

FOREST MANAGEMENT PLAN
FOR THE
CENTRAL HIGHLANDS

Department of Natural Resources and Environment
May 1998

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Victoria. Department of Natural Resources and Environment
Forest management plan for the Central Highlands.

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1. Forest management - Environmental aspects - Victoria - Central Highlands Region. 2. Forest conservation - Victoria - Central Highlands Region. 3. Forest ecology - Victoria - Central Highlands Region. 4. Biological diversity conservation - Victoria - Central Highlands Region. I. Title.

333.751609945

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Printed by Gill Miller Press Pty. Ltd.

ISBN 0 7311 3159 2 (online version)

FOREWORD

Extending from Mt Disappointment in the west to Lake Eildon and the Thomson Reservoir, the forests of the Central Highlands of Victoria contain major environmental, cultural and economic resources. The area is renowned for its beauty, diverse range of flora and fauna, timber resources, recreational opportunities and the quality of water in the rivers and streams flowing from the forest.

Over 600 000 ha of the planning area is publicly-owned native forest, of which about 180 000 ha is reserved in parks and other conservation reserves, arising largely from the recommendations of the Land Conservation Council. State forest comprises nearly 400 000 ha and has an important complementary role to play in conserving the area's natural values, as well as contributing to the regional and State economy.

This plan provides for the balanced use and care of State forest, and a framework in which the area's timber industry can continue to confidently invest while providing protection for the natural and cultural values of the forest. To meet the requirements of the National Forest Policy Statement, the Victorian and Commonwealth governments have prepared a Regional Forest Agreement on the management of the forests of the Central Highlands. This plan comprises an important component of that Agreement.

A detailed zoning system allows for the protection and management of a range of values and uses of the State forest. This zoning scheme comprises a Special Protection Zone, in which conservation of identified values is best achieved by the exclusion of timber harvesting; a Special Management Zone, where management is modified to achieve particular objectives; and a General Management Zone, where timber harvesting may proceed subject to the requirements of the Code of Forest Practices for Timber Production and the series of prescriptions and guidelines detailed in this plan.

This plan is an example of integrated regional planning, drawing on a wide range of expertise both within and outside the Department of Natural Resources and Environment. Public participation has been integral to the development of this plan. Three Forest Management Area Advisory Committees, drawn from local communities and key stakeholder groups, have advised the planning teams of community concerns and attitudes regarding forest management and have given valuable comment on drafts.

A proposed plan, launched in January 1997, provided the basis for further comment and subsequent refinement of the plan. I am very grateful to the Advisory Committees, those who took time to make submissions, and all others who contributed to the planning process.

Michael J. Taylor
Secretary,
Department of Natural Resources and Environment

ACKNOWLEDGMENTS

This plan was prepared by a project team of Forests Service staff from the North East and Gippsland Regions and the Strategic Forest Planning Section. The project team comprised: Ross Potter, Richard Gijbers, Mal McKinty, Gordon Robson, Kylie White and the three Senior Foresters - Peter McHugh, Geoff Scales and Mark Woodman. The team was assisted by a large number of other NRE staff, particularly Geographic Information System (GIS) operators - Alison Boak and Donna Sweatman, GIS analysts - Blair Freeman and Nadia Marine, and Forests Service field staff. Others who contributed included David Cameron, Daniel Catrice, John Davies, Kirsty Dell, Peter Fagg, Fiona Hamilton, Sue Houlden, Alex Lau, Malcolm Macfarlane, Darren McKinty, Bill Peel, Anna Siora, Jill Smith, Steve Smith, Richard Wadsworth, Brian Ward and Rolf Willig. The final preparation of the maps was undertaken by George Mansour. Valued advice was provided by Tony Edgar, Andrew Maclean, Gerard O'Neill, Ross Penny, David Tainsh and Brian Thompson.

