management boards. The language used in the framework assumes a level of familiarity with the elements of biodiversity conservation. It identifies processes to facilitate the establishment of meaningful conservation targets. It also outlines some of the tools available to assist practitioners to make decisions on the best configuration for conservation.
areas, identifies data collection and management issues, and addresses management and monitoring.

**Statewide GIS conservation monitoring**

This project is developing a conservation monitoring system that can be used to chart the progress of conservation management across New South Wales. The collection and refinement of statewide geographic information system (GIS) layers is nearing completion. This information and its statistical analysis will enhance conservation assessment and management in New South Wales by enabling the identification of gaps in the reserve system, measuring reservation bias and identifying future conservation priorities. The project will also assist statewide and national monitoring mechanisms such as State of the Environment, State of the Parks, the National Reserve System Program, the State Reserve System Program and NPWS community conservation programs. One of the highlights of the project is the delineation of subregions across all bioregions in New South Wales.

**Ecosystem project**

This project is delineating the state’s ecosystems using a range of biotic and abiotic features of the landscape. Once the delineation is complete, it will be possible to identify and report on the status of conservation assessment and planning for each ecosystem. The most significant outcome will be a comprehensive synthesis of information gathered from within and outside the NPWS. This information will be contained in a linked database accessible to a wider audience. The database will be particularly useful in cases where specific features of an ecosystem are of interest and will be an extremely useful tool for future conservation planning.

**Bioregional overviews**

New South Wales contains a diverse range of landscapes, vegetation, geology and other features. A broad framework for assessing these landscapes has been established through the process known as the Interim Bioregionalisation of Australia (IBRA). In New South Wales, four of these bioregions are well represented in reserves and off-park conservation areas. These include the fertile, high rainfall coastal areas of the Sydney Basin, the Australian Alps, and the arid zone desert landscapes in the Tibooburra Downs region. The landscapes that are not well reserved and do not adequately conserve biodiversity include those occurring on the tablelands, slopes and plains. These bioregions have mostly been highly altered and impacted by threatening processes, including vegetation clearing, intensive agriculture, irrigation and mining.

The bioregional overview project has compiled textual snapshots of the characteristics and conservation significance of each bioregion in New South Wales. These snapshots will allow a wide audience to appreciate the conservation significance of these landscapes and to understand the future challenges for conservation and management of natural resources in this state. The final report will assist NPWS employees, local communities, land managers, conservation planners and all levels of government and industry.

**Darling Riverine Plains bioregional assessment**

The Darling Riverine Plains coarse-level bioregional conservation assessment is a three-year project to be completed by March 2002. In 2000-2001 flora and fauna surveys were taken in the Darling Riverine Plains bioregion, an area covering 94,000 square kilometres and stretching from Moree to Menindee. The local community and landholders were involved in these surveys. The information resulting from this project will be used by communities for the development of regional vegetation, catchment and river management plans. The survey results will also be used to target conservation efforts in the bioregion and to work with landholders to conserve biodiversity on their properties.

**Nandewar bioregional assessment**

Of the 14 bioregions in New South Wales, Nandewar ranks fourth in terms of the amount of land clearance. The Nandewar bioregional assessment is the first project to examine the biodiversity of this region systematically. The assessment will be completed in three stages, over five years. Stage one, the Nandewar Bioregion Scoping Project, is nearing completion following two years of investigation. Stage two, a biodiversity survey program, will continue for the next two years.
The initial survey results have already increased the knowledge of biodiversity in the bioregion. Outcomes from the assessment will be used by community and government stakeholders and provide the capacity to undertake informed land evaluations of different conservation options.

South-West Slopes
A scoping study for a conservation assessment of the south-west slopes was undertaken between May 2000 and February 2001. The bioregion contains 16 per cent native vegetation cover. Vegetation communities dominated by yellow box, Blakely’s red gum, white box, red box and grey box generally occur at less than 10 per cent of their pre-European distribution. A study using high-resolution satellite imagery found that small remnants represent a substantial proportion of the remaining vegetation of these communities. Approximately two-thirds of the bioregion’s vegetation has not been mapped to a standard that is suitable for a comprehensive bioregional assessment and those that have been mapped are biased towards reserves and state forests. A pilot study investigating methods for mapping native vegetation on the slopes was undertaken as part of this scoping exercise. The draft report for this project has been prepared.

Other IBCA Program projects commenced in 2000-2001
Other projects which began in 2001 include:
• scoping for a bioregional conservation assessment for Brigalow Belt South is to be completed in 2001
• development of a framework for assessing conservation priorities in Sydney region is to be completed in 2001
• development of a coarse level statewide mapping of native vegetation coverage in New South Wales, drawing on existing information, is to be completed in 2001

Cobar Penplain biogeographic region
The Cobar Penplain Bioregional Assessment and Planning Project completed its report series in early 2001. The nine documents produced will be released widely, and should make a significant contribution to the management of biodiversity and ecosystems in the Cobar Penplain biogeographic region.

The handbook Pilaarrkiyalu of the Cobar Penplain: Ngiyampaa traditional uses of plants and animals was launched by the Minister for the Environment in April 2001 at the Mt Grenfell Historic Site, 50 kilometres north-west of Cobar. It was warmly received by both the Aboriginal and broader community, and is being distributed widely. The handbook details the cultural history, language, and traditional ecological knowledge and use of animals and plants from the Pilaarrkiyalu people’s homeland west of Cobar.

The Fauna of Western New South Wales: the Cobar Penplain Biogeographic Region is another important resource produced by the project, and is the third report in the Fauna of Western New South Wales series. Employing a user-friendly style, this report details the fauna and major vegetation communities within the Cobar Penplain, the methods used by the project to survey them, and ways in which landowners can manage their properties to conserve biodiversity and ecosystems.

Key habitats and habitat corridors in north-east New South Wales
The NPWS has completed derivation and mapping of key habitats and corridors throughout northern New South Wales. The results are being used by regional vegetation committees, water advisory committees and catchment management boards. Key habitats and corridors have also been derived for the Eurobodalla area catchment and Cumberland Plains.

Wilderness assessment*
Wilderness is defined as a large natural area of land which, together with its native plant and animal communities, is in a relatively natural state. This means it has not been substantially modified by non-indigenous human activity, or if it has been modified, is capable of restoration. The Wilderness Act 1987 provides for the identification, declaration and management of wilderness and promotes public education on wilderness. The Act requires the Director-General of the NPWS to report on the status of areas of New South Wales identified as wilderness and on matters relating to such areas. Information on past NPWS activities in this regard is contained in previous NPWS annual reports.

The wilderness process
Wilderness proposals
Under the provisions of section 7 of the Wilderness Act 1987, any person, body or organisation may submit a written proposal that an area of land be identified or declared as wilderness. The NPWS can also assess an area for wilderness values independent of any proposal. The Director-General of the NPWS is required to provide advice to the Minister for the Environment in respect of any wilderness proposal within two years.

In June 2000, the NPWS received a wilderness proposal which nominated a package of lands which incorporated much of the area that had been assessed as part of the recent southern New South Wales comprehensive regional assessment (CRA) (see below). The NPWS will make a decision on this proposal when the wilderness component of this CRA is finalised. A proposal for additions to the Grattai wilderness at Mount Kaputar was received in July 2000. The proposal has since been accepted and the area will be assessed jointly with an earlier proposal for additions to the Nandewar and Rusden wilderness areas, also in the Mount Kaputar area.

* In 2001 NPWS adopted a standardised method of calculating and reporting on wilderness statistics, using the NPWS digital mapping system. The figures for wilderness areas quoted in this report will therefore be inconsistent with those of previous years, where data were derived from a variety of sources.
No other wilderness nominations were received during the 2000-2001 year; however a preliminary assessment of the wilderness values of Yengo and Murruin was undertaken as part of the lower north-east and southern CRA wilderness assessments. A wilderness assessment report for Yengo is expected to be released for public comment before the end of 2001.

**Wilderness identification and declaration**

Once an area is proposed as wilderness, the NPWS investigates it to determine whether it is capable of being identified as wilderness. The area must be in a substantially natural state, be large enough to maintain this natural state and provide opportunities for solitude and self-reliant recreation. Areas meeting all three criteria may be identified as wilderness by the Director-General of the NPWS. The NPWS then assesses whether the area is suitable to be managed as wilderness. During the *suitability* assessment phase, identified wilderness areas are overlaid with social, tenure, recreational and management factors to determine what part, if any, should be declared as wilderness. Only declared wilderness is required by law to be protected and managed as wilderness under the Wilderness Act. While private and Crown leasehold lands may be identified as wilderness, identification does not constrain land use.

For each wilderness assent, the NPWS prepares a report for public comment, so that the views of the public can be considered before a decision is made on wilderness declaration.

The 2000-2001 period has seen the completion of major wilderness assessments in northern and southern New South Wales. The comprehensive regional assessments for upper and lower north-east, and for southern New South Wales included a study of each regions’ wilderness values, regardless of tenure. As a result, substantial areas have been identified as wilderness. A decision on wilderness declarations will be made following public exhibition of the assessment reports and consideration of public submissions.

**Identified and declared wilderness areas at 30 June 2001**

Wilderness protection agreements and conservation agreements are voluntary agreements made between the Minister for the Environment and other parties that own or manage land. These agreements place certain restrictions over the management of the subject area. Protection agreements can be made between the Minister and statutory authorities or government departments, and conservation agreements can be made between the Minister and private landholders.

Any areas declared as wilderness must be managed in ways which retain their wilderness values. Wilderness can be declared over NPWS estate, including national parks and nature reserves and other public lands covered by wilderness protection agreements. Freehold land can only be declared wilderness where it is covered by a conservation agreement. The Wilderness Act allows the declaration of wilderness outside national parks, nature reserves and government lands only with the consent of the landholder, and in the case of Crown leasehold the lessee must also consent. Government policy dictates that there can be no resumption of freehold or
leasehold lands for wilderness purposes. Declaration of wilderness over government lands such as state forest can only proceed with the approval of the relevant Minister.

As at 30 June 2001, 710,606 hectares of NPWS-managed land were identified as wilderness. This is just under 1 per cent of the total NPWS estate. Over the same period, 1,587,744 hectares of land was declared as wilderness in New South Wales, constituting 29 per cent of the total NPWS estate, and 2 per cent of the total land area of New South Wales. These areas are listed in Appendix A.

Apart from NPWS-managed lands, no wilderness protection agreements currently exist over public lands. One small area of freehold land in the declared Budawang wilderness is being managed under a voluntary conservation agreement.

Public exhibition and consultation
Wilderness assessment reports are publicly exhibited before a wilderness declaration is made. The NPWS has a continuing commitment to wide-reaching public consultation regarding wilderness identification and declaration. The extensive public consultation process includes information mailouts to affected and adjoining landholders; mailouts to regional and state interest groups and stakeholders; advertising in local and metropolitan newspapers; poster displays at NPWS regional offices, local councils, libraries and other community focal points; and meetings with key stakeholders and interest groups.

Wilderness assessments 2000-2001
North-east New South Wales
In north-east New South Wales, 475,876 hectares were proposed for assessment, identification and declaration of wilderness through individual, government and group submissions. These areas were assessed as part of the wilderness component of the comprehensive regional assessment for upper north-east (UNE) and lower north-east (LNE) New South Wales. Two rounds of wilderness identification have resulted. Stage 1 was completed in March 2000 and resulted in the identification of 10 wilderness areas covering a total of 84,243 hectares. Stage 2 was completed in May 2001 and resulted in the identification of a further 142,131 hectares of wilderness. The results of these assessments will be exhibited publicly from 26 July to 20 September 2001. This component includes:

- areas identified as wilderness in stages 1 and 2 of the UNE/LNE wilderness assessment
- the Levers Wilderness, identified in 1997 (15,372 hectares)
Vegetation surveys and mapping

The NPWS compiles vegetation surveys and mapping which are vital for management planning of parks and reserves; fire monitoring and management; weed control strategies; and effective management of threatened species. NPWS vegetation mapping, which is often unique in its high quality, is also used for regional vegetation planning.

Systems and processes are being developed to improve the collection, integration and interpretation of data. These include a Global Positioning System (GPS) unit connected to a handheld computer which will enhance field-based data collection and real-time mapping.

Major surveys carried out during the year included:

• **Tarengo leek orchid**, to find additional populations. As the survey did not find other populations, high priority will be assigned to propagation and augmentation of existing populations.

• **Bega wattle** (*Acacia georgensis*), where a survey confirmed reports of current locations and documented new populations in the Wadbilliga and Bemboka areas.

• **Small purple pea** (*Swainsona recta*) The NPWS continues to manage and monitor 32 research plots established in 1994 to help determine the most appropriate burning regimes for the management of this endangered grassland plant. The NPWS also continues to coordinate regular ecological management burns (with the assistance of local Rural Fire Service brigades) of the rest of the native grassland on the easement.

• **Mongarlowe mallee** (*Eucalyptus recurva*) Surveying has confirmed the rarity of this species. The species is not reproducing in the wild, it produces very little seed, and the seed that is produced has been found to be of hybrid origin. Some hand cross-pollination work was undertaken between four of the known plants of the Mongarlowe mallee in an attempt to produce viable seed that could be grown into pure-bred individuals of the species. The success or otherwise of these pollination attempts is not yet known.

• **East Lynne midge orchid** (*Genoplesium vernale*) A joint survey by the NPWS and State Forests produced a report which details all data obtained, including the nine additional sites supporting the East Lynne midge orchid discovered during this survey.

• **Tallong midge orchid** (*Genoplesium plumosum*) A detailed population count was conducted at all known sites of the Tallong midge orchid. Additional surveys of likely potential habitat were also undertaken, but only one new site supporting this orchid was discovered.

• **Small-leaf pomaderris** (*Pomaderris elachophylla*) Targeted surveys resulted in the identification of three new populations of the species, as well as confirming the continued presence of plants at three known localities. These surveys will provide a basis for longer-term monitoring of populations within the state.

• options for wilderness declaration boundaries, which include the above identified wilderness and additional areas which were previously identified and are now able to be considered for declaration (58,270 hectares)

**Southern New South Wales**

In 2000 the NPWS completed its wilderness assessment of southern forests, involving the assessment of 314,000 hectares contained in 20 study areas. These study areas were drawn up on the basis of information collected during the comprehensive regional assessment and during the preceding public consultation phase in 1999.

On 20 December 2000 the Director-General endorsed the Southern Wilderness Assessment Report (SWAR) and identified 200,484 hectares of wilderness in the southern CRA region. This resulted in six new identification areas plus the identification of 20 areas adjacent to existing declared wilderness.

The SWAR was placed on public exhibition from March to May 2001. One of the most comprehensive consultation programs ever was undertaken during the assessment and exhibition period. The success of this consultation program is reflected in the record number of submissions received (over 20,000) and the positive feedback from a diverse range of community groups and individuals.

The immediate task in the next financial year is to complete processing of the submissions and log and report on the issues raised. A Summary and Analysis of Submissions Report will then be prepared and presented to the government.

The government will refer to this report when deciding which areas of the identified wilderness will be declared under the Wilderness Act.

**Grose wilderness**

The wilderness process was completed this year for the Grose wilderness, resulting in the declaration of almost 38,000 hectares on 11 May 2001.

**Assessment of vacant Crown land in north-east New South Wales**

The Forest Agreements for the upper and lower north-east regions of New South Wales require the NPWS to assess the conservation values of remaining vacant Crown land and negotiate the establishment of reserves over areas found to contain high conservation values.

The NPWS has assessed the remaining vacant Crown land and identified a further 38,000 hectares of high conservation value. Negotiations are continuing to add these lands to the reserve system.
Other vegetation surveys completed during the year included:

- New England, Lower Hunter, Budderoo, Maria, Kumbatine, Mebbin, Myall Lakes, Arakwal, Toombar, Richmond Range, Hogarth Range, Mallanganee, Mt Warning and Nightcap national parks
- Wamberal Lagoon, Skillion, Yarrawil, Ballina, Billinudgel, Cudgen, Broken Head, Brunswick Heads, Cumbin Swamp, Ukerebagh, Tweed Estuary, Wooyung, Boatharbour, Stotts Island, Hayters Hill, Tyagarah, Limpinwood, Numinbah, Bluff River and Bolivia Hill nature reserves, Lachlan catchment, Cape Byron State recreation area, and Hainsworth voluntary conservation agreement area
- Nandewar bioregion biodiversity study undertaken in the parks and reserves in the Northern Tablelands area

**Validating forest ecosystems in the South-West Slopes of New South Wales**

Since April 2001 the NPWS has been trialling a method to validate the southern CRA forest ecosystem mapping in the new reserves of the south-west slopes of New South Wales. This project will also provide information on vegetation that will assist in the preparation of plans of management for the new reserves. Reporting on the trial phase, which will be completed in 2001-2002, will outline and evaluate the process used to validate the forest ecosystem mapping, plus limitations of the current mapping for management purposes. Most importantly, the report will recommend future work required to update southern CRA forest ecosystem mapping for reserve and fire planning and on-ground management purposes in the area.

**Rediscovery of rare daisy**

The daisy *Calotis cuneata var. pubescens* was rediscovered in Kosciuszko National Park this year by NPWS staff. Although not listed under the Threatened Species Conservation Act, this species has only been collected four times, including three times in New South Wales. It is thought to be extinct in Victoria. Four small patches of the species were found on an isolated grassy plain near Kiandra. Surveys in other similar habitat in the vicinity have failed to find further populations. It is proposed to give the species the common name of Max Mueller’s burr-daisy, to honour Max Mueller, a German naturalist who worked in the area and who made a number of notable plant collections.