The team was guided by the Central, Dandenong and Central Gippsland Forest Management Area Advisory Committees. These committees were formed in 1990 and met until the production of the Dandenong, Central and Central Gippsland Statements of Resources, Uses and Values in 1991, 1992 and 1993 respectively. The Dandenong and Central committees were reconvened in 1995 and Central Gippsland in 1996. Those members of the reconvened committees who oversaw the production of this plan comprised:

Central Forest Management Area Advisory Committee

Ray Donkin (chair)	Local business
Geoff Biggs	Ex - Local Government
Julie Cross	Local landholder
David Goding	Local hardwood sawmiller
Nils Gunnersen	Local hardwood sawmiller
Dieter Juegens	Marysville tourism
Peg Lade	Yea Field Naturalists
Dean McLean	Rubicon School Camp

Dandenong Forest Management Area Advisory Committee

Gordon Buller (Chair)	Local community and ex - Local Government
Harvey Crane	Amcor Plantations
Andrew Flint	Shire of Yarra Ranges
Lindsay Hesketh	Upper Yarra Conservation Society
Frank Lawless	Melbourne Water
Janet Mattiske	Upper Yarra Valley and Dandenong Ranges Environment Council
Gary Moran	Local logging contractor
Ron Reid	Local hardwood sawmiller
Ina Saville	Local hardwood sawmiller

Central Gippsland Forest Management Area Advisory Committee

Andrew Kee (Chair)	Australian Deer Association
Jim Blucher	Latrobe Valley Field Naturalists
Bill Briggs	Amcor Plantations
Janet Chandler	Australian Trail Horse Riders Association
John Cribbes	Victorian Association of Four Wheel Drive Clubs
Elizabeth Doery	Federation of Victorian Walking Clubs
John Larson	Latrobe Valley Forum
Jim Micah	Local hardwood sawmiller
John Riddiford	Melbourne Water

Many other interested individuals and organisations provided input during the planning process. Their contributions are also gratefully acknowledged.

SUMMARY

This plan incorporates the Central Highlands of Victoria which extends from the Hume Highway in the west, to the Goulburn River in the north, the Goulburn and Thomson Rivers in the east and the Princes Highway in the south. Of the 1 100 000 ha planning area, 35% is State forest, 16% parks and reserves, 4% other public land and the balance private land. State forest, national parks and other reserves in the area play an important role in providing for conservation, recreation and clean water to local and regional communities and to the people of Melbourne. State forest also provides timber for local sawmills, employment and economic benefits.

The major challenges addressed in this plan are to meet a number of conservation and resource use requirements, including the *Flora and Fauna Guarantee Act* 1988, the government's commitments under the National Forest Policy Statement (NFPS), current sawlog and pulpwood licence commitments and the sustainable yield requirements of the *Forests Act* 1958.

This plan establishes a system of **Forest Management Zones** for State forest which sets priorities and permitted uses for different parts of the forest. The Special Protection Zone will be managed for the conservation of natural and cultural values and timber harvesting will be excluded. The Special Management Zone will be managed to maintain specific values while catering for timber production under certain conditions. The General Management Zone will cater for a range of uses with timber production a high priority.

The future management of all aspects of State forest is detailed in a series of guidelines, prescriptions and management actions. These establish a framework for the future management of the forests and commit the Department of Natural Resources and Environment (NRE) to the completion of specific management actions which will enhance the conservation and production roles of State forest.

An orderly process for the review and refinement of forest management strategies and zones is established in the plan. This will ensure forest management programs remain responsive to new information, community expectations and other developments in natural resource management, while maintaining resource security for the regional timber industry.

Combined, these strategies provide a network of protected areas that complement the system of national parks and conservation reserves in the Central Highlands, a framework for sustainable use of the forest for timber production and other purposes, and a process for adapting to change in a systematic and orderly manner. In doing so, this plan will fulfil some major requirements of the NFPS.

Major directions

Conservation of biodiversity

- Minimum levels of protection of between 30% and 90% have been set for each of the 23 ecological vegetation classes found in the State forests of the Central Highlands, according to their relative abundance and sensitivity to disturbance. Where conservation reserves do not meet these targets, areas of State forest have been set aside to make up the balance.
- All stands of rainforest are protected along with their associated forested buffers, which range from 40 m to 100 m in width, and extend to sub-catchments for the most significant rainforest stands.
- A minimum of 60% of old-growth forest in each vegetation class is protected.
- Ash eucalypt trees established prior to 1900 will not be harvested.

- A minimum of 40 trees per 10 hectares will be retained in timber harvesting coupes.
- Strategies for conserving threatened flora and fauna known to occur in the Central Highlands are established.
- A comprehensive system of retained habitat for Leadbeater's Possum is established.
- A network of linear reserves 200 m wide has been designed to connect areas in the Special Protection Zone with each other and with conservation reserves and to cross altitudinal gradients.
- Amendments to the plan will be assessed to ensure that there is no net deterioration in the level of protection of CAR values¹ in the Special Protection Zone.

National Estate

- Conservation measures for the natural values identified as being sensitive to disturbance by the Joint Forest Assessment between the Australian Heritage Commission and the Department of Conservation and Natural Resources (AHC & CNR 1994a) have been developed.
- Conservation of other National Estate values are achieved through conservation and management guidelines and actions set out in this plan.

Historic places, landscape and recreation

- Conservation measures have been developed for all known historic places.
- Prominent landscape features and views from major roads, lookouts and walking tracks are protected from management activities.
- State forest is zoned for recreational use. Future management of facilities is linked to these zones.

Streams and Catchments

- Timber harvesting in the Thomson Reservoir catchment will be restricted to an average of 150 ha per year for the period 1987 to 2002.

Forest Production

- Sawlog and residual log supplies will be maintained to meet existing licence commitments.
- The legislated sawlog sustainable yield will be reviewed for the Central Highlands prior to 2001, incorporating forest resource data from the Statewide Forest Resource Inventory. When the sustainable yield for the Dandenong, Central and Central Gippsland FMAs is confirmed following this review, NRE will supply the revised sustainable yield levels from these FMAs to the industry, in accordance with the requirements of the *Forests Act* 1958. However, NRE is committed to supply, as a minimum, the current licensed volume of D+ sawlogs (345 000m³ per annum) for the next 20 years from these FMAs.

¹ "CAR values" means the conservation values as described by the JANIS Reserve Criteria embodied in the comprehensive, adequate and representative reserve system (see Section 1.3).

- The productive capacity of areas of State forest reduced by fire, clearing or past selective harvesting practices will be restored through a program of timber stand improvement and reforestation.
- Amendments to the plan will be assessed to ensure that the timber production capacity of State forest is maintained.

Forest Roads

- A process to identify and maintain the permanent road network is established.

Pest Species Control

- A rolling three-year pest species control program is established.

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Chapter 1

BACKGROUND

1.1 SCOPE AND PURPOSE

This plan applies to the 400 000 ha of State forest in the Central Highlands of Victoria. This area includes the Central Forest Management Area (FMA), the northern section of the Dandenong FMA and the western section of the Central Gippsland FMA (see Map 1). No State forest exists in the southern section of Dandenong FMA and planning for the forests in the balance of the Central Gippsland FMA will be undertaken separately. The Statements of Resources, Uses and Values, (Jeremiah and Roob 1992, McHugh 1991 and Abbott *et al* 1993) describe the area in detail, including its biodiversity, historical, recreational, catchment and timber values. The draft project report of the Joint Forest Assessment - 'National Estate Values in the Central Highlands of Victoria' (AHC & CNR 1994a), provides more detail on the natural and cultural values.

Vision and Aims for the forests of the Central Highlands

NRE's vision for the forests of the Central Highlands is that the natural and cultural values are maintained and the use of forest resources provide long-term community benefit.