**Boorowa Shire vegetation maps**

Vegetation mapping to cover Boorowa Shire commenced with some 250 vegetation plots surveyed across the shire using modelling and survey techniques developed during recent surveys for regional forest agreements. From this data maps will be produced of the existing vegetation and vegetation prior to clearing. The maps and accompanying report will aid in the current review of the local environment plan of the shire, roadside conservation, and protection of threatened species and communities, as well as to guide regeneration and rehabilitation works, and assist in applications for Landcare and other funding.

**Native grassland surveys**

The NPWS has continued a program of surveying sites for grassland and grassy woodlands. The highlights of this survey program included the discovery of several new species of orchids, an interesting find of a possibly new *Senecio* species and range extensions of the grassland earless dragon into an area south-west of Nimmitabel, and of the button wrinkelwort (*Rutidosis leptorrhynchos*) south to Michelago.

Another project to identify significant grassland species commenced with preliminary analyses of site data from some 1,000 sites to define what species should be regarded as significant, based on their rarity in the area. This process enables defining of each species under one of five significance classes (SC), with those species most common being under SC 1 and the rarest under SC 5. This information will be essential in assessment of the relative conservation values of grassland sites. This is a collaborative project between the NPWS, Environment ACT and the Worldwide Fund for Nature.

**Aquatic plants of desert river systems**

Little is known of the biodiversity of plants on inland river systems and yet they are vitally important for the functioning of rivers and wetlands. A project commenced which will determine the aquatic plant biodiversity of inland wetlands and the importance of salinity, turbidity and changing flow regimes for these unique systems. This research has found four species not previously recorded in New South Wales (*Ruppia tuberosa*, *Lepilaena preissii*, *Aponogeton queenslandicus*, *Dentella minutissima*), two of which are endangered and known only from Nocoleche Nature Reserve on the Paroo River. An undescribed species of Goodenia has also been discovered, and an algal species rediscovered.
Wetland and river system survey and research

**Mapping wetlands and developing a wetland geographic information system (GIS) for all wetlands in New South Wales**

There is little information currently on the numbers, location or extent of wetlands across New South Wales, which makes effective natural resource management extremely difficult. Given the critical importance of these habitats and the considerable pressure currently being placed on them, this project is identifying and digitally mapping all wetlands in New South Wales. It builds on methodology developed for mapping wetlands in the Murray-Darling Basin. Providing this information as a GIS layer will allow various boundaries to be superimposed and spatial analysis to be carried out, for example the conservation status of wetlands. Importantly, it will help determine which wetlands are likely to be dependent on river flows. The wetland GIS will be linked to a wetland database which will provide data on a number of biological and hydrological issues for each wetland. Wetlands are being mapped using satellite imagery data (Landsat MSS and TM).

**Database for rivers and wetlands: the Barwon-Darling, Namoi, Gwydir, Paroo, Warrego and Hacking rivers**

This unique software program will revolutionise river management in New South Wales. It provides a critically important tool for making decisions about our rivers and wetlands. The most up-to-date scientific information on river management is often not easily accessible to river managers and the community because research results are published in international journals and often focus on general processes rather than specific locations. This database links all the information on a particular topic which is available for a specific catchment to scientific papers, allowing managers and policy makers to identify key references relevant to effective management. The topics available include salinity, hydrology, fauna and flora, conservation status, culture, history, ground water, palaeontology and economics. The CD-ROM also has a database of pictures of each river and its wetlands and a video database. All of these are linked to maps of the rivers and wetlands. The project was a finalist in the 2000 National Banksia Environmental Awards for innovation.

**Studying the impact of changing water regimes on waterbirds in the Macquarie Marshes**

Good management of river systems is dependent on good information on ecological responses. A project to measure the impacts of changing water regimes on the reproductive success of waterbirds in the Macquarie Marshes was conducted during the year. It used data collected over the past nine years which links flows to breeding events and aims to provide an adaptive management framework for decision-making on environmental flows for the entire river system.

**Examining changing water regimes in the Lowbidgee floodplain**

The Lowbidgee floodplain includes some of the most important wetland habitat in New South Wales. The wetlands of Pollen Creek floodplain, the Great Cumbung Swamp and many other wetlands of the confluence of the Murrumbidgee and Lachlan rivers cover an area of 217,000 hectares. This huge floodplain area has the capacity to be at least as important and possibly more important than the Barmah-Millewa Forest or the Macquarie Marshes. In the past this area regularly supported more than 50,000 waterbirds; however about 76 per cent of the wetland is now lost or degraded and waterbird numbers have decreased by 80 per cent. During the year a project was conducted to examine the long-term impacts of water resource development on the major waterways. The research found that better conservation of aquatic systems around the country is required. A report on the research will be released during the next year.

**Study of the river flows and wetland flooding in the Paroo and Warrego river catchments**

The Paroo and Warrego river systems remain the last major lowland rivers in the Murray-Darling Basin unaffected by river regulation and diversions, and they supply the most extensive floodplain wetland area in the Murray-Darling Basin. These wetlands regularly support large and diverse waterbird populations. Flooding patterns of the Paroo and Warrego rivers remain largely unmodified but development pressures exist, with few data on the likely ecological consequences of such development on downstream wetland areas. Using satellite imagery over a 20-year period, this project aims to determine the extent of wetlands dependent on each river system. Relationships between wetland area, river flows and rainfall are being examined to develop models to predict the likely
impacts of future water resource management decisions. The dynamics of waterbird populations will also be examined in relation to wetland flooding over a four-year period. This information will help to ensure that the ecological values of the two catchments can be properly accounted for in water management planning.

**North Coast water habitats study**

The North Coast water habitats study investigated, mapped and reported on the location of habitats potentially impacted by water management decisions. The study specifically investigated and reported on the relative dependence of North Coast habitats on water. It represented the first practical application of a North Coast bioregional vegetation data set (CRAFTI), one of the major products of the comprehensive regional assessment. The study has been used by North Coast water management committees to identify environmental assets in each sub-catchment. The reports were presented to North Coast water management committees and to the North Coast Wetland Conference at Southern Cross University. The potential exists for further analysis and interpretation of the vegetation data, particularly in relation to recommendations for ecologically sustainable management of water resources.

**Implementation of the Allocasuarina portuensis recovery plan**

Translocation plantings of *Allocasuarina portuensis* are well established in Nielsen Park and nearby NPWS reserves. In the past year funds from the NSW Biodiversity Strategy have been used to enlarge the buffer zones around these plantings. Additional areas were prepared by bush regeneration contractors for further translocation plantings in autumn 2001. The population of translocations now exceeds 100.

**Native fauna surveys and research**

**Gap analysis**

The NPWS has developed a systematic approach to identifying and addressing gaps in information on fauna in parks and reserves within a region. The approach will have potential applicability throughout the NPWS. The new approach, based on sophisticated statistical analysis techniques, aims to significantly increase the efficiency of survey work and to improve park and landscape management.

**Green and golden bell frog**

Following the rediscovery of the green and golden bell frog (*Litoria aurea*) on the southern tablelands in April 2000, the University of Canberra was contracted to undertake research on the distribution and habitat-use of green and golden bell frogs on the Upper Molonglo River Flats. Frogs were observed at 13 sites within the Molonglo River floodplain – eight wetlands, four river sites and one farm dam. The number of frogs observed at each of these sites ranged from two to 63 individuals, with habitat-use focused on wetland and river margins. It was found that little use was made by the frogs of pasture improved areas.

**Botany Bay survey of seabirds**

A survey and analysis of shorebird, migratory wader and other seabird distributions was undertaken around Botany Bay, to provide an overview of the status and future of Botany Bay as habitat for migratory and endemic shorebird species. The project was instigated in response to ongoing concerns about the long-term future of at least two of the sites which were historically recognised as key wader sites in Botany Bay – Towra Point and Penrhyn inlet. The species studied in the project are primarily migratory waders subject to a number of international treaties and conventions to protect them and their habitats. Historic records of waders in Botany Bay demonstrate dramatic declines in these species over the last 50 years. The causes are various, but largely to do with loss of habitat due to the construction of industrial infrastructure and activities such as dredging.

A number of endemic wader species were also studied in the project. While some of these are common species, some are either regionally significant, such as the black winged stilt and double banded plover, or classified as threatened, such as the Terek sandpiper, golden plover and sooty oystercatcher. The shorebird community in one section of Botany Bay, Taren Point, has been classified as an endangered ecological community under the Threatened Species Conservation Act. The research being conducted will contribute to recovery planning of these species and ecological communities within Botany Bay.

Outcomes from the project to date include a better understanding of the daily and seasonal movements of shorebirds, improved definition of their micro-habitat...
preferences, identification of key foraging sites, wader habitat assessment and quantitative analysis of changes in wader numbers over the last 50 years.

**Predictive koala habitat mapping project**

The NPWS undertook a project to derive a predictive koala habitat map for use in regional vegetation management plans. The project also provided a list of koala browsing trees for each area and provided a process for assessment at a site level. The project used an expert panel of koala ecologists to review and produce a habitat model.

**Eastern bristlebird recovery program**

The northern sub-species of the endangered eastern bristlebird is centred on the QLD/NSW border region. Fewer than 50 individuals have been recorded in northern New South Wales. National Heritage Trust funding has enabled ongoing research into this sub-species. Population monitoring of all known territories is conducted annually. More recently a series of long-term vegetation and habitat monitoring sites has been established in a number of territories. These will assist in our understanding of this species and its eventual recovery. The recovery team involves the NSW NPWS, Queensland Parks and Wildlife Service, Queensland Department of Natural Resources, Southern Cross University, and various specialists and volunteer organisations, all working together to promote the long-term survival of this species.

**Threatened reptile surveys**

Surveys for the threatened grassland reptiles, the striped legless lizard and grassland earless dragon, were carried out at a number of sites in the area between Queanbeyan and Bredbo in southern New South Wales. This work, funded by the Natural Heritage Trust as part of the ongoing Joint Regional Biodiversity Survey of Grassy Ecosystems, expanded the size of the known grassland earless dragon population and distribution at a grassland site near Queanbeyan. It will feed data into the development of a regional grassland conservation strategy to be developed in late 2001.

**Smoky mouse**

Surveys continued to establish the range of the smoky mouse in South-East Forest National Park and to monitor population variation. This year surveys were extended into possible habitat in Morton, Budawang and Nalbaugh national parks, but no smoky mice were trapped in those areas.

**Mountain pygmy-possum**

Trapping and on-site habitat surveys for the mountain pygmy-possum across its entire distribution within Kosciuszko National Park were completed in summer. This is the fourth summer of a project that aims to map and assess the quality of all habitat, and to re-assess the total population size and distribution of the species in New South Wales. Following digitising of habitat patches, snow duration indices will be derived from LANDSAT imaging. These will be used as one of the variables in habitat modelling and for predictions of habitat change and delineation of refuge habitats under climate warming scenarios.

**Southern brown bandicoot**

Surveys for the endangered southern brown bandicoot (*Isoodon obesulus*) were undertaken in coastal reserves in southern New South Wales, resulting in the identification of a previously unknown population in Ben Boyd National Park. That population is now the subject of a long-term monitoring program.

**Long-footed potoroo**

In April 2001 a targeted survey for the endangered long-footed potoroo (*Potorous longipes*) in southern New South Wales was conducted in Tennyson Creek Flora Reserve and immediate surrounds. Unfortunately, no new occurrences of the species were recorded.

**Squirrel gliders**

A survey for the endangered population of squirrel gliders (*Petaurus norfolcensis*) in the Wagga Wagga local government area resulted in identification of breeding colonies of the species at three separate locations. Further survey work is planned for 2001-2002, with the aim of establishing whether these colonies are linked or isolated, and whether the species occurs elsewhere within the general Wagga Wagga area.

**Corroboree frog**

A significant part of the recovery program for the corroboree frog is focused on threat management research. One aspect of this is the effort to identify the threat or threats which have caused the range contraction and drastic decline in numbers of the species since the early 1980s. It has been established beyond doubt that the species suffers high mortality during the early life-history stages. This appears to be related to some aspect of climate, though the exact way this is impacting remains to be established. It is also possible that the chytrid fungus, implicated in the decline and extinction of other frog species, may play a part in corroboree frog decline. Research to clarify this is underway. UV-B radiation has also been investigated and appears unlikely to have played a role.

A second major aspect of threat management research for the corroboree frog is the recruitment enhancement initiative. This is intended to at least halt the decline in numbers at selected sites and, ideally, augment population numbers by enhancing survival during the early life-history stages. Eggs are collected from five sites during autumn months and transported to the Amphibian Research Centre in Melbourne where they develop over winter under ideal simulated conditions. This has resulted in very high levels of survival of individuals which are replaced in their natal ponds in the spring. It is expected that next summer, when the first cohort
of these frogs reaches reproductive maturity, increased numbers will be observed returning to breed at these five sites. The intention of this program is to support the species while gaining a better understanding of the causes of decline. More effective intervention programs can be initiated when these causes are established.

**Spotted tree frog**

Targeted surveys for the endangered spotted tree frog (*Litoria spenceri*) in the upper Murray River catchment were carried out during the period November 2000-February 2001 along streams with visually suitable habitat. Unfortunately, no new occurrences of the species were recorded. However, the surveys did identify possible locations for future release of captive-bred animals.

**Booroolong frog**

As part of the recovery program for the Booroolong frog (*Litoria booroolongensis*), two long-term monitoring sites were established to provide information on population size, adult movement and survival. The sites were 500-metre stream transects, one on Brungle Creek and one on Mountain Creek. Life history data collected indicate that annual adult mortality is high, with females potentially attaining higher survival rates and being older at sexual maturity. The adult sex ratio is heavily skewed towards males. There also appear to be large fluctuations in adult population size from year to year, suggesting the populations are responding to environmental variation or stochastic events.

**Woodland birds**

In 2000 a survey was conducted into the number, habitat range and species of woodland birds. Key findings are that threatened and declining woodland birds show strong relationships with condition, connectivity and amount of remnant woodland. These strong relationships reinforce the need to manage for conservation across landscapes, including on private land. Threatened and declining woodland birds cannot be conserved by managing isolated sites.

**Stuttering barred frog**

The stuttering barred frog (*Mixophyes balbus*) has undergone a substantial decline in south-east New South Wales. Surveys were conducted along 37 streams, eight of which were historic localities for the species. *Mixophyes balbus* was only detected along two streams during the survey, Big Belimba Creek in Dampier State Forest and a tributary of Macquarie Rivulet in Macquarie Pass National Park. In addition, the density of *M. balbus* along these streams was extremely low, with only a single adult male being detected during survey number 1 (Big Belimba Creek), a single tadpole being detected during surveys 16 and 20 (Big Belimba Creek), and five tadpoles being detected during survey number 9 (tributary of Macquarie Rivulet). The results from this survey were consistent with the results of other surveys conducted for this species in recent years, indicating that *M. balbus* has declined from a large portion of its former range in southern New South Wales, and that where this species is still present, it is occurring in very low densities. If these results accurately
reflect the current status of *M. balbus*, then the persistence of this species in the southern portion of its historic geographic range is very precarious.

**Surveys for the golden sun moth in Cootamundra, Gundagai and Tumut regions**

During November and December 2000 a total of 66 sites were surveyed for the presence of the endangered golden sun moth. This work yielded five new sites for the species and covered much of the known and expected range of the species in south-east New South Wales.

**Yellow-footed rock wallaby survey**

Aerial surveys by helicopter of the yellow-footed rock wallaby population in Mutawintji National Park are conducted each year by NPWS staff. The mean number seen rose from 18 in 1996 to 80 in 2000, an increase of approximately 350 per cent. This increase is attributed to a targeted fox and goat control program conducted jointly with neighbouring landholders. The population is not only increasing in number but the area they occupy has increased.

**Radio-tracking of regent honeyeater**

During spring 2000 nine regent honeyeaters bred at Taronga Zoo were released at Capertee Valley. A sample of the birds was fitted with radio transmitters. Extensive experience was obtained tracking regent honeyeaters and the trial transmitter harnesses were successfully carried by birds without noticeably affecting their behaviour. It has also been determined that captive-bred regent honeyeaters can successfully be released into the wild, with survival up to four weeks being documented. This was conducted as a trial prior to the capture, fitting of radio transmitters and radio-tracking of the movement patterns of wild birds after breeding. This project, conducted over three months, showed that regent honeyeaters used habitats previously unknown to NPWS staff. It was found that they utilise grey gum (*Eucalyptus punctata*) on the valley sides after breeding and after the flowering of Mugga ironbark and white box on the lower valley sides and floor, and mistletoe in the she oak lined creeks. Further studies are planned to observe movements outside the valley so that habitats used by regent honeyeaters during winter can be identified and protected.

**Brush-tailed rock wallaby**

In 2000-2001 the brush-tailed rock wallaby program conducted monitoring of sites to identify changes in abundance of rock wallabies and foxes, and undertook fox baiting on a monthly basis in cooperation with other government departments and private landholders. A paper on community involvement in fox baiting was produced and will be used to assist with actions in the recovery plan. Community involvement was continued through education programs, community group team building days and participation in field days.

**Bats at Willi Willi Caves**

In January 2001 at Willi Willi Caves west of Kempsey, two incidents occurred which led to the accidental death of about 1,700 bats out of the estimated 200,000-strong local population. The deaths occurred during a routine scientific research program conducted by NPWS staff and assisted by a contractor. Relevant authorities were notified and independent investigations undertaken. It is expected that recommendations will be made to improve procedures and ensure that such an incident does not happen again.

**Satellite-tracking of black swan movements in relation to habitat availability**

Waterbirds depend on river flows creating wetlands. Movements and breeding of waterbirds are primarily determined by wetland flooding. A critical issue for the management of wetlands and waterbirds is understanding the mobility of waterbird populations and the major factors influencing their movements. Conventional radio-tracking techniques allow observations over limited spatial and...
temporal scales. Satellite-tracking is the most cost-effective option for long-term tracking of waterbirds that fly at night and can move long distances (greater than 1,000 km).

The project has followed the movements of two black swans in inland New South Wales by using satellite transmitters on wild birds and tracking their movements for 12 months. The results have discovered patterns of movement not previously known for this species. Movements of individuals were very different, with one foraging over a restricted area and the other moving long distances before settling in coastal habitat for a period of months. Ongoing analysis is examining patterns of habitat-use and differences in daytime and night-time movement.

**Aerial survey of waterbirds in eastern Australia**

In 1983 the CSIRO Division of Wildlife and Ecology and state park authorities (NSW, VIC, SA, QLD) began a research program to estimate the abundance of waterbirds in eastern Australia. This later became a CONCOM (Council of Nature Conservation Ministers) approved program. In 1995, the aerial survey extended to Tasmania. It is arguably the largest aerial survey of fauna in the world.

In October of each year from 1983-2000, waterbirds in eastern Australia have been counted from the air on about 2,000 wetlands (100 hours flying). This has provided some of the country’s most important long-term data on the health of our rivers and wetlands and information on up to 50 waterbirds, including threatened species. There are few data sets around the world that provide nearly 20 years of data on more than 50 species over such a large part of a continent.

**Whales**

Surveys of humpback whales were undertaken from Cape Solander in Botany Bay National Park and Cape Byron State Recreation Area in cooperation with volunteers and the Southern Cross University Whale Research Program.

**Wildlife research approvals**

NPWS approval is required for research involving or possibly affecting native wildlife. In 2000-2001 the NPWS issued 100 certificates under section 95(2) of the Threatened Species Conservation Act 1995 and 927 scientific licenses under sections 120, 131 and clause 20 of the National Parks and Wildlife Act and Regulations.

**Animal ethics approvals**

Under the provisions of the Animal Research Act 1985, the NPWS Animal Care and Ethics Committee is required to review, supervise and make recommendations on all animal research conducted by NPWS employees and contractors. The committee's membership comprises research, veterinary, animal welfare, external and independent representatives. The committee met nine times during the year and approved 26 new research proposals and 48 research authority renewals. Committee members also inspected the research sites of three projects.

**Threat management research**

**Salinity and biodiversity**

Work has commenced in collaboration with the Department of Land and Water Conservation to investigate impacts of dry land salinity on terrestrial biodiversity. Preliminary assessment indicates that the adverse effects are likely to be substantial, including negative impacts on some national parks and nature reserves.

**Pest management**

**Foxes**

Two complementary research projects on fox control to protect brush-tailed rock wallabies have been funded by the Natural Heritage Trust. The projects, located in the Hunter Valley and Kangaroo Valley, aim to evaluate current practices for reducing fox abundance and their impact on rock wallaby populations. These projects are also examining how the community can best contribute to such control programs.

There is concern that fox baiting with 1080 may adversely impact on populations of the vulnerable spotted-tailed quoll, *Dasyurus maculatus*. Research staff have recently begun investigating this risk in a project jointly funded by the NPWS and the Natural Heritage Trust. The fate of quolls fitted with radio transmitters is being monitored during fox baiting in Werrikimbe National Park.

**Dingoes and wild dogs**

In Kosciuszko National Park, the NPWS is participating in an adaptive research project which aims to gain a better understanding of wild dog movements in the area so that more effective control can be achieved. The project is managed by a coordinating committee with representatives from Yass, Gundagai, Holbrook, Cooma, and Bombala Rural Lands.
Protection Boards, NSW Agriculture, the NPWS, State Forests of NSW, the Department of Land and Water Conservation, ACT Parks and Wildlife Service and Conservation Service and the ACT Rural Leaseholders Association.

The NPWS is also contributing to a University of New South Wales research project which is refining DNA techniques to ascertain the genetic purity of dingo populations and determine their distribution in New South Wales. DNA analysis of tissue samples collected from animals in New England and Guy Fawkes River national parks in north-east New South Wales confirmed that, while some hybridisation has occurred, purebred dingoes still persist in these areas.

**Goats**

In Coolah Tops National Park, the NPWS is assisting NSW Agriculture scientists to study the behaviour of goats and to develop more cost-effective management strategies. The results of this research will improve the effectiveness of current control programs and will also be important in the event of an exotic disease outbreak involving feral goats.

**Deer**

The NPWS has contracted the University of Western Sydney to undertake research to assess the impacts and monitor the population dynamics of deer in Royal National Park. Preliminary results indicate that fecundity is high and 50 per cent of the fawns produced survived through the first year. Analysis of rumen contents indicates that there is dietary overlap with the swamp wallaby (*Wallabia bicolor*), while flora surveys indicate that high population densities of deer have a significant impact on the diversity and abundance of plant species. The research will provide valuable information on future sustainable management strategies.

**Environmental weed research**

The NPWS is a major contributor to national programs seeking biological controls for a range of environmental weeds. Programs funded during 2000-2001 included bitou bush, lantana, Scotch broom, bridal creeper and serrated tussock.

Lantana is an example of a very vigorous and invasive weed which has been listed as a Weed of National Significance. In Nymboida National Park a control program has commenced...
to tackle lantana infestations, which range from isolated clumps to large areas of impenetrable, highly competitive thickets along the Mann River. The NPWS is also a major contributor to the national research program on biological control of lantana which is being undertaken by the Queensland Department of Natural Resources and NSW Agriculture. Over the past four years seven insect species have been released at a number of sites, many of them on NPWS reserves.

During the last 12 months the research effort has focused mainly on the release and monitoring of the stem sucking insect, *Aconophora compressa*, which has been released at 17 sites. A leaf sucking bug, *Falconia intermedia*, has also been released at a number of sites, while a leaf rust, *Prospodium tuberculatum*, has been approved for release by the Australian Quarantine and Inspection Service. Other agents, including a bud mite, *Aceria lantanae*, are still being evaluated overseas.

### Fire management research

The NPWS was funded through the NSW Biodiversity Strategy to address Priority Action 43: *Manage fire in accordance with ESD principles*. A project is underway to achieve better fire management by developing guidelines about appropriate fire regimes for the conservation of biodiversity within given ecosystems. The development of databases on the fire response and life history characteristics of flora and fauna species, and research into the effects of infrequent fire, will aid the development of these guidelines. This is a two-year project that commenced in 1999-2000 and will be completed in 2002.

Collaborative research between the NPWS, the University of Technology, Sydney and the University of Western Sydney has examined the role fire plays in controlling germination in plants. Particular emphasis was placed on the interaction between several key fire cures that break seed dormancy (heat, smoke and charred wood) and the effects of fire season. This research will help the NPWS manage fire for the conservation of plant species.

As reported in last year’s annual report, a PhD student from the University of New England undertook the third year of a research project in Guy Fawkes River National Park investigating the fire responses of all native vegetation species. The findings have been submitted, and following finalisation of the PhD will be incorporated into NPWS fire management planning. One key outcome of the project was the development of a methodology to map fire intensity from Landsat TM images. Subject to funding, this promises enhanced fire management planning. The research also amended existing community-level fire regimes to reflect the needs of individual threatened plant species. It was found that the impacts of grazing were more detrimental to the parks than fire.

### Cultural heritage research

In the fourth year of the strategic research program into cultural heritage, a number of long-term projects came to fruition. One of these projects was *Remembering Country: History and Memories of Towarri National Park*, and a document with this title was published by the NPWS in June 2001. This was a milestone in the effort by the NPWS to articulate non-indigenous cultural heritage at a landscape level. The document describes the lives of the families who farmed the land that now makes up Towarri National Park.

The cultural heritage research program’s projects on Aboriginal heritage similarly aim to promote a landscape approach to cultural heritage. The Mapping Attachment Project being carried out in partnership with the Forster and Purfleet-Taree local Aboriginal land councils maps the lives of local Aboriginal people of the lower North Coast. It has been possible to map the many places, such as fishing sites and picnic and camping places, that Aboriginal people remember as significant in their lives and the lives of their parents and
grandparents, and the pathways and routes between these places.

One of the objectives of the strategic research program is to break down the distinction between Aboriginal and non-indigenous heritage, especially in the historical period (post-1788) during which Aboriginal and white history were intertwined. The ongoing project on the shared history of pastoralism on NPWS estate is documenting how both white and Aboriginal people commonly worked side by side on pastoral properties, learning from each other and borrowing from each other’s cultures.

Publication in June 2001 of Social Significance: A Discussion Paper concluded the first stage of a research project designed to give greater emphasis to social value in the process of assessing the significance of cultural heritage places. The paper presented a strong case for directing at least as much attention to the attachment that local communities feel to heritage places and landscapes as we direct to the archaeological and architectural values of these places and landscapes. The research program has expanded the concept of social significance to include the culturally particular ways that different migrant groups perceive and use the national parks of New South Wales. The first outcome of this work was the volume, *A Multicultural Landscape*, to be published in July 2001, which describes the unique significance of Royal National Park to Sydney’s Macedonian community.

Other publications resulting from the cultural heritage research program are included in Appendix H.

**Cultural heritage surveys**

A number of site surveys were conducted during the year. These included:

- an Aboriginal sites survey in Myall Lakes National Park conducted by NPWS staff, a consultant archaeologist and Karuah Local Aboriginal Land Council members. The project identified, recorded and provided management recommendations for sites along the beach dune system in the park.
- surveys on private lands which have recently entered into voluntary conservation agreements (VCA) in the Eden Regional Forests Agreement area. The surveys were conducted by NPWS staff, sites officers from the Eden Local Aboriginal Land Council, and elders from local communities. The results from the surveys were made available to VCA landholders to assist in the management of cultural heritage on private lands and also contribute to an expanding heritage database for community conservation projects.

**Historic heritage research**

During the year research commenced into the history of lighthouses under NPWS management. As part of the project the oral histories of previous lighthouse keepers will be gathered.

At Lake Innes House, south of Port Macquarie, research is continuing into the living conditions in the house in the 1830s. Conservation plans have been prepared for Bolivia Hill and Arakool nature reserves, former grazing properties with historic shearing sheds, houses, yards and fences. The plans provide valuable information on the history, use and former management of these properties, as well as making recommendations to stabilise structures. It is intended that the shearing sheds will be maintained and managed to provide safe storage for farm artefacts, as well as providing an opportunity for educational programs.

**Conservation research and assessment tools**

**Quantifying biodiversity values**

Research is being carried out throughout Australia on financial incentives to conserve biodiversity on private land. Incentives could include stewardship payments, product accreditation, tax breaks and tradable credits, and the amount of the incentive would depend on the biodiversity value of the site. The NPWS, in collaboration with State Forests of NSW, is participating in this research by developing a relatively simple and inexpensive procedure for quantifying the biodiversity value of a site. It will capture the site’s condition, function and importance in the landscape context. This project, which commenced in March 2001, is expected to be finalised by June 2003.

**Survey guidelines**

The NPWS was allocated funds through the NSW Biodiversity Strategy for a project to address Priority Action 130: *Implementation of the Biodiversity Survey Program*. The project will develop, publish and promote guidelines to support the systematic acquisition and assessment of survey...
data through agreed survey methods, well-planned surveys, and a standard reporting framework. A range of guidelines will be produced to suit the differing needs of stakeholder groups. The first of three planned guidelines, the Community Biodiversity Survey Manual (revised second edition) was launched in May 2001 by the Minister for the Environment, Bob Debus, and Ian Kiernan, Chairman of Clean Up Australia. These guidelines are aimed at assisting community groups to conduct their own biodiversity field surveys.

Conservation assessment

Performance targets 2000-2003

• A model monitoring regime in place in at least one park in each NPWS region by June 2003
• 75 per cent of voluntary conservation agreements and new reserve proposals are selected on the basis of regional assessments
• Demonstrated evidence of quality NPWS contribution to bioregional planning

Performance results

• The inaugural State of the Parks 2001 report was drafted. This report describes conservation throughout New South Wales and establishes the criteria for monitoring conservation values across a cross-section of parks and reserves in future reports.
• A framework for selecting voluntary conservation agreements and reserves is contingent upon the development of a framework for identifying conservation priorities. Work identifying conservation priorities is underway, and is reported upon in the section on Conservation Planning.

Future directions

• The NPWS contributed actively and effectively to a number of bioregional planning instruments, such as regional vegetation plans, water management plans and regional environmental planning. Contributions included the development of bioregional planning guidelines, flora and fauna surveys, vegetation and habitat mapping, comprehensive regional assessments, and provision of advice on natural and cultural heritage and ecosystem function.

Workshops around New South Wales involving fauna and flora survey consultants, local government and natural resource management agencies helped develop two other sets of guidelines. The Regional Biodiversity Survey and Assessment Guidelines can be used for regional planning needs. The Threatened Species Survey and Assessment Guidelines can be used for development-oriented assessment, including Environmental Impact Statements and Species Impact Statements. Both sets of guidelines will be completed in 2001-2002.
Conservation planning

The making of judgments about what to conserve and how best to do this, and the development of processes by which this is done.
Conservation planning is undertaken by the NPWS in close consultation with the community and other land managers to ensure the conservation of natural and cultural heritage while also providing for people’s enjoyment of that heritage. The key objective of NPWS conservation planning activities is to improve the process for establishing conservation priorities for New South Wales to ensure:

- integration of natural, cultural and community values
- consultation and transparency
- responsiveness to threats and change

The activities addressed in this section include planning-related activities through which the NPWS is contributing to the achievement of NSW Biodiversity Strategy objectives.

Biodiversity planning

Environmental planning
The NPWS continued its statutory responsibilities as a concurrence authority and approval body under the Environmental Planning and Assessment Act 1979 (EP&A Act). The NPWS has provided submissions and advice to the Department of Urban Affairs and Planning (DUAP) and other agencies regarding environmental planning matters. In addition, the NPWS has supported local government by providing advice on flora, fauna and Aboriginal heritage matters with respect to developments.

The NPWS participated in the review of Part 3 of the EP&A Act and in the development of an environmental impact assessment guideline for fisheries management strategies prepared by DUAP. The NPWS has prepared a guideline for use by NPWS staff when considering application of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

Environmental factors assessments are conducted by the NPWS for proposed developments on NPWS-managed lands. During the year, the NPWS refined and updated the assessment procedures and prepared a training package to educate NPWS staff of the new procedures.

NSW coastal policy
The NPWS is a member of the NSW Coastal Council, which is responsible for monitoring the implementation of the government’s NSW coastal policy, a whole-of-government approach to protecting and managing the coastal zone of New South Wales. The NPWS has primary responsibility for the implementation of 24 strategic actions contained within the policy. The NPWS’ progress in meeting its responsibilities...
during 2000-2001 will be reported in the council’s next annual report in late 2001. Council annual reports can be viewed at its website at www.coastalcouncil.nsw.gov.au.

In June 2001 the Premier announced an $11.7 million coastal package to protect and provide a planning blueprint for the state’s coast. The package includes $8.6 million for a comprehensive coastal assessment (CCA) to be completed over the next three years. The assessment will involve the systematic study of environmental, social and economic values of the coast and will determine those parts which are suitable for development and those which require protection. The NPWS will play a key role in the assessment.

**Ramsar wetlands**

The Ramsar Convention on Wetlands of International Importance provides a framework for international cooperation to conserve wetlands. The NPWS administers the convention in New South Wales, which involves identifying significant wetland sites; assessing whether they meet the criteria for Ramsar listing; negotiating new nominations with landholders, government and the broader community; and supporting long-term sustainable management at these sites. Since 1998, the NPWS has been working with the World Wide Fund for Nature Australia (WWF), the NSW National Parks Association (NPA), the Commonwealth, and private landholders, as part of a collaborative project to expand the Ramsar estate outside the reserve system in New South Wales and ensure that listed wetlands are considered in natural resource-use decision-making.

The success of this project was recognised with a gold award in the Economy and Environment category of the 2000 NSW Premier’s Public Sector Awards. Since then, the project partners have continued to collaborate in the preparation of a management framework for the Macquarie Marshes Ramsar site, and a property management plan for the Wilgara wetland on private land at this site. This planning framework will serve as a model for other private land Ramsar sites, such as those in the Gwydir.

In addition, the NPWS and its partners are implementing the formally agreed process under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 for nominating new wetlands in New South Wales to the convention. Negotiations commenced in relation to a number of new nominations outside the reserve estate in the Riverina, Sydney Basin and Darling-Riverine Plains bioregions. The project partners also commenced supervision of a consultancy to obtain in-principle support for Ramsar listing of important wetlands on the Paroo from Aboriginal people with rights and interests along this river system. If successful, this project will establish a model for consulting Aboriginal people about future Ramsar nominations and involving them in the ongoing management of listed sites.

**Water reforms**

Through the water reforms process over the past few years, the NPWS has had a key role in protecting water-dependent natural values, particularly wetlands conservation, threatened ecological communities, and protected and threatened non-fish native species, as well as the review of threatening processes. Reserves where rivers and wetlands contribute significantly to natural, cultural and recreational values have also been a key focus in terms of assessment and conservation.

Over the past 12 months, the NPWS has been a key player in the considerable changes that have occurred in water management. The end of last year saw the introduction of the Water Management Act 2000. This new legislation aims to develop a ‘water sharing’ approach to protect water-dependent environmental and cultural values whilst also facilitating resource certainty. The NPWS supported and participated in a wide range of government and community committees with interests in water conservation, which have been involved in drafting water management and water plans. NPWS and community representatives have provided scientific and policy input into the objectives, outcomes and bulk access regimes for water sharing planning. A key outcome has been the provision of information on conserving wetlands, threatened species and Aboriginal cultural heritage.