NRE aims to manage the State forests of the Central Highlands so that:

- in combination with all public land, viable populations of native species and ecosystems are maintained in a structurally diverse forest with increased areas of older-aged forest, particularly the ash-eucalypt species
- a sustainable resource base for forest-dependent industries is maintained
- the scale and pattern of timber harvesting more closely follows the scale and pattern of natural disturbances
- the quality of water flowing from the forest is maintained
- cultural values are maintained
- changing community expectations and an expanding knowledge of the forest ecosystem are incorporated into forest policy and management practices

To achieve these aims, this Forest Management Plan establishes strategies for integrating the use of State forest for wood production and other purposes with the conservation of natural, aesthetic and cultural values. It is to apply for ten years unless a substantial change of circumstances (such as a major wildfire) warrants a review before then. Flexible management strategies will, however, enable progressive refinement in response to new information.

1.2 LEGISLATIVE AND POLICY FRAMEWORK

This plan is a working plan prepared and to be put into operation by the Secretary of the Department of Natural Resources and Environment pursuant to Section 22 of the *Forests Act* 1958.

The plan has been developed to conform with all Victorian land and natural resources legislation including the *Forests Act* 1958, *National Parks Act* 1975, *Land Act* 1958, *Heritage Rivers Act* 1992, *Flora and Fauna Guarantee Act* 1988, and the *Catchment and Land Protection Act* 1994. Protection of species listed under the Commonwealth *Endangered Species Protection Act* 1992 is also provided for in this plan. The plan also fulfils a requirement of the *Code of Forest Practices for Timber Production* (Code) (NRE 1996a), which sets goals and guidelines for the conduct of all commercial timber production activities in Victoria. The Code has recently been revised to incorporate the most recent research on forest protection and management.

The land base to which this plan applies has been established by Government decisions following recommendations by the Land Conservation Council (LCC 1977, 1991 and 1994). Notwithstanding anything which may appear to the contrary, any reference to Heritage Rivers is a reference to Heritage Rivers managed in accordance with the *Heritage Rivers Act* 1992, and all actions arising from reference to Heritage Rivers will be carried out in accordance with the *Heritage Rivers Act* 1992.

The plan also fulfils a number of the key requirements of the National Forest Policy Statement (NFPS) (Commonwealth of Australia 1992a) relating to the management of native forests, including those which provide for:

- the current and future range of commercial and non-commercial uses
- nature conservation and the maintenance of forest biological diversity
- regional economic development and employment opportunities.

The findings of the Study of Old Growth Forests in Victoria's Central Highlands (NRE 1996b) and the results of the Joint Forest Assessment (AHC & CNR 1994a) are also incorporated.

Other legislation, policies and plans are referred to where relevant in the text.

This plan establishes broad strategies for forest management. In addition to establishing a system of Forest Management Zones for State forest which set priorities and permitted uses for different parts of the forest, a series of management guidelines, prescriptions and actions have been developed.

- **Management Guidelines** give direction to forest managers to facilitate protection or careful management of specific values or uses.
- **Management Prescriptions** detail specific conditions or standards which are to apply to forest operations in the vicinity of certain threatened flora or fauna. More detailed prescriptions are established at the local level and are reflected in Wood Utilisation Plans.
- **Management Actions** commit NRE to implementing a number of actions which will further enhance the management of State forest.

1.3 NATIONAL RESERVE CRITERIA

The National Forest Policy Statement (Commonwealth of Australia 1992a) established an approach to resolving the competing demands of conservation and industry on Australia's forests. This includes a requirement to establish a Comprehensive, Adequate and Representative (CAR) reserve system as a prerequisite to the signing of a Regional Forest Agreement. Accordingly, the Commonwealth and states jointly developed a set of criteria (the JANIS² criteria) to guide the establishment of a CAR forest reserve system in each RFA region. The biodiversity criteria are summarised as follows:

Summary of the biodiversity criteria

1. As a general criterion, 15% of the pre-1750 distribution of each forest ecosystem should be protected in the CAR reserve system with flexibility considerations applied according to regional circumstances, and recognising that as far as possible and practicable, the proportion of dedicated reserves should be maximised.
2. Where forest ecosystems are recognised as vulnerable, (e.g. approaching a reduction in areal extent of 70% within a bio-regional context and/or subject to continuing threatening processes), then at least 60% of their remaining extent should be reserved. These ecosystems include those where threatening processes have caused significant changes in species composition, loss or significant decline in species that play a major role within the ecosystem, or significant alteration to ecosystem processes.

² Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for Forests in Australia. A report by the Joint Australian and New Zealand Environment and Conservation Council/Ministerial Council on Forestry, Fisheries and Aquaculture National Forest Policy Statement Implementation Sub-committee. September 1997.

3. All remaining occurrences of rare and endangered forest ecosystems should be reserved or protected by other means as far as is practicable.
4. Reserved areas should be replicated across the geographic range of the forest ecosystem to decrease the likelihood that chance events such as wildfire or disease will cause the forest ecosystem to decline.
5. The reserve system should seek to maximise the area of high quality habitat for all known elements of biodiversity wherever practicable, but with particular reference to:
 - the special needs of rare, vulnerable or endangered species;
 - special groups of organisms, for example species with complex habitat requirements, or migratory or mobile species;
 - areas of high species diversity, natural refugia for flora and fauna, and centres of endemism; and
 - those species whose distributions and habitat requirements are not well correlated with any particular forest ecosystem.
6. Reserves should be large enough to sustain the viability, quality and integrity of populations.
7. To ensure representativeness, the reserve system should, as far as possible, sample the full range of biological variation within each forest ecosystem, by sampling the range of environmental variation typical of its geographic range and sampling its range of successional stages.
8. In fragmented landscapes, remnants that contribute to sampling the full range of biodiversity are vital parts of a forest reserve system. The areas should be identified and protected as part of the development of integrated regional conservation strategies.

In addition to the biodiversity criteria, the following National Reserve Criteria have been established for the conservation of old-growth forests:

Old-growth criteria

1. Where old-growth forest is rare or depleted (generally less than 10% of extant distribution,) within a forest ecosystem, all viable examples should be protected, wherever possible. In practice, this would mean that most of the rare or depleted old-growth forest would be protected. Protection should be afforded through the range of mechanisms outlined in the National Reserve Criteria.
2. For other forest ecosystems, 60% of the old-growth forest identified at the time of assessment would be protected, consistent with a flexible approach where appropriate, increasing to the levels of protection necessary to achieve the following objectives:
 - the representation of old-growth forest across the geographic range of the forest ecosystem;
 - the protection of high quality habitat for species identified under the biodiversity criterion;
 - appropriate reserve design;
 - protection of the largest and least fragmented areas of old-growth; and
 - specific community needs for recreation and tourism.

The CAR reserve system on public land primarily comprises areas established for conservation purposes (e.g. National and State Parks) and areas set aside for conservation within the Special Protection Zone (SPZ) in State forest. This plan includes Conservation Guidelines which establish levels of protection for different forest values on State forest such as old-growth forest, vegetation communities and threatened species. In meeting these guidelines, the plan takes account of existing national parks and other conservation reserves which are complemented by the SPZ in State forest.

The Conservation Guidelines in this plan and the JANIS criteria are based on similar concepts but are applied to different land bases. The JANIS criteria apply to all forested land across all land tenures and are based on the extent of pre-1750 vegetation communities. The Conservation Guidelines in this plan apply to the current extent of native forest cover on public land.

In practice, the Conservation Guidelines are used as a basis for *developing* the zoning system and the JANIS criteria are used to *evaluate* the outcome of the State forest zoning system in combination with the permanent reserve system. Where this evaluation indicates a higher level of reservation is desirable, additional areas of State forest Special Protection Zone are normally established, subject to consideration of economic and social outcomes. This process of evaluation has taken place during the development of the Regional Forest Agreement for the Central Highlands.

1.4 PLANNING PROCESS

Work