**Catchment Management Boards**

Catchment Management Boards were established in 2000 by the Minister for Land and Water to enhance the capacity of total catchment management in order to improve the quality and sustainability of the state’s natural resources and environment. Membership of the Boards is drawn from the local community, and state and local government. Since their establishment, the NPWS has been represented on the majority of the Boards. On a state level, the NPWS has actively participated on the state catchment management coordinating committee, policy and planning subcommittee, and the interagency technical reference group. This involvement by the NPWS has ensured that biodiversity and Aboriginal cultural heritage protection are considered in the preparation of catchment management plans across NSW.

**Native vegetation reforms**

The NPWS continued to be represented on regional and statewide native vegetation management and conservation committees, including the Native Vegetation Advisory Council and its sub-committees and the Minister for Land and Water Conservation’s Community Reference Panel and related interagency committees. Issues being addressed by these committees include developing native vegetation conservation targets, the review of clearing exemptions, development of a Native Vegetation Conservation Strategy, incentives, integrated property management planning, vegetation mapping and the establishment of the Nature Conservation Trust.
Guidelines for biodiversity planning

The NPWS was allocated funds through the NSW Biodiversity Strategy to address Priority Action 56: Local Biodiversity Action Plans. This project assists councils to use existing planning mechanisms, such as local environmental plans, to achieve biodiversity outcomes. The Biodiversity Planning Guide for Local Government was launched on 20 June 2001. These guidelines will now be piloted with a number of councils in 2001-2002.

Pest management

Weeds and pest animals are included in the NSW Biodiversity Strategy under Priority Action 39: Improve cooperative approaches to weed and pest management. During the initial three-year phase of the strategy, funding was provided to the NPWS for six projects to:

- coordinate a more strategic approach to the management of bitou bush in coastal ecosystems
- expand rainforest restoration programs on the North Coast
- protect threatened species in Barrington Tops National Park from invasion by Scotch broom
- enhance bush regeneration programs in priority conservation areas in the Blue Mountains and Sydney metropolitan area
- protect priority conservation areas in western New South Wales from grazing and land degradation by rabbits
- develop a program to improve the effectiveness of NPWS pest management programs

Establishment of parks and reserves

During the year some 290,000 hectares of new parks and additions to existing parks were declared as part of the New South Wales reserve system. Sixteen new parks with a total of 114,380 hectares and 58 new nature reserves with a total of 48,517 hectares were proclaimed, together with three new regional parks and three state recreation areas. Since March 1995, over 5.5 million hectares have been formally protected, bringing the total land area of New South Wales under reservation to 6.7 per cent of the state.

The bulk of land incorporated in the reserve system during the year arose from the outcomes of the comprehensive regional assessment process for the South Coast and Tumut regions.

With the passing of the National Park Estate (Southern Region Reservations) Act 2000 the government declared 16 new national parks, 55 new nature reserves, and three new state recreation areas, and made additions to 11 national parks and nature reserves across south-east New South Wales. An additional 33,000 hectares were protected with 15 new Crown reserves.

The creation of these new reserves has resulted in the establishment of a continuous north-south corridor of national parks that runs for 350 kilometres along the coastal escarpment between the NSW/Victorian border and the Illawarra. Importantly, several key east-west corridors have also been created linking conservation reserves on the coast to others on the tablelands via the coastal escarpment reserves.

Among the most significant of the new conservation reserves are:

- **Meroo National Park** (10 kilometres south and south-west of Ulladulla) This stunning new park protects 3,600 hectares and connects in one park five coastal lakes: Willinga, Meroo, Termeil, Tabourie and Burrill. It provides a key link that completes a conservation corridor from the coast through Morton National Park to the tablelands.
- **Woomargama National Park** (20 kilometres south of Holbrook) Located just north of the Murray River, this 23,000 hectare reserve is the largest west of the Great Dividing Range in south-east New South Wales. This represents the largest remnant of box woodlands on the south-west slopes. It contains substantial areas of old growth forest made up of mixed forest species dominated by box woodland. It is a very important haven for a large number of threatened and endangered species, such as the regent honeyeater, swift parrot, powerful owl, brown toadlet and carpet python. It is also home to the very rare wattle known...
as *Acacia phasmoideae*. Parts of the reserve are close to 1,000 metres above sea level, providing stunning views over the Murray River and areas west of the park.

- **Greater Murramarang** (9,600 hectares) protects high biodiversity values in the spotted gum forest, increases the size of Murramarang National Park fivefold, and protects the catchment of Durras Lake.

- **Monga and Buckenbowra** in the new Monga National Park (25,000 hectares) contains majestic old growth forest stands, pinkwood rainforest and threatened plant species. It is the key to creating a 350 kilometre coastal escarpment corridor of parks.

- **Conjola National Park** extension (6,800 hectares) protects important coastal old growth remnants and includes the spectacular granite falls.

- **Brindabella Corridor** (10,000 hectares) links Brindabella and Kosciuszko national parks to consolidate the 200 kilometre alpine national park system to protect important tiger quoll, koala and corroboree frog habitat.

Other significant areas of new reserves include:

- **Lower Hunter National Park** (2,143 hectares)
- **acquisition of Big Yango, a property within Yengo National Park**

In conjunction with Environment Australia, the NPWS continues to purchase lands for declaration that contribute to the establishment of a national reserve system. This year the NPWS declared Bolivia Hill Nature Reserve, located on the New England Tableland 56 kilometres north of Glen Innes. It is the key remaining remnant on the Bolivia Range, comprising diverse ecosystems that contain samples of ecologically viable plant and animal populations. The reserve is floristically rich, containing high numbers of species that are endemic or largely restricted to the area. Two shrubland communities dominated by the nationally vulnerable *Acacia pycnostachya* are only known from the Bolivia Range, and the most extensive and least disturbed samples are restricted to Bolivia Hill.

Land has been acquired in Wellington that is significant to the Aboriginal community, both through general cultural associations with the country and as a mission and contact site. It is also a significant archaeological site, having one of the earliest convict stockades in the region and as the site of the first Government House. A community reference group has been established in Wellington to ensure input and guidance is received from representatives in the district. It is intended to gazette the land as an historic site.

**Declaration of Greater Blue Mountains World Heritage Area**

The Greater Blue Mountains area is now internationally recognised as containing outstanding examples of evolutionary processes and possessing significant natural habitats for conservation of biological diversity. In December 2000 this area, which covers one million hectares and includes the Blue Mountains National Park, was inscribed on the World Heritage list.

The Blue Mountains have been described as a natural laboratory for the evolution of eucalypts. In the mountains’ diverse plant communities you can trace the changing nature of the Australian environment, from geological shifts and climate variations, through to the impact of Aboriginal settlement and European colonisation.
More than 90 different eucalypt species are found in the Greater Blue Mountains, some 13 per cent of all the eucalypt species in the world. They grow in a great variety of communities, from tall closed forests, through open forests and woodlands, to the stunted mallee shrublands on the plateaux. Among them are rare species like Baeuerlen's gum.

The World Heritage list covers much of Australia's biodiversity, particularly in rainforests and desert areas. However, the list has tended to leave out the environments that lie in between the wet and the dry. By including the eucalypt forests of the Blue Mountains, the World Heritage list now holds a more complete picture of Australia's natural diversity.

Eight conservation reserves make up the Greater Blue Mountains World Heritage Area:
- Blue Mountains National Park
- Wollemi National Park
- Kanangra-Boyd National Park
- Yengo National Park
- Gardens of Stone National Park
- Nattai National Park
- Thirlmere Lakes National Park
- Jenolan Caves Conservation Reserve

**Acquisition of wilderness**

**Dunphy Wilderness Fund public appeal**

The Premier of NSW, the Hon Bob Carr, launched a public appeal for the Dunphy Wilderness Fund on 15 May 2001 at the Bondi Pavilion Gallery. The theme for the appeal was *Creating a wilderness legacy*.

The Dunphy Wilderness Fund was established in September 1996 in memory of Milo Dunphy and his father Myles, to purchase freehold and leasehold land to add to existing wilderness. The initial government funding commitment was $1 million each year for five years from 1996-1997 until 2000-2001. Expenditure has exceeded this commitment in two of the five years of the fund's operation, and the total spent to date on Dunphy Wilderness Fund acquisitions is now approaching $5.63 million.

Donations to the fund total $73,200 as at 30 June 2001. A reference group for the fund, comprising representatives from the NPWS, the Foundation for National Parks and Wildlife and the Nature Conservation Council of NSW, provides advice on acquisition criteria, reviews the acquisition program and promotes the fund.

The appeal launch was held in conjunction with the official opening of the Henry Gold Wilderness Photographic Exhibition, with over 100 people attending the evening. The NPWS produced a Dunphy Wilderness Fund display and brochure for the event, detailing the conservation work of Myles and Milo Dunphy and the achievements of the fund to date. The launch was coordinated by the NPWS, the Foundation for National Parks and Wildlife, the Colong Foundation for Wilderness and the National Parks Association of NSW.

Through the Dunphy Wilderness Fund, the NPWS has acquired 32 properties, and an additional two properties are in the final stages of purchase. These acquisitions will bring the total area purchased under the Dunphy Wilderness Fund over its five years of operation to 38,867 hectares, at a cost of $5.63 million. Acquisitions for 2000-2001 will form additions to the Macleay Gorges, Wollemi, Ettrema, Levers and Guy Fawkes wilderness areas.

Additional freehold and leasehold properties within identified wilderness have been purchased by the NPWS under other land acquisition programs, including the Occupational Permit Fund.

**Declaration of Aboriginal Areas and Places**

Aboriginal Places have been declared on a range of different land tenures, including freehold, local shire council land, state forest, other Crown land and NPWS estate. Many Aboriginal people have expressed delight that the value of their cultural places is being formally recognised. The places range from women's areas and men's ceremonial areas to story sites, a massacre area and living areas.

Six Aboriginal Place nominations investigated in 1999-2000 were finalised and declared in 2000-2001. These were: Barlings Beach, Sugarloaf & Waratah Trig, Parrots Nest, Ti Tree (Taylors) Lake, Mimiga Gaungan (St Mary's Waterhole) and Mt Drysdale.

Four other investigations commenced in 1999-2000 were completed and are either in the negotiation stage or being finalised. These are: Angels Beach (Ballina), Three Brothers Mountains (Port Macquarie), White Lady Rock (Tibooburra) and Dippo Ceremonial Ground (Balranald).

Seven new nominations have also been investigated this year and the recommendations for these are currently being considered. These were Balranald Island Reserve (Balranald), Denewan Mission site (adjoins Culgoa National Park), Camp...
Wanawong (Sutherland), Chinaman’s Creek (near Tabulum), Goanna Headland (Evan’s Head), Hamilton Hume’s grave (Tumut), and Tumut women’s site. Two other investigations have been commenced at Bermagui Waterhole and Sandon Point (Bulli).

### Plans of management

The National Parks and Wildlife Act 1974 requires a plan of management to be prepared for each national park, nature reserve, historic site, karst conservation reserve, state recreation area and regional park. A plan of management is a legal document outlining how the area will be managed. The procedures for exhibiting and adopting a plan of management are laid down in the Act.

During the year 14 plans of management were adopted by the Minister for the Environment for the following 21 NPWS-managed areas:

- Popran National Park
- Eurobodalla National Park
- Bournda National Park and Bournda Nature Reserve
- Morton National Park and Budawang National Park
- Scheyville National Park and Pitt Town Nature Reserve
- Towra Point Nature Reserve
- Billimudgel Nature Reserve
- Langtree Nature Reserve
- Stotts Island Nature Reserve
- Wollomi National Park
- Kanangra-Boyd National Park
- Nattai Reserves (Nattai National Park and Bargo, Burragorang, Nattai and Yerranderie state recreation areas)
- Tarawi Nature Reserve
- Blue Mountains National Park

In addition, the NPWS assisted the Jenolan Caves Reserve Trust with the adoption of a plan of management for Borenore Karst Conservation Reserve.

At the declaration of the Mimiga Gaungan Aboriginal Place in northern NSW, a site associated with maternal uses and healing.

A disused silo in Scheyville National Park is a reminder of one of the park’s former uses. Scheyville was one of 21 NPWS-managed areas to have a plan of management adopted by the government during the year.
Eleven plans of management were placed on exhibition during the year covering the following 12 areas:

- Torrington State Recreation Area
- Stotts Island Nature Reserve
- Goulburn River National Park and Munghorn Gap Nature Reserve
- Nadgee Nature Reserve
- Wolli Creek Regional Park
- Ballina Nature Reserve
- Maryland National Park
- Cathedral Rock National Park
- Pilliga Nature Reserve
- Coolah Tops National Park
- Tuckean Nature Reserve

The National Parks and Wildlife Advisory Council has specific responsibilities under the National Parks and Wildlife Act to consider and advise the Minister for the Environment on plans of management and any representations received in response to public exhibition of a plan. The advisory council considered and reported on 10 plans of management for 11 NPWS-managed areas during 2000-2001.

**Strategic plans for World Heritage properties**

In November 2000 the New South Wales, Queensland and Commonwealth governments endorsed the Strategic Overview for Management of the World Heritage Central Eastern Rainforest Reserves of Australia. These reserves include the major rainforest parks in all five regions of the northern area of New South Wales, as well as south-east Queensland.

The strategic overview, although not a statutory plan, will provide direction for the preparation of plans of management for the individual national parks and nature reserves in this World Heritage property.

---

**Conservation planning**

<table>
<thead>
<tr>
<th>Category of reserved area</th>
<th>An adopted plan of management 1999-2000</th>
<th>A plan exhibited or finalised for exhibition 2000-2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>National parks</td>
<td>48</td>
<td>59</td>
</tr>
<tr>
<td>Historic sites</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Nature reserves</td>
<td>54</td>
<td>61</td>
</tr>
<tr>
<td>State recreation areas</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Aboriginal areas</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Regional parks</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>138</td>
</tr>
</tbody>
</table>

*Includes six new plans to replace existing plans of management*
Threatened species planning

Recovery plans

As at 30 June 2001, 24 recovery plans had been prepared by the NPWS and approved by the NSW Minister for the Environment. Another 10 plans were on public exhibition or had completed exhibition, and a further 148 were in preparation. The total number of threatened species, populations and ecological communities currently being addressed by recovery planning in New South Wales is in excess of 270, or 35 per cent of those listed under the Threatened Species Conservation Act 1995.

The following recovery plans were approved by the Minister during the year:

- down wattle (*Acacia pubescens*)
- Gould’s petrel (*Pterodroma leucoptera*)
- Illawarra greenhood orchid (*Pterostylis gibbosa*)
- *Grevillea obtusiflora*
- *Epacris hamiltonii*
- Bathurst copper butterfly (*Paralucia spinifera*)
- Blue Mountains water skink (*Eulamprus leuraensis*)
- little penguin (Manly) (*Eudyptula minor*)
- Somersby mibush (*Prosthemera junonis*)
- Bellinger River emydura (*Emydura macquarii*)
- Mitchell’s rainforest snail (*Thersites mitcellae*)
- yellow-spotted bell frog and peppered frog (*Litoria castanea* and *Litoria piperata*)
- Araluen zieria (*Zieria adenophora*)
- ‘lost’ threatened flora of south-east New South Wales
- southern corroboree frog (*Pseudophryne corroboree*)
- spotted tree frog (*Litoria spenceri*)
- threatened alpine plant species

Threat abatement plans

Several pest species have been recognised as key threatening processes under the Threatened Species Conservation Act. These include predation of native fauna by foxes, feral cats and plague minnow (*Gambusia holbrooki*), and invasion of native plant communities by bitou bush.

Foxes

The NPWS has prepared a draft fox threat abatement plan which details a strategy to minimise the impact of foxes across New South Wales on threatened and other native fauna such as the yellow-footed rock wallaby, southern brown bandicoot and little tern. Implementation of the plan will result in a fundamental change in fox control practices as the plan pro-actively determines priorities for management to be applied across all public land tenures.

In particular, the draft plan identifies species most at risk from fox predation and the localities where the benefits of fox control will be greatest. Eighty-one priority sites for fox control have been identified across New South Wales, providing recovery actions for 34 threatened species (11 mammals, 15 birds and 8 reptiles).

Undertaking collaborative fox control programs across all land tenures at these localities is the core action of the draft plan. The plan also identifies methods to maximise the effectiveness of individual programs, identifies research actions to improve methodology, and provides specific guidelines to measure the success of individual programs. Such monitoring programs are fundamental to improving the effectiveness of the management of threatened species.

The draft fox threat abatement plan has been prepared in consultation with State Forests of NSW, the Department of Land and Water Conservation, NSW Agriculture, CSIRO Sustainable Ecosystems, the University of Sydney Institute of Wildlife Research and the NSW Pest Animal Council.

The draft plan was placed on public exhibition in June 2001 and an extensive public consultation period will be undertaken before it is finalised.

Bitou bush

Because it is a serious threat to all coastal ecosystems, bitou bush has been listed as a Weed of National Significance and as a key threatening process under the Threatened Species Conservation Act. It is a highly competitive environmental weed which reduces the abundance and diversity of native plant communities. The NPWS has appointed a project officer to develop and implement a more strategic and collaborative approach to managing bitou bush. The NPWS coordinated the preparation of national and statewide strategies for bitou bush during the year.

The National Strategic Plan for Bitou Bush and Boneseed identifies priorities and provides direction at the national level and will also be used by the Commonwealth to determine...
priorities for applications seeking funding from the Natural Heritage Trust.

The NSW Bitou Bush Strategy is closely linked to, and expands on, the national plan. With assistance from local government councils and community groups the NPWS has re-mapped the distribution and abundance of bitou bush. There are more than 36,000 hectares of bitou bush-infested land in New South Wales. Over 900 km or about 90 per cent of coastline is infested, which is a 30 per cent increase since the last mapping in 1981.

The NPWS has established three demonstration sites to promote and refine best management practices: at Munmorah State Recreation Area, and at Sea Acres and Cudgen nature reserves. Additional demonstration sites have been established on the South Coast by the South Coast Bitou Bush Steering Committee.

The NPWS has continued to contribute to the national research program on biological control of bitou bush, with $60,000 being provided in 2000-2001. Four biological control agents from this program have now been released.

A key action in the national and NSW strategies is the preparation of a threat abatement plan for bitou bush. This plan will be prepared during 2001-2002.

Plague minnow

The plague minnow is common and widespread throughout New South Wales in both inland and coastal drainages and is considered to have an impact on native frogs and fish, including threatened species. Initial preparation for drafting a threat abatement plan for the plague minnow has commenced, with information being sought from researchers, local government and the community on current programs in New South Wales and Australia aimed at the control or eradication of the species from waterways. A literature review is being prepared of the latest research on the impacts of the species on native fauna and flora, likely physical and biological control options, and other recommendations for management.

Fire management plans

As part of a multi-agency working group comprising State Forests of NSW, the Department of Land and Water Conservation and the Rural Fire Service, the NPWS has played a key role in the development of bush fire risk management plans across the state. These plans provide a cooperative framework for fire management and reinforce conservation objectives for fire management across the landscape.

Planning work undertaken during the year included:

• draft reserve fire management plans exhibited for Berowra Valley Regional Park and Royal and Georges River national parks
• fire management plans for Warrumbungle National Park and Binnaway, Billinudgel and Pilliga nature reserves adopted
• community workshops conducted to prepare draft fire management plans

Cultural heritage planning

Aboriginal heritage regional studies

During this year a regional studies program was commenced. This was designed to allow trialling of landscape-based approaches to Aboriginal cultural heritage planning that could be used as models to guide land-use decision-making and environmental impact assessment. One study was undertaken within the Coffs Harbour Local Aboriginal Land Council area. This project involved collaboration between Aboriginal organisations, NPWS staff, Goulding Heritage Consulting Pty Ltd and the Coffs Harbour City Council. The approach taken was to assess a range of heritage values and places, including post-contact places, areas used today to obtain wild resources, and areas where people are concerned about environmental management. Over 400 places of cultural value were mapped and complex issues raised about the way in which we define Aboriginal heritage. This represents a new and innovative direction for heritage planning and it is proposed to complete this project next year by focusing on obtaining planning outcomes.

A second project was undertaken on the Riverine Plain. This focused on mapping and predicting the location of
pre-contact places valued by the Aboriginal community. Extensive archaeological survey work was undertaken and this was combined with conservation works on a range of burial sites.

**Regional cultural heritage management strategy**

A cultural heritage management strategy for the South Coast of New South Wales for 2001-2006 has been piloted. The strategy directs on-park and selected off-park activities through the identification and prioritisation of long-term conservation and management outcomes for Aboriginal and historic cultural heritage places and landscapes within the area. The strategy aligns its management principles, goals and strategies with the NPWS Corporate Plan 2000-2003, and covers conservation assessment, planning, management, facilitation and capacity building. A collaborative workshop process was used to develop the strategy, facilitating a broader understanding of cultural heritage and its management. The strategy brings a directed and strategic approach to the management of a selected, representative collection of places and landscapes. It highlights places of high conservation priority, their adaptive and future use, and their potential as cultural tourism destinations.

**Historic huts conservation study**

A conservation study of the Broughton Island and Tamboy huts within Myall Lakes National Park was undertaken to establish their historic heritage values and significance. The importance of the sites was evaluated in relation to the long-term establishment of a settlement and the local fishing industry.

**Hill End Historic Site community consultation**

A comprehensive consultation process has been undertaken with the community of Hill End to identify and develop a common vision and agreed future for the Hill End Historic Site. A principal focus of this approach has been a fundamental shift away from planning for, and management of, the site as an archaeological feature and “museum piece”, towards a partnership with a living community within a highly significant cultural landscape. The process is embodied in a report which will inform broader planning processes, such as the review of the draft plan of management and the production of a master conservation management plan. The report also provides an action plan which will drive this operational and cultural shift, including the identification of community concerns, issues and aspirations, and the establishment of mechanisms which facilitate their meaningful involvement in setting the direction of their community and associated landscape, and in its ongoing management.

**Other cultural heritage conservation planning**

The Neranie recreation development plan was prepared to assess the heritage values of the area and outline a site plan for it. The plan recommends the continuation of camping at Little Lake and utilisation of the mill site as a day-use area. Toilets and a gas barbecue facility have been installed. Neranie was added to Myall Lakes National Park in 1997. Conservation management plans for Roto House and Innes Ruins were also finalised during the year.

Conservation management plans and stakeholder consultations for the Gara River Hydro-electric Scheme and Kunderang East Pastoral Station in Oxley Wild Rivers National Park were commenced.

**Marine park planning**

Marine park planning is undertaken to ensure that the principal aim of conserving marine biodiversity and maintaining ecosystems can be met while also allowing ecologically sustainable use. Planning for Jervis Bay Marine Park and Solitary Islands Marine Park progressed during the year. Stakeholder meetings were held with local charter boat operators, marine tourism operators, diving clubs, conservation groups and recreational and commercial fishers. Comments from these meetings and submissions received on the previously released issues and options paper were used to prepare final drafts of the zoning and operational plans. It is anticipated that these will be released for public comment during 2001. Final plans, incorporating amendments made after consideration of submissions from the public, will then be prepared.

In partnership with the Marine Park Authority, the NPWS contributed to the effective and efficient planning of marine parks. The draft Overview for a representative system of marine protected areas was reviewed. Planning for the management of Lord Howe Island Marine Park continued, a draft zoning plan for Solitary Islands Marine Park was prepared to be released for public comment, and bioregional assessments were completed in the waters around Byron Bay and in the Manning Shelf bioregion.

**Other conservation planning**

**Enhancements to Burrarorang Lookout**

A community master plan for proposed enhancements to the Burrarorang Lookout at Burrarorang State Recreation Area is being developed. A steering committee comprising community representatives, the Sydney Catchment Authority and the NPWS is guiding the process.

**Cabins in Royal National Park**

An integrated draft conservation management plan for the natural, cultural and Aboriginal heritage components of the cabin areas in Royal National Park is being developed.
Conservation planning

Performance targets 2000-2003

The NPWS Corporate Plan and performance targets were reviewed and adjusted in 2000-2001.

Performance targets reported against during 2000-2001 were:

- state conservation priorities established by June 2002
- conservation priorities for 60 per cent of bioregions established by June 2002
- 20 per cent of listed threatened species covered by recovery or threat abatement plans by June 2003

Following the annual review of the NPWS Corporate Plan 2000-2003, these performance targets have been replaced, effective from 1 July 2001, by:

- plans of management developed to schedule
- NSW Biodiversity Strategy implemented to schedule
- regional conservation plans prepared for priority areas within agreed timeframes
- threatened species recovery plans and threat abatement plans developed to schedule
- regional cultural heritage strategies developed for New South Wales by June 2003

Performance results 2000-2001

- During 2000-2001 work was undertaken in developing a process to identify conservation priorities for both cultural and natural values. Four of the state biodiversity strategy projects, the regional conservation assessment framework, state conservation monitoring project, interim ecosystem listings project, and the bioregional overviews project were progressed according to original timeframes.
- The development of the NPWS conservation priorities framework was scoped.

- The Corporate Plan 2000-2003 established a target of 20 per cent of threatened species to be covered by an approved recovery or threat abatement plan or a national recovery plan. The bar graph below shows progress since 1997.

Recovery plan progress timetable

Future directions

In 2001-2002 the NPWS will continue to work with the community and other government agencies to establish agreed criteria for cultural and natural significance. This is an important step towards the establishment of state conservation priorities.

Another major area of activity will be the continued accelerated development of recovery and threat abatement plans to protect threatened species of flora and fauna.
The management of natural and cultural heritage values across the state, incorporating

• conservation incentives, education and advice
• regulation and enforcement
• the nurture and rehabilitation of the natural and cultural heritage landscape, including protected areas and beyond
• the establishment of appropriate reserves
• the ecologically sustainable use of protected areas
Conservation management is undertaken by the NPWS and by many other organisations and communities. It is not only carried out on NPWS-managed lands, but right across New South Wales. This section addresses conservation management in its broadest sense, and includes activities through which the NPWS is contributing to the achievement of NSW Biodiversity Strategy objectives.

Working with Aboriginal communities

The NPWS works with Aboriginal communities to achieve the protection of natural and cultural heritage through mechanisms that also deliver social and economic benefits. Projects undertaken in 2000-2001 included:

- development of an oral history report for the Oakhill Aboriginal Reserve Conservation Project, and the establishment of signage and information displays
- fencing works at the Orient Point Aboriginal Cemetery at Nowra, a cooperative project with the Commonwealth Development Employment Program (CDEP)
- maintenance works, including stabilisation, fencing, revegetation and interpretative signage, on burial sites at Crescent Head on the mid North Coast and Karuah in the Hunter region
- conservation at the Australian Museum of the Corelette Aboriginal Lookout Tree which was near Port Stephens. The tree was damaged and unsafe and was removed from the site with the agreement of the local Aboriginal community. It is now on display in the main entrance of the museum.
- provision of topographic mapsheets to the Garby Elders Group, Yarrawarra, to assist in their collation and mapping of significant Aboriginal sites within their area

In addition, burials were discovered by cavers in the Coolamon Plains karst region within Kosciuszko National Park. Conservation works involving the Snowy Mountains Elders Group and the NPWS were undertaken on the burials. In addition, repatriation of removed Aboriginal remains is currently being arranged between the NPWS, the NSW Aboriginal Land Council and the local Aboriginal community.

Joint management of national parks

Discussions and research to identify Aboriginal owners and negotiations about the return of land continued throughout the year for Mungo, Stockton Bight, Biamanga and Gulaga national parks, and Mt Grenfell Historic Site. At Warrell Creek, negotiations are continuing between the NPWS and the Nambucca and Unkya local Aboriginal land councils to develop an agreement to return claimed land and establish part of the area as a nature reserve to be leased back to the NPWS. At Arakwal, an indigenous land-use agreement is being negotiated regarding the creation of a new national park at Byron Bay.

Eden Regional Forest Agreement

Outcomes from the Eden Regional Forest Agreement in 2000-2001 included:

- the employment of a number of Aboriginal staff
- assistance to Aboriginal cultural tourism providers as part of the NPWS Discovery program
- release of a monthly newsletter called Coastal Custodians, a specialist Aboriginal newsletter designed to increase awareness and participation of Aboriginal people in the NPWS estate

Aboriginal communities were represented in planning, in particular on plans of management, and where relevant the NPWS will enter into memoranda of understanding on key local issues.

Management partnerships

Memoranda of understanding (MOUs) are currently being discussed and negotiated with a number of Aboriginal groups for Bundjalung and Mt Warning national parks. These MOUs cover matters such as joint cooperation, employment and training opportunities, and cultural matters.

Joint management agreements were established with the local Aboriginal land council at Eurobodalla National Park, and negotiations commenced over the joint management of land at Seal Rocks and the newly acquired Wellington Aboriginal mission and convict stockade.
Working with Aboriginal communities

Performance targets 2000-2003

• Increased participation by Aboriginal people in management committees and advisory bodies
• Increase in the number of agreements in place with Aboriginal communities for the management or use of protected areas
• Increase in the number of Aboriginal people employed by the NPWS or in associated activities

Performance results 2000-2001

The following graph shows participation by Aboriginal people in management committees and advisory bodies.

The following graph shows the total number of agreements in place with Aboriginal communities for the management or use of protected areas.

NOTE: This figure may include informal, non-statutory agreements.

Future directions

The NPWS will continue to work with Aboriginal communities and organisations in relation to joint management of protected areas and to deliver Aboriginal heritage conservation outcomes across the landscape.
Outside the reserve system

Traditionally New South Wales has depended on the creation of national parks to conserve areas of natural and scenic beauty. This has resulted in a network of public conservation reserves that is internationally recognised. Many of our most vulnerable ecosystems and native plants and animals, however, are found on private land within agricultural production areas or close to cities. Traditional approaches to public conservation will not be sufficient in these areas and new and innovative approaches are required.

The NPWS is working to increase conservation on privately managed land through a number of mechanisms and to recognise the contribution of landholders to conservation.

Voluntary conservation agreements

It is 10 years since the first voluntary conservation agreement (VCA) was signed. These agreements between the landowner and the Minister for the Environment outline how the land will be managed into the future. They help landholders protect the natural and cultural values of their properties. Each agreement is registered on the land’s title, thereby being passed on to successive owners. Typically the lands covered by VCAs have at least one of the following features: habitat for species listed as nationally endangered or as threatened within New South Wales, declared wilderness, high-quality remnant vegetation, or sites of Aboriginal significance. Landholders with VCAs receive assistance with on-ground works, including fencing, weed control and surveys, to help implement their agreements.

Nineteen VCAs were signed during 2000-2001, bringing the total at 30 June to 101, and these will be regularly monitored. Over 7,200 hectares are now protected by VCAs in New South Wales. Of particular significance was one landholder who signed VCAs protecting four properties on the far South Coast of New South Wales.

In the south-east corner of New South Wales eight VCAs were finalised in 2000-2001 and a further eight advanced towards completion. In addition, vegetation surveys have been conducted to assist two private landholders to develop their own VCA documentation. VCAs continue to develop momentum, with over one-third of the state’s 100 VCAs located in the south-east of New South Wales. These agreements contribute significantly to the conservation of priority forest ecosystems which are under-represented in the public reserve system, to the establishment of vegetation corridors in the landscape and to the protection of significant threatened species habitat. Active promotion within the community continues to attract interest from new landholders. The NPWS, in conjunction with the South-east Catchment Management Board, is developing agreed assessment criteria for determining priorities and resource allocation for outstanding VCA applications.

More VCAs are under development, including Croome Road VCA, which is currently with the Shellharbour Municipal Council for endorsement. The VCA covers 22 hectares of council reserve and protects a population of the endangered orchid Pterostylis gibbosa and endangered vegetation communities. Other voluntary conservation agreements are being negotiated in the mid North Coast area.

Biodiversity conservation programs

Bushcare

Bushcare is a component of the Commonwealth Government’s Natural Heritage Trust. The goal of Bushcare is to reverse the decline in the quality and extent of Australia’s native vegetation cover. The Bushcare program invests in a range of projects focused on on-ground protection of native vegetation. In 2000-2001 Bushcare invested over $12 million in 286 projects in New South Wales.

The NPWS has a key role in the delivery of the Bushcare program within New South Wales, being responsible for its statewide coordination and urban Bushcare facilitators, and for jointly managing the program in conjunction with the Department of Land and Water Conservation. During 2000-2001 the nine regional facilitators were strengthening contacts at the regional level, and assisting groups and organisations to develop projects to seek funding. Bushcare network members have been assisting the Commonwealth to develop and implement a monitoring and evaluation program to provide valuable information on the success of the program in New South Wales.

Grassy Box Woodlands Conservation Management Network

The Grassy Box Woodlands Conservation Management Network assists woodland owners and local communities involved with management and protection of locally significant sites. This is a trial of a model for protecting and managing fragmented ecosystems. Activities have included field days, ecological burns and thinning, weed clean ups, floristic surveys, management advice on activities such as mowing and grazing, development of interpretive signs, negotiation of voluntary conservation agreements and plans of management, production of a newsletter, Woodland Wanderings, and development of a management database.

There are currently 39 sites involved with the Grassy Box Woodlands Conservation Management Network. A national
workshop was held in Canberra to bring together groups and agencies undertaking similar work across Australia. National guidelines are currently under development. The project is supported by the Natural Heritage Trust through the National Reserve System Program and Bushcare.

**Farming for the Future**

The NPWS continued to co-sponsor this farm planning program, which is jointly administered by the NPWS, the Department of Land and Water Conservation, NSW Agriculture and the NSW Farmers’ Association. The program runs workshops for landholders through an integrated workshop series. The NPWS has employed facilitators in Queanbeyan, Bathurst, Armidale, Grafton, Griffith, Cobar, Dubbo and the Upper Hunter.

The NPWS received Natural Heritage Trust funding to enhance the biodiversity component of the program’s property management planning workshop series. This assists the NPWS to incorporate biodiversity in property planning programs.

**ANZECC**

The NPWS continued its involvement in the Australia and New Zealand Environment and Conservation Council (ANZECC) working group on nature conservation on private land. This group has overseen the national implementation of the Land for Wildlife Scheme. On 29 June 2001, ANZECC was dissolved and its work subsumed into the Natural Resource Management Ministerial Council and the Environment Protection and Heritage Ministerial Council.

**Southern integrated forestry operations approval**

During 2000-2001 the NPWS made a substantial contribution to the development of a NSW forest agreement and an integrated forestry operations approval for the southern comprehensive regional assessment. The Department of Urban Affairs and Planning placed a draft forest agreement for southern New South Wales on exhibition from 30 April to 1 June 2001 which will be finalised in the next year.

**Landcare**

The NPWS participated in the Landcare program as a member of the NSW State Landcare working group, which includes representatives from other government agencies and the community. This provided the NPWS with opportunities to work closely and share information with groups involved with on-ground work addressing important biodiversity issues.

**NSW Roadside Environment Committee**

The NSW Roadside Environment Committee facilitates the management of NSW roadsides for the benefit of the environment and the public. The NPWS, together with other land managers, participated in the committee, which runs training and workshops on assessment and conservation of remnant native vegetation along roadsides.

**Wildlife management**

**Kangaroo Management Program**

The Kangaroo Management Program is the largest wildlife management program in New South Wales. The Kangaroo Management Unit, located in Dubbo, works closely with universities and wildlife agencies from other states. The NPWS is currently involved in a project modelling and monitoring the spatial and temporal dynamics of kangaroo populations. The NPWS also convenes the NSW Kangaroo Management Advisory Committee. Through this committee, landholders, animal welfare and conservation groups, the kangaroo industry and other state agencies contribute to kangaroo management. The Kangaroo Management Program is currently being reviewed with the assistance of the advisory committee. Over 6,000 licences are issued annually and 10,000 returns providing information on species, weight and gender are received and entered by the NPWS.

**Approvals for keeping native animals**

To ensure the care and protection of native animals, the NPWS issues a number of licences relating to their captivity and monitors adherence to licence conditions. Licences issued are shown below:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Keeping reptiles</td>
<td>4,234</td>
<td>5,685</td>
</tr>
<tr>
<td>Keeping amphibians</td>
<td>490</td>
<td>619</td>
</tr>
<tr>
<td>Keeping birds</td>
<td>4,997</td>
<td>3,714</td>
</tr>
<tr>
<td>Keeping native mammals</td>
<td>38</td>
<td>45</td>
</tr>
<tr>
<td>Exporting native wildlife from NSW</td>
<td>431</td>
<td>437</td>
</tr>
<tr>
<td>Importing native wildlife into NSW</td>
<td>998</td>
<td>1,219</td>
</tr>
<tr>
<td>Scientific research licences</td>
<td>859</td>
<td>927</td>
</tr>
<tr>
<td>Bird dealers</td>
<td>105</td>
<td>109</td>
</tr>
<tr>
<td>Miscellaneous**</td>
<td>561</td>
<td>536</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12,713</strong></td>
<td><strong>13,291</strong></td>
</tr>
</tbody>
</table>

* Due to a transposition error, the figures for 1999-2000 were published incorrectly in last year’s annual report. They are listed correctly above.

**Miscellaneous licences include licences for bird trappers, pest control, wildlife rehabilitation, taudery, emu farming and egg carving, holding specimens of protected fauna, etc.”
The number of licensed bird keepers declined during the year by about 25 per cent, from 4,997 to 3,714, mainly as a consequence of the exemption from licensing of 30 bird species from August 1999. The number of reptile and amphibian licenses increased by 33 per cent from 4,724 to 6,304.

During the year a Native Animal Keepers Consultative Committee was established as an official forum for discussion of issues related to the keeping of and trade in native animals. The committee, which includes representatives of conservation groups, met on four occasions.

**Outside the reserve system**

**Performance target 2000-2003**

- Increase in the area of land outside the reserve system formally managed for conservation outcomes

**Performance results 2000-2001**

The following graph shows the increase during 2000-2001 in the area of land outside the reserve system formally managed for conservation outcomes.

---

**Future directions**

The NPWS will continue to work towards enhancing the range of formal incentives for the ecologically sustainable management of land outside the reserve system. It will also seek to influence land-use decisions outside the reserve system by working with local government, other government agencies and community groups. The NPWS will seek to increase the area of land outside the reserve system formally managed for conservation outcomes, primarily through increasing the number of voluntary conservation agreements. Bioregions poorly represented in the reserve system and key corridor linkages between reserves will be particularly targeted.

---

**Ecologically sustainable management of NPWS operations**

A key objective for the NPWS is to employ effective systems to ensure the ecologically sustainable management of its operations, including on NPWS reserves.

**Threatened species conservation**

Weeds and pest animals are recognised as broad threats under the Threatened Species Conservation Act 1995. Pest threats listed as key threatening processes include predation of native fauna by foxes, feral cats and plague minnow (*Gambusia holbrooki*) and invasion of native plant communities by bitou bush. Other nominations for pest threats are currently under consideration by the NPWS.

NPWS has prepared a draft threat abatement plan for foxes that details a strategy to minimise the impact of foxes on threatened and other native fauna across New South Wales. Examples of affected native fauna are the yellow-footed rock wallaby, southern brown bandicoot and little tern.

Implementation of the plan will result in fox control practices for nature conservation in New South Wales which will proactively determine priorities for management to be applied across all public land tenures. In particular the draft plan identifies species most at risk from fox predation and the localities where the benefits of fox control will be greatest.

Eighty-one priority sites for fox control have been identified across the state, providing recovery actions for 34 threatened species (11 mammals, 15 birds and 8 reptiles).

The NPWS also has responsibility for preparation of recovery plans for species, populations or ecological communities listed as threatened under the Threatened Species Conservation Act. Key weed control programs underway to protect threatened species include those associated with the habitats of the following species: the endangered dwarf mountain pine *Microstrobos fitzgeraldii*, in Blue Mountains National Park; *Allocasuarina portuensis* in Sydney Harbour National Park; *Ratidiosis leptorhynchos* in Queanbeyan Nature Reserve; *Cynanchum elegans* in Booti Booti and Woko national parks and Glenrock State Recreation Area; *Rutidosis leptorhynchoides* in Glenrock State Recreation Area; *Sophora tomentosa* and *Chamaesyce psammogeton* in Yuraygir National Park; and *Zieria prostrata* in Moonee Beach Nature Reserve; and *Diurus praecox* and *Tetratheca juncea* in Glenrock State Recreation Area; *Zizia prostrata* in Moonee Beach Nature Reserve; *Sophora tomentosa* and *Chamaesyce psammogeton* in Yuraygir National Park; and blackberry removal to protect the Bathurst copperwing butterfly *Paraleucia spinifera* at various sites in central-west New South Wales. The NPWS is also working closely with Sydney Water and Ku-ring-gai Municipal Council to protect blue gum high forest in the Dalrymple-Hay Nature Reserve. The forest has been listed as an endangered ecological community.

Work continued to restore the endangered Cumberland Plain woodland community within the Mulgoa Nature Reserve, involving the Mulgoa Landcare Group and bush regeneration contractors. Works included the removal of woody weeds such as privet, lantana, olives, blackberry and non-native grasses, and the destruction of feral animal harbour. Australian
Museum Business Services were engaged to collect baseline natural resource data for Mulgoa Nature Reserve as a precursor to preparing the draft plan of management.

**Southern Regional Forest Agreement**

On 24 April 2001 the NSW and Commonwealth governments signed a regional forest agreement for the South Coast and Tumut sub-regions. This agreement ends years of conflict over logging of old growth forests and provides a guarantee that the timber industry will be supplied 48,500 cubic metres per year of high-quality large logs from the South Coast region and 48,000 cubic metres per year from the Tumut region.

The first of four years of capital works funding was provided for recreational facilities in the extensions to Morton and Murramarang national parks that resulted from the Southern Regional Forest Agreement. The money will be used to improve or develop day-use facilities and lookouts, walking tracks, and bush camping areas.

### Caring for the environment

#### Environmental management system

As the prime conservation agency in New South Wales, the NPWS must consider the environment in all aspects of its operations. As well as fulfilling our statutory responsibilities, we should be a model for other organisations and the community. To this end, the NPWS has established a comprehensive environmental management system (EMS).

The implementation of the EMS by June 2003 has been set as a performance target in the NPWS Corporate Plan 2000-2003 and will be tracked under the corporate performance monitoring system.

Actions completed during the year included the development and distribution to staff of an EMS information booklet, implementation of the Waste Reduction and Purchasing Policy (WRAPP) Plan, implementation of the Government Energy Management Policy (GEMP), review of environment-related legislation to clarify the NPWS’ obligations, and a review of sewage management actions and their performance in the field.

In 2002 two reviews will be undertaken: recycled products, their performance, and guidelines on their use; and standard operating procedures for NPWS depots to ensure they incorporate environmental management standards. These reviews were postponed in 2000-2001 due to resources being diverted to the higher-priority Asset Management System.

#### Government Energy Management Policy

The NSW Government Energy Management Policy (GEMP) was launched in 1998. The GEMP provides a framework for energy management practices that minimise energy wastage, optimise energy efficiency and minimise the quantity and cost of energy consumed. This covers all types of energy, including electricity, gas, petrol and aviation fuel. The NPWS developed its energy management plan in August 2000.

Over the past two years the reports submitted to the Ministry of Energy Utilities, as required under GEMP, have shown that energy consumption has actually increased. The reason for this is the increase in park estate and staff in regional offices. Nevertheless, the NPWS is expected to demonstrate a downward trend in its consumption of electricity and fuel over the next few years, in accordance with the government’s commitment.

The NPWS head office in Hurstville, and several offices in the north of the state and in Queanbeyan, currently purchase at least 10 per cent green power under the NSW government electricity supply contract.

The 2000 GEMP report highlighted environmental initiatives such as at the Yarrangobilly Caves, where hydro-electric power is used to generate electricity, the Snowy Region Visitor Centre, which has a geothermal heating system, and the acquisition of some dedicated LPG motor vehicles.

The NPWS engaged a company to do a comprehensive audit of every energy account that the NPWS received in the period June 2000 to May 2001. This will provide the NPWS with accurate data and enable it to start comparing its performance on energy management across the state. It will also provide the base data to enable each NPWS area to benchmark its performance. This report is expected early in the new financial year. In addition, each finance service centre is recording the consumption details from each electricity account using the software package SAP. This should enable the NPWS to retrieve more accurate data from the system for future years.

### Waste management

#### Waste Reduction and Purchasing Policy

The NSW Waste Reduction and Purchasing Policy (WRAPP) was announced in 1997, requiring all state government agencies to develop and implement a WRAPP plan to reduce waste and increase purchases of recycled content materials in four areas:

- paper products
- office equipment and consumables (eg toner cartridges)
- vegetation material (tree clippings, leaves etc)
- construction and demolition material

In 2002 two reviews will be undertaken: recycled products, their performance, and guidelines on their use; and standard operating procedures for NPWS depots to ensure they incorporate environmental management standards. These reviews were postponed in 2000-2001 due to resources being diverted to the higher-priority Asset Management System.
The NPWS provided its annual WRAPP progress report to the Environment Protection Authority in May 2001. During the year the NPWS developed a communication strategy to disseminate information regarding the WRAPP to all staff. One of the strategies being employed to reduce the amount of paper being generated is the issuing of internal memos via email. Staff are also encouraged to use double-sided copying whenever possible, and recycled paper is used throughout the NPWS. The WRAPP plan will be reviewed in 2001-2002.

**Sewage management**

A number of initiatives were undertaken throughout the NPWS to better manage sewage. These included:

- contained effluent and composting toilets have replaced pit toilets in Crowdy Bay and Willi Willi national parks and Limeburners Creek Nature Reserve on the mid North Coast
- toilets at the Lighthouse Precinct in Cape Byron State Recreation Area were approved to be linked to the Council’s sewer system
- a pit toilet replacement program has commenced throughout World Heritage reserves in the north of the state, with composting toilets constructed in Richmond Range, Mebbin, Koreelah, Bundjalung and Nightcap national parks and Tyagarah Nature Reserve. Planning has commenced for the installation of composting toilets at Mount Warning
- in the Snowy Mountains area, a number of unlined toilets in close proximity to pristine waterways such as the Murray and Swampy Plains rivers were identified for replacement. Eight sealed pump-out pit toilets were installed.
- improved sewage treatment systems were installed at Apsley Falls and Tia Gorge visitor areas in Oxley Wild Rivers National Park and Mann River Nature Reserve
- solar-powered pumps are now used at visitor facilities throughout the Northern Tablelands area

**Myall Lakes National Park toilet and waste-water study**

A toilet and waste-water study in Myall Lakes National Park (1999) recommended a systematic upgrade of toilet facilities, a public education campaign to change visitor use practices, together with revegetation of foreshore areas to minimise nutrient flows into the lakes system. The NPWS has commenced installing new toilets throughout the park, with a projected cost of $1 million over two years: $400,000 in 2000-2001, and a further $600,000 to complete the project in 2001-2002.

**Upgrade of Perisher sewage treatment plant**

The NPWS has been engaged in upgrading the Perisher Valley sewage treatment plant over the past four years. The upgrade will meet new and more stringent effluent standards, and improve the capacity and operating reliability of the system. The total cost of the project, to be completed by June 2002, is estimated at $12 million. The plant is a centralised facility that provides the principal means of treating and disposing of sewage from the residents and day visitors using the Perisher Valley, Smiggin Holes, Guthega and Blue Cow ski resorts.

The cost of the upgrade is being minimised by using as much of the existing infrastructure as possible. Most of the works are already complete. The upgrade of the sludge storage facilities and final augmentation of the plant is due for completion in 2001-2002. Augmentation is necessary to cover an anticipated increase in sewage resulting from additional beds in the Perisher Range resorts, which were approved by the NSW government in 1999.

**Stormwater management**

Stormwater management devices to minimise erosion and run-off were installed in a number of parks, including Wolli Creek and Western Sydney regional parks.

**Recycling**

In early 2001 the NPWS embarked on a recycling program at all its major offices. Recycling services for plastic, glass, aluminium and steel containers, and organic waste are also now in place in most of the heavily visited parks, other than in those where visitors are encouraged to remove their own rubbish. There is a program for recycling waste cooking oil in the Perisher resort area of Kosciuszko National Park.

**Ecologically sustainable management**

**Performance target 2000-2003:**

- Environmental management system implemented by June 2003

**Performance report**

The environmental management system is being implemented, and progress monitored. Progress for 2000-2001 includes:

- recycling of paper at head office and regional offices
- recycling of plastic, glass, aluminium and steel containers, and organic waste in most heavily visited parks
- review of all environment-related legislation in terms of NPWS obligations
- development of the NPWS motor vehicle best practice guide, which includes information on regular servicing of vehicles to ensure maximum performance
- inclusion of an EMS component in future training and staff induction programs
- engagement of an energy consultant to analyse electricity usage

**Future directions**

A key initiative over the next three years will be the implementation of the environmental management system. The NPWS will undertake more audit activity, and benchmark our performance with respect to the ecological sustainability of NPWS management practices. In addition, the NPWS will sustain its commitment to fire and pest management.
Managing our built assets

The NPWS seeks to manage its built assets to ensure conservation of natural and cultural heritage values, and to facilitate the community’s enjoyment of those values, while at the same time ensuring the health and safety of visitors and staff.

Buildings

Projects undertaken as part of the Historic Assets Maintenance Program during 2000-2001 included:

- conservation building works at Willandra homestead, Willandra National Park, and Fort Denison, Sydney Harbour National Park
- conservation works at Old Great North Road, Yarrangobilly Caves House, Goat Island Colonial Magazine, Montague Island Light Station, Throsby Park Historic Site, Georges Head Beehive Casemates, Nielsen Park Bathing Pavilion, Boyds Tower, Innes Ruins, Penders, Roto House, and a wide range of buildings at Hill End Historic Site.
- maintenance works at Hartley Historic Site, Hill End Historic Site, Nielsen Park Bathing Pavilion and Roto House
- repairs and maintenance works at the Quarantine Station, Greycliffe House and Goat Island
- conservation works at Kelly’s Cottage, Budderoo National Park and Throsby Park Historic Site
- conservation works continuing at Georges Head Beehive and the casement on Goat Island

Greycliffe Gardens

A generous sponsorship by the Westfield Foundation is allowing the restoration of the gardens of Greycliffe House in Nielsen Park, Sydney Harbour National Park, to mirror the Tresillian Home period of the 1930s and re-establish the historic connection between the house and the harbour. Works this year included the production and public display of a landscape plan, the removal of several trees to open the harbour vistas and protect an historic magnolia, and the re-establishment of Matron Kaibel’s terrace garden.

Adaptive re-use of historic heritage

The conservation and adaptive re-use works for the cafe and interpretation at Fort Denison, Sydney Harbour National Park, and holiday accommodation at Smoky Cape Lighthouse Cottages, were both commended in the Adaptive Re-use Category for corporate/government at the National Trust of Australia (NSW) Heritage Awards 2001.

ANZECC cultural heritage benchmarking project

The NPWS will host the first annual workshop of ANZECC historic heritage managers in September 2001. The workshop will review the progress of conservation agencies towards best practice and where appropriate set higher levels of best practice in historic heritage management.

The NPWS has made significant progress in most of the best practice processes identified by the project with the development of a draft strategic policy on cultural heritage, interim guidelines for approvals for cultural heritage places, buildings, landscapes and moveable heritage items, and the first regional cultural heritage management strategy developed for the far South Coast region of New South Wales.

Roads and other access

During the year road and walking track works were undertaken throughout NPWS reserves to repair damage, upgrade facilities and improve access and visitor safety and enjoyment. Some of these included:

- road works in Jervis Bay, Washpool and Crowdy Bay national parks, Limeburners Creek Nature Reserve and Munmorah State Recreation Area
- bridges repaired or replaced at Brindle Creek, Border Ranges National Park and Koraleah Creek in Koraleah National Park, and in Kumbatine National Park
- walking track repairs and upgrades in Cape Byron State Recreation Area, Shelley Beach Walking Track in Yuraygir National Park, Little Congwong Beach in Botany Bay National Park, North Head Lookout, Lady Fairfax Walk and Dobroyd Head in Sydney Harbour National Park, and Bungoona Walk in Bald Rock National Park
- viewing platform and major walking track improvements at Minyon Falls and Protestor Falls in Nightcap National Park, Apsley and Dangars Falls in Oxley Wild Rivers National Park, Wonga Walk in Dorrigio National Park, Tianjara Falls, Fitzroy Falls and Long Point in Morton National Park, Yellow Track in Bungonia State Recreation Area, Yuelarbah Track in Glenrock State Recreation Area, Raspberry Lookout in Bindery-Mann Wilderness Area, plus works in Mount Warning, Dooragan, Crowdy Bay, Brisbane Waters, Mount Royal and Wyrrabalong national parks, Burning Mountain, Kattang, Victoria Park and Sea Acres nature
reserves, and Arakoon and Lake Macquarie state recreation areas

- major maintenance and road upgrades on the Tweed Range Scenic Drive and other flood-affected roads in the area, the Old Great North Road, and in Barrington Tops, Booti Booti, Tomaree, Towarri, Camerons Gorge and Wallabadar national parks

A project was undertaken in northern New South Wales to develop an accurate, standardised database of all roads within reserves in that area, to facilitate budgeting and planning processes. The approach developed by this project will assist other areas of the NPWS in the future.

A program of risk reduction works on the Alpine Way in Kosciuszko National Park included improvements to drainage, installation of netting, gabions and soil anchors. The program concentrated on sites between the park entrance station and Thredbo, and at Thredbo and south of Khancoban.

### Walking track construction and revegetation of the Kosciuszko summit area

A major upgrade has been underway since 1996 of the walking tracks of the Main Range, including the summit of Kosciuszko and the Main Range Walk. This is one of Australia’s most scenic walks and travels through rare plant communities, passing sparkling glacial lakes and providing stunning views in all directions. The first 1.8 kilometres of the walk has been reconstructed, from Rawson’s Pass north to Mueller’s Pass. The upgrade of the Main Range walks and old summit road are to be completed by 2004, with various soil conservation works to be undertaken following the removal of grazing from the high country.

### Cape Hawke summit development

Work continues on the Cape Hawke summit development project in Booti Booti National Park. The steps to the summit lookout are completed and the tower manufactured. Installation of the 8.3-metre tower is due for completion early next financial year.

### Tomaree Head enters final phase of works

In Tomaree National Park, the Tomaree Head walk is almost complete, with the construction of rock-based steps and steel observation decks, and the return of the radar equipment. More than $150,000 has been spent on what is a major upgrade. It is estimated more than 100,000 people walk up the Head each year to experience the world-class view.

### TransGrid clearing in Kosciuszko region

TransGrid is a (Statutory) State Owned Corporation responsible for the management and development of the NSW high-voltage electricity network. It has a large number of powerlines in NPWS reserves and an agreement exists for clearing to enable maintenance. In early 2001 TransGrid conducted extensive clearing under powerlines in Brindabella and Kosciuszko national parks and in Bimberi Nature Reserve which did not comply with the protocols in the agreement and may possibly be in breach of the National Parks and Wildlife Act. The NPWS, the Environment Protection Authority and State Forests of NSW are investigating this matter. The NPWS has insisted TransGrid undertake a program of remediation to deal with the environmental damage caused.

### Other park infrastructure

#### Upgrading and redeveloping visitor facilities

Major upgrading and redeveloping of visitor facilities was carried out during the year at:

- Boatharbour Nature Reserve, Mebbin National Park and Tyagarah Nature Reserve
- Cambridge Plateau (camping area and walking tracks), Richmond Range National Park, and the camping area at Koreelah Creek in Koreelah National Park
- Washpools in Towarri National Park, installation of a picnic area
- Youngville, Mount Royal National Park, completion of visitor use area
- Bongil Bongil National Park, picnic area at Bonville Creek
• Williams River Area, Barrington Tops National Park, completion of day-use facilities
• Bonville Creek, Bongil Bongil National Park, construction of day-use facilities
• Mill Creek, Dharug National Park, construction of fire pits and large group camping area facilities, and interpretation stands and material at the Old Great North Road
• Boarding House Dam, Watagans National Park, new visitor facilities
• Willi Willi and Tapin Tops National Parks and Brimbin Nature Reserve, picnic and camping area upgrades
• Dangars Falls, Edgars Lookout, Apsley Falls and Tia Gorge, Oxley Wild Rivers National Park, upgrading and redevelopment of visitor facilities
• Lemon Tree Camping Area, Severn River Beach Walk, Macintyre River, Kwiambal National Park, completion of visitor facilities
• Bellbird Camping Area, Washpool National Park and Mann River Nature Reserve, construction of new galley, toilets and upgraded walking tracks using World Heritage funding
• Boonoo Boonoo Falls, Boonoo Boonoo National Park, relocation of camping area
• Red Point, Hammerhead Point, Jervis Bay National Park, and Tianjara Falls and Yalwal, Morton National Park, upgrading of visitor facilities

Visitor facilities at Mount Mackenzie Nature Reserve
Mount Mackenzie Nature Reserve, 10 kilometres west of Tenterfield, is a popular stopping point near the New England Highway with magnificent views over the Northern Tablelands. The NPWS provided $30,000 for a new cooking galley with gas barbecues, a new lookout area, disabled access and signage. The project was completed with assistance from the Tenterfield Council, and labour supplied by the Aboriginal Community Development Employment Program.

New camping ground in Warrumbungle National Park
A new camping ground has been constructed in Warrumbungle National Park. The camping ground, to be known as ‘Walaay’ (pronounced wal-eye), is to cater primarily for groups and is located around the Department of Education’s Environmental Education Centre. The existing group camping area, Camp Elongery, is located on top of a large Aboriginal artefact scatter and is degraded due to the high volume of usage. It is to be closed and the original vegetation regenerated.

Walaay has been specifically designed to cater for buses and large groups. There are five sites catering for groups of up to 150, with parking bays designed for buses with trailers. Composting toilets have been installed on site and it is a five-minute walk to the best hot showers in the state.

Thredbo Coronial Inquiry
On 29 June 2000 the Coroner released the findings of his inquiry into the 1997 Thredbo landslide, together with 10 recommendations, all of which were accepted by the NSW government. A key recommendation was that an independent review be undertaken to assess the appropriateness of the NPWS retaining responsibility for urban communities and road maintenance within the NPWS estate. On 30 June 2000 the Minister for the Environment appointed Mr Bret Walker, Senior Counsel, to conduct this review and to report to the government by 31 December 2000. The terms of reference for this review were:

• to review the effectiveness of the National Parks and Wildlife Service’s policies and practices in carrying out its responsibilities for urban communities and road maintenance within national parks and make recommendations about the appropriateness of these responsibilities remaining with the Service
• to examine all other recommendations made by Coroner Hand in relation to the responsibilities of other Government authorities in the Kosciuszko National Park and recommend any ways in which the carrying out of these responsibilities can be improved

The review has been completed. Four key recommendations were made in the Walker report, and these were accepted by the government. The key recommendations were:

• that the ski resorts be retained within Kosciuszko National Park, under the management of the NPWS
• that a new regional environmental plan be developed to apply to the ski resorts
• that the Department of Urban Affairs and Planning be the consent authority for future major developments in the resort areas
• that responsibility for the Alpine Way and the Kosciuszko Road be transferred from the NPWS to the Roads and Traffic Authority

Negotiations are underway between the NPWS and the RTA in relation to the transfer of the Alpine Way. The regional environment plan will be developed and the Kosciuszko National Park Plan of Management will be reviewed over a two year period. In the interim, a State Environmental Planning Policy will be developed to give effect to the planning changes as soon as possible.

Managing site-use in protected areas

The NPWS aims to manage site-use within the protected area system in a culturally sensitive and ecologically sustainable way. During the year a number of policies were drafted, reviewed or developed. These included policies on park visitation, fees and charges, companion animals, firearms, recreational horse riding, hang gliding, car rallies, management of cultural heritage information, Aboriginal community consultation, and strategic policy for cultural heritage management.

Managing our built assets

**Performance targets 2000-2003**
• Reduction in maintenance liability by June 2003
• Reduction in health and safety related incidents involving either staff or members of the public

**Performance report 2000-2001**
Changes to NPWS business processes and technology are currently underway. These changes will improve the management of plant maintenance and information.

The following graph shows health and safety related data for staff.

![Graph showing health and safety incidents](image)

**Future directions**
A key initiative over the next year will be the development of a comprehensive asset management system to improve the maintenance of built assets, and ensure they are safe and healthy for staff and for the public to use.

Managing site-use

**Performance targets 2000-2003**
• Statewide site-use policies and guidelines systematically developed and implemented

**Performance results 2000-2001**
• Strategic policy framework developed
• Strategic policy for cultural heritage management drafted
• Preliminary strategic policy content prepared on:
  – park visitation
  – fees and charges
• Field management policies prepared or reviewed for:
  – management of cultural heritage information
  – Aboriginal community consultation
  – companion animals
  – firearms
  – recreational horse riding
  – artificial waters
  – hang gliding
  – car rallies

**Future directions**
The NPWS will continue to progressively develop statewide policies and guidelines to minimise the effects of site-use. We will also develop and implement recreational strategies for sites identified as being ‘at risk’ from recreational use affecting conservation outcomes.
Contributing to communities

The NPWS seeks to ensure that its operations across New South Wales contribute to the environmental, social and economic well being of local and regional communities.

Contributing to sustainable rural and regional development

As part of its mission of working with people and communities to protect and achieve natural and cultural heritage conservation in the New South Wales landscape, the NPWS is carrying out a program of research to assess the social and economic role of conservation in rural and regional development. During 2000 the NPWS completed regional economic impact assessments for Warrumbungle National Park, and Sturt, Kinchega, and Mutawintji national parks in western New South Wales. These studies assessed the economic contribution of park management and associated visitation to the regional economies in which these parks are located. As with previous regional economic impact studies produced by the NPWS, this information will be used in conservation planning and management, and to contribute to rural and regional development programs being produced by local councils, and other public bodies.

During the year the NPWS held discussions with representatives from government agencies and academic institutions to discuss the potential for collaboration on projects and initiatives in the field of conservation and rural and regional development. A collaborative project commenced with the University of Western Sydney on the contribution of protected areas to community quality of life in rural and regional areas. The first stage of this project was presentation of a joint paper to the Australian Association for Social Research annual conference in May 2001.

During 2001 the NPWS will be presenting papers to meetings of regional development practitioners on the role of national parks in rural and regional development, producing reports on the economic and social value of public open space (in conjunction with the Sydney Urban Parks Education and Research Group), publishing research on the economic value of recreational use for ten protected areas in New South Wales, and producing guidelines for local councils on incorporating conservation into regional development programs.

Tourism

Tourism awards

National parks play an important role throughout the state in assisting rural and regional economies by helping to attract visitors to the local area. The NPWS is able to provide world class tourist facilities while still maintaining its primary role as a nature conservation agency.

At the NSW Tourism Awards, the NPWS Blue Mountains Heritage Centre received an Award of Distinction for Tourism Retailing. The NPWS also had finalists in four other categories for Montague Island Tours, Smoky Cape Lighthouse and Blue Mountains National Park Discovery Tours.

Smoky Cape Lighthouse

The Smoky Cape Lighthouse complex in Hat Head National Park received a commendation in the National Trust Heritage Awards, and was runner-up in the Mid North Coast Region Tourism Awards.

Touring By Car

One of the routes selected by Tourism NSW for the Touring By Car program was the Waterfall Way, which runs east from Armidale to the coast. Along the Waterfall Way are eight national parks, including three World Heritage areas. The NPWS provided assistance in the development of the Touring By Car brochure through the Gorge Gateway working group based in Armidale.

Commercial tour operators policy

The NPWS continued its review of a licensing system for sustainable tourism and commercial recreation operators. A draft framework document is nearing completion, but a number of outstanding areas such as buses and commercial consents still need to be addressed and integrated into the document. Further work will be undertaken at the field level to develop effective implementation. In addition, there is close liaison with Tourism NSW regarding the development of its statewide nature tourism strategy to ensure the approaches are complementary.
Other activities

The NPWS is continuing to work with the Council for Tourism Associations to customise the accreditation system for NPWS visitor centres across the state. This will provide an independent third-party accreditation standard.

The NPWS again mounted a major exhibition at the eight day Caravan and Camping Show, Sydney’s premier camping exhibition held at Rosehill Gardens. Officers from across the state were available to explain NPWS policies, as well as providing park and camping information to regular and potential visitors, and receiving feedback.

The NPWS continued to work with Tourism NSW and local government in developing Tourism Gateway Centres at key tourist entry points to New South Wales. The NPWS provides advice and guidance in the development of the centres, as well as providing displays, brochures and other materials for centre staff and visitors. The NPWS provided input to Tourism NSW on the development of their Nature Tourism Strategy and the Tourism Masterplan.

The NPWS met with the NSW Roads and Traffic Authority to discuss opportunities for upgrading roadside signage for national parks and reserves.

Weed management programs

The NPWS was represented on or was a member of a number of tourism-related organisations, including the Tourism Industry Forum, Partnership Sydney, the Tourist Attractions Association and the Outdoor Recreation Industry Council. This representation allows the NPWS to present its position on the need for a sustainable approach to tourism-related activities.

Weed management programs

The NPWS undertakes a large number of weed control programs. The following provides a summary of a few of these programs. Details of these and other programs can be found on the NPWS website at www.npws.nsw.gov.au.

Bushland regeneration

The NPWS is undertaking restoration programs to control weeds and regenerate bushland in many national parks. The strategy is to replace weeds with native species in such a way that the process of natural regeneration and succession is sustainable and that target weeds are not simply replaced by other weeds. A number of these programs are supported by funding provided through the NSW Biodiversity Strategy, Coastcare and Bushcare programs, or through grants from the NSW Environmental Trusts.
Much of the regeneration works is undertaken with the support of community groups. Volunteers regularly work with the NPWS helping to remove a variety of weeds including bitou bush, lantana, privet, pampas grass, gorse and a wide range of exotic vines and groundcover species. For example, in the Sydney area more than 500 volunteers assist the NPWS in the Lane Cove, Garigal, Ku-ring-gai Chase, Sydney Harbour, Botany Bay and Royal national parks. At Lane Cove National Park, 36 Bushcare groups work on a regular basis and the park also fosters corporate and community days which allow private organisations and community groups to ‘get their hands dirty’ for a day.

A major aim of bush regeneration programs is to increase community awareness of the significance of environmental weeds and the need for their control. For example, in southern Sydney areas the NPWS has consolidated its links with the community, neighbours and Bushcare groups. Visits to schools and the preparation of resource materials encouraged participation in bush regeneration projects.

The NPWS has embarked on a massive bush regeneration program on several coastal headland areas around Sydney Harbour and Botany Bay. The program has included abseiling down cliff faces to pull out weeds, strategic use of herbicides including aerial application for bitou bush, use of fire to stimulate weed seed germination and preparing sites for major replantings of native species.

In the World Heritage listed Blue Mountains National Park, funding provided through the NSW Biodiversity Strategy has been used to survey and assess the conservation values of weed prone areas. A bush regeneration strategy has been prepared to identify priority areas for action. Gorse is one of the most serious weeds in the Blue Mountains. To combat the problem, a regional management plan has been developed, and each year the NPWS seeks community support in detecting and recording outbreaks of gorse in the Grose Valley.

The Great Grose Gorse Walk has become a major community event with over 140 person-days contributed by the community over the past 12 months. Elsewhere in the Blue Mountains, NPWS staff and volunteer groups have removed willow infestations from a number of remote waterways in the Kanangra-Boyd National Park and in the Colo River Gorge area of Wollemi National Park. In addition the NPWS and the Blue Mountains City Council produced an education booklet titled *Weeds of the Blue Mountains Bushland*. The illustrated booklet provides valuable information on the identification of the 30 most important weeds in the region with additional information on impacts, management techniques, and alternative planting options.

On the Central Coast the NPWS has continued a habitat restoration program in the Lake Macquarie State Recreation Area. A management plan has been prepared and priority actions started. The Department of Sport and Recreation, which leases the area, has included bush regeneration as part of its curriculum.

Other bush regeneration programs have been conducted in Wollemi, Yuraygir, Bundjalung, Hat Head, Tomaree, Booti Booti, Myall Lakes, Wyrrabalong, Boudi, Eurobodalla and Mimosa Rocks national parks, Broken Head, Tucki Tucki, Wilson, Berkeley, Kattang, Cockle Bay, Wambina, Seaham Swamp and Towra Point nature reserves, and Illawarra Escarpment, Lake Macquarie and Glenrock state recreation areas.

**Rainforest restoration**

The NPWS continued to undertake rehabilitation works in a large number of coastal rainforest remnants. Successful programs are continuing in sub-tropical rainforest remnants in Wilson, Moore Park and Davis Scrub nature reserves, Dorrigo and Myall Lakes national parks and Glenrock State Recreation Area. Very rare remnants of lowland sub-tropical rainforest are the subject of successful programs in Coramba and Wingham Brush nature reserves, on Susan Island in the Clarence River, and on Coocumbar Island in the Manning River. Programs are being undertaken in littoral rainforests at Broken Head, Brunswick Heads, Iluka, Sea Acres and Snapper Island nature reserves, and Royal, Wyrrabalong, Bongil Bongil and Booti Booti national parks. Several of these programs have been expanded with funding provided under the NSW Biodiversity Strategy.

Weed species targeted vary according to the location of the reserve, but important species include bitou bush, lantana, Cape ivy, *Protasparagus* spp., cat's claw creeper, Madeira vine, glory lily, coastal and common morning glory, *Passiflora* spp., privet, camphor laurel and fishbone fern.

The NPWS, in conjunction with the Iluka Landcare Group and a variety of sponsors (NSW Environmental Trusts, Coastcare and Green Corps) completed a major restoration project in the World Heritage listed Iluka Nature Reserve and adjoining...
areas. A rehabilitation plan for the dry sclerophyll rainforest on Snapper Island has been developed and this is being implemented with the assistance of the Worimi Land Council and the Tilligerry Habitat Association.

**Montague Island Nature Reserve kikuyu eradication program**

Montague Island Nature Reserve off the South Coast is home to a little penguin colony of approximately 12,000 birds. The NPWS and Charles Sturt University have been undertaking a two year research program to eradicate kikuyu grass from the island. Kikuyu grass invades the penguins’ habitat and poses a serious threat to their nesting. Many options were considered to control the grass, including burning. In June 2001 a burn being undertaken by staff involved in the research escaped its boundaries and killed approximately 42 penguins of the estimated 12,000 on the island. The penguin population was not threatened, however the incident was a sad loss for residents, tourists and NPWS staff. An independent investigation has been commissioned and the findings will be reported in next year’s annual report.

**Cooperative programs targeting noxious weeds**

Weeds can be declared ‘noxious’ under the *Noxious Weeds Act 1993* if they pose a threat to agriculture, the environment or community health, and there is a public benefit from government expenditure on their control.

The NPWS is represented on the NSW Noxious Weeds Committee and is a member of regional weed advisory committees. The NPWS is keen to collaborate with other stakeholders to ensure statewide and regional approaches to weed management are effectively planned and implemented.

Many of the NPWS weed control programs focus on environmental weeds because of the need to reduce the adverse impacts of these species on biodiversity conservation. The NPWS also undertakes numerous programs targeting noxious agricultural weeds, to protect neighbouring properties. Some of these weeds are serrated tussock, Bathurst burr, Noogoora burr, Johnson grass, giant Parramatta grass and Scotch thistle.

**Pest animal management programs**

In 2000-2001 NPWS conducted more than 800 pest animal control programs, of which 70 per cent were conducted in collaboration with neighbours and other stakeholders. Details of these cooperative programs are summarised under each pest species and more detailed information can be found on the NPWS web site at www.npws.nsw.gov.au. The following examples illustrate the range of the collaborative programs undertaken by the NPWS.

**Cane toads**

Cane toads are now established on the North Coast of New South Wales as far south as the Clarence River. The only confirmed breeding colonies south of this area are two isolated colonies at Angourie near Yamba, adjacent to the Clarence River and one around Lake Innes near Port Macquarie.

The education and awareness campaign launched in 2000 by the Minister for the Environment has continued throughout the state. The objectives of the campaign are to:

- prevent cane toads establishing outside their existing range, which is north of Grafton
- raise community awareness of cane toads, including their impacts on biodiversity
- increase community ownership of the cane toad issue and community involvement in their control
- raise community awareness of native frogs and their conservation requirements

**Guy Fawkes River National Park feral horse control program**

In October 2000, NPWS staff undertook a feral horse control program in Guy Fawkes River National Park. This involved the aerial culling of 606 horses from the extremely rugged park. A great deal of public concern was expressed about the nature of the cull and the RSPCA undertook an investigation.

Following strong community reaction to the cull the aerial shooting of horses in national parks was banned. The Minister for the Environment appointed Professor Tony English to investigate the program and make recommendations on appropriate feral horse management initiatives. The full text of Professor English’s report can be found on the NPWS website at www.npws.nsw.gov.au.

In March 2001, the Minister announced that a study would be undertaken into the heritage value of horses in the park. A Heritage Working Party was established under the chairmanship of Associate Professor Frank Nicholas of the Faculty of Veterinary Science, University of Sydney, with membership from the local community. The final report of the
working party is due in December 2001 and will be summarised in next year’s annual report.

The RSPCA commenced prosecution of the NPWS in November 2000. This matter is still before the courts.

**Regional programs**

On the NSW South Coast the NPWS is working jointly with the South Coast, Bombala and Braidwood rural land protection boards (RLPBs), State Forests of NSW (SFNSW) and the Victorian Department of Natural Resources and Environment to develop a regional approach to vertebrate pest control. A working group has been established and the RLPBs and SFNSW have been contracted to undertake a regional vertebrate pest control program. Similarly, NPWS South-West Slopes Region undertakes a cross-border cooperative pest program with the ACT Parks and Conservation Service.

The NPWS is working jointly with Coonabarabran, Coonamble, Walgett, Narrabri and Tamworth RLPBs, SFNSW and NSW Agriculture in a fox baiting program over a large area surrounding the Pilliga Nature Reserve and Pilliga State Forest. The program aims to protect native species such as the threatened Pilliga mouse and to increase lambing percentages on farms. Further west, a major project to protect malleefowl from fox predation in the Yathong, Nombinnie and Round Hill nature reserves is complemented by an extensive ground baiting program on surrounding properties and state forests which is coordinated by the Hillston RLPB.

In northern New South Wales, the NPWS is a key participant in regional pest animal groups such as the Northern Feral Animal Advisory Council and the North Eastern Pest Animal Advisory Committee. These groups aim to develop a more coordinated approach to pest animal control within the areas they cover. Both groups include representation from government agencies and rural lands protection boards and the north east group also includes representation from local councils.

Control of pest animals in or near urban areas is much more difficult than in rural areas and the NPWS has worked closely with local councils and the community to address this issue. The southern brown bandicoot is one of the few priority species identified for fox control in the Sydney area. The species is restricted to a few large reserves in the northern Sydney suburbs. An innovative program is being trialled in this area to overcome the difficulties of fox control in urban areas. In the program, 11 local councils, Taronga Zoo and the NPWS have combined to undertake a regional fox-baiting program within key bushland reserves. The program has wide community support and its effectiveness is being monitored by regular fauna surveys.

**Fire management**

The NPWS is responsible for the care and management of more than six per cent of the land area of New South Wales. Much of this estate is some of the most rugged and bushfire prone country in the world. The NPWS has statutory responsibilities relating to the protection from bushfires of human life, property, and natural and cultural heritage values on land under its management. Under the provisions of the NSW Biodiversity Strategy, the NPWS is also a lead agency in the objective to improve fire management regimes across the state.

With its strong emphasis on developing staff skills, the NPWS now has more than 900 trained firefighters and over 300 support staff, together with a full range of vehicles, plant, equipment and aircraft for fire management operations, particularly in remote areas.

**Prevention**

Predominantly dry weather conditions across much of New South Wales helped fuel reduction and prescribed burning operations during the winter months of 2000-2001. The NPWS was able to conduct prescribed burning operations over 19,733 hectares of its managed lands. In addition, maintenance was undertaken on 5,276 kilometres of NPWS fire trails in 2000-2001.

Prescribed burning operations conducted by the NPWS are directed mainly at protecting neighbouring areas, thereby protecting life and property. This is done through the implementation of ‘asset protection zones’ along park and reserve boundaries where appropriate. Prescribed burns are also focused through strategic wildfire control zones across parks. These zones provide fuel reduced areas that help to break up and minimise the spread of wildfires and allow for safer access for firefighters. Burning is also conducted to maintain appropriate fire regimes on NPWS managed lands, which aids in maintaining biodiversity within our reserve system.

**Total area burnt in prescribed burning operations on NPWS managed lands since 1993**

<table>
<thead>
<tr>
<th>Year</th>
<th>Area prescribed burnt (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993-94</td>
<td>47,816</td>
</tr>
<tr>
<td>1994-95</td>
<td>35,778</td>
</tr>
<tr>
<td>1995-96</td>
<td>25,572</td>
</tr>
<tr>
<td>1996-97</td>
<td>15,866</td>
</tr>
<tr>
<td>1997-98</td>
<td>9,601</td>
</tr>
<tr>
<td>1998-99</td>
<td>12,971</td>
</tr>
<tr>
<td>1999-2000</td>
<td>6,752</td>
</tr>
<tr>
<td>2000-2001</td>
<td>19,220</td>
</tr>
<tr>
<td>Total</td>
<td>173,576</td>
</tr>
</tbody>
</table>

**Policy framework development**

A workshop was held in Sydney in November 2000 for key NPWS fire operational staff. This workshop focused on reviewing and updating the NPWS Fire Management Manual. The NPWS has developed 53 policies and related standard operating procedures to carry it forward in the area of prevention, preparedness, response and recovery, as well as fire management administrative requirements. The new NPWS Fire Management Manual is scheduled for release around July 2001.
Standards of fire cover

The NPWS is currently reviewing its standards of fire cover in line with the newly developed Australian Standard to assist in determination of the resources, such as equipment and competent staff necessary for prevention and fire suppression on its managed lands. The principle of hazard and risk assessment are to be applied across all areas of the NPWS to assess the core firefighting resources required for the NPWS.

Fire management training

The NPWS is currently aligning its training to the National Public Safety Training Package which is a competency-based package taking into account both curriculum based classroom training and on-ground practical experience progression.

The NPWS conducts a comprehensive fire management training program for its staff. Courses conducted include basic firefighter, crew leader, the Incident Control System, helibase management, aerial incendiary operator, and Situation Officer, Resource Officer and Logistics Officer training.

Courses were also conducted jointly with the Rural Fire Service, State Forests of NSW, NSW Fire Brigades, the Bureau of Meteorology (Severe Weather Section) and Natural Resources and Environment (Victoria), in prescribed burning, severe fire weather, Fire Ground Manager, Air Attack Supervisor and Air Observers.

Reserve fire management plans

Of the current 580 NPWS parks and reserves in New South Wales, 516 require some degree of fire management planning. There are at present over 230 reserve fire management plans that are either in preparation, on public exhibition or have been adopted. Performance indicators have been adopted that will enable the NPWS to monitor and report on its effectiveness in achieving the objects of the plans. This major project is ongoing and focuses on biodiversity and cultural heritage aspects of fire management within each reserve, the fuel management actions to be undertaken and wildfire suppression issues. Each plan identifies Bush Fire Management Zones (BFMZ) that are used to implement fuel management (prescribed burning), vegetation slashing and fire trail maintenance. The issues of biodiversity conservation and operational suppression of wildfires are also addressed in these plans.

All fire plans are placed on public exhibition for three months during which time local interest groups may comment on relevant fire management issues for the reserve. Relevant interest groups and park neighbours are also consulted during the development of each reserve fire management plan.

Coordinated fire fighting

The NPWS is committed to cooperative and coordinated firefighting. This involves close liaison with NSW Fire Brigades, the Rural Fire Service and NSW State Forests for better coordination of fire preparedness activities.

The NPWS is an active member of the Bush Fire Coordinating Committee and its various standing and working committees. The NPWS is also active in its representation on 97 per cent of district bushfire management committees in locations where the NPWS has parks and reserves.

The NPWS is working closely with NSW State Forests to achieve similar prevention and response systems so as to achieve common-ground fire management between the two major land managers in New South Wales. Memoranda of understanding are currently being developed between the NPWS and NSW State Forests, NSW Fire Brigades and the Rural Fire Service. The NPWS also maintains a cross-border cooperative fire fighting agreement with the Department of Natural Resources and Environment (Victoria) in order to provide rapid fire suppression across the NSW/Victoria border area of the Snowy Mountains. This arrangement will be replicated to cover the South Australia and Queensland border areas.

The NPWS and the Sydney Catchment Authority are taking a joint management approach to fire management, with the deployment of seasonal fire teams for the Sydney water catchment areas. These teams contained all wildfires within the catchment to under eight hectares and completed 1,300 hectares of hazard reduction burning during the year.

The NPWS continued to be proactive in promoting and supplying resources for the development of 138 bush fire risk management plans and plans of operation for bush fire management committees across New South Wales. Nearly all these plans have now been completed and signed off for adoption by the Bush Fire Coordinating Committee. The commitment by NPWS staff to this project has been extensive over the last three years as the NPWS has been the main provider of information and development of these plans.

NSW Biodiversity Strategy: fire regimes

The NPWS was funded through the NSW Biodiversity Strategy to address Priority Action 43: Manage fire in accordance with ecologically sustainable development principles. The NPWS commenced a project to achieve better fire management by developing guidelines that identify appropriate fire regimes for the conservation of biodiversity within given ecosystems. The development of databases on the fire response and life history characteristics of flora and fauna species, and the conduct of original research into the effects of infrequent fire, will aid the development of these guidelines. This project is in its second year with the aim of having a comprehensive overview available for use in 2002.

Wildfire record

The record of wildfire occurrence on NPWS managed lands is listed in the table below. The NPWS is one of four firefighting authorities in New South Wales and has been involved in wildfire suppression since 1967.
On-park bushfires

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of fires</th>
<th>Area burnt on park (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989-1990</td>
<td>249</td>
<td>66,464</td>
</tr>
<tr>
<td>1990-1991</td>
<td>425</td>
<td>125,469</td>
</tr>
<tr>
<td>1991-1992</td>
<td>396</td>
<td>66,409</td>
</tr>
<tr>
<td>1992-1993</td>
<td>213</td>
<td>21,772</td>
</tr>
<tr>
<td>1993-1994</td>
<td>300</td>
<td>382,897</td>
</tr>
<tr>
<td>1994-1995</td>
<td>250</td>
<td>89,112</td>
</tr>
<tr>
<td>1995-1996</td>
<td>189</td>
<td>15,192</td>
</tr>
<tr>
<td>1996-1997</td>
<td>194</td>
<td>12,670</td>
</tr>
<tr>
<td>1997-1998</td>
<td>466</td>
<td>236,152</td>
</tr>
<tr>
<td>1998-1999</td>
<td>189</td>
<td>14,195</td>
</tr>
<tr>
<td>1999-2000</td>
<td>166</td>
<td>6,715</td>
</tr>
<tr>
<td>2000-2001</td>
<td>389</td>
<td>217,695</td>
</tr>
<tr>
<td>Total</td>
<td>3,426</td>
<td>1,254,742</td>
</tr>
</tbody>
</table>

Wildfire statistics for parks and reserves

Detailed records of fire origins and causes have been kept centrally in the NPWS since the 1993-1994 fire season. Of the 1,706 fires that have started ‘on-park’ since 1 July 1993, 90 per cent of these fires were contained within park and reserve boundaries. Only 10 per cent of fires have escaped from park or reserve boundaries into neighbouring tenures. In contrast, over 20 per cent of all fires that have occurred within parks and reserves since 1993 began outside a reserve and crossed onto NPWS managed lands. These figures are summarised in the pie charts below.

NPWS wildfire origin and control

- Started on park, controlled on park: 71.6%
- Started on park, moved off park: 8.1%
- Started off park, moved on park: 20.4%

NPWS containment of wildfires that started on parks and reserves

- Started on park, controlled on park: 90%
- Started on park, moved off park: 10%

2000-2001 bushfire season

The bushfire season began for the NPWS in mid August 2000, when the North Coast and tablelands of New South Wales experienced drier than normal conditions. Within this area many prescribed burns that were being conducted on adjoining lands became wildfires as the weather deteriorated and escaped into parks, reserves and state forests. During this time numerous fires were started deliberately both on and off parks across the North Coast and tablelands and within the Sydney Basin.

Containing these fires proved difficult as most were burning in rugged terrain. The lack of significant rainfall across north-east New South Wales and Sydney prevented these fires from being fully extinguished until mid October 2000. The situation required a heavy commitment of NPWS resources, with all NPWS firefighting resources being dispatched to the North Coast and Sydney while the fires persisted. In any one day during this critical period NPWS resources allocated to these fires were up to 551 firefighters, 71 fire tankers, 27 aircraft, 17 bulldozers and graders and 3 fireboats. In addition, incident management personnel and support staff amounted to just over 100.

The NPWS dealt with a total of 454 bushfires covering 465,870 hectares, of which 389 were on NPWS-managed lands (covering 217,695 hectares of parks and reserves) and 65 were on neighbouring lands. The chart below identifies the major causes of the wildfires that occurred on NPWS parks and reserves over the past year.

NPWS parks and reserves – wildfire cause for 2000-2001
Recovery and rehabilitation

The NPWS is committed to recovery and rehabilitation after all fires occurring on its managed lands. Fires within parks and reserves are assessed for appropriate recovery and rehabilitation measures to be undertaken when all suppression activities have ceased.

Some recovery and rehabilitation strategies used by the NPWS include wildlife rescue with the assistance of volunteer groups such as WIRES (Wildlife Information and Rescue Service), the rehabilitation of temporary fire control lines (temporary bulldozer trails and hand constructed trails and fire breaks) and tree surgery to remove dangerous tree limbs and trees from visitation areas.

The NPWS starts the planning of any recovery or rehabilitation activities even before the fire has been fully extinguished. These activities then commence during the ‘mop-up’ phase of the fire. Recovery plans are passed on to the relevant NPWS administrative area for further implementation.

Ku-ring-gai tragedy update

Four NPWS officers lost their lives and three were severely injured following a fire hazard reduction operation in Ku-ring-gai Chase National Park in June 2000. An inquiry into the fire has been conducted and an inquest into the deaths will be conducted by the Deputy State Coroner. The Coronial inquest is expected to start hearing evidence on 16 July 2001.

Three permanent memorials and tributes to the victims of the fire have been established, namely a memorial plaque on the Mt Ku-ring-gai walking track in Ku-ring-gai Chase National Park, a community memorial site in Mt Ku-ring-gai and perpetual achievement awards honouring the victims of the fire.

Contributing to communities

Performance target 2000-2003

• Increase in the number of joint NPWS-community tourism, pest control and fire management programs

Performance report

The following graph shows the number of programs run jointly by the NPWS and local government and/or community groups.

Future directions

The NPWS will work with local and regional communities to encourage and promote tourism, while ensuring appropriate use of reserves. The NPWS will also undertake research on the environmental, social and economic benefits of NPWS reserves and programs for local and regional communities to support decision-making at state, regional and local levels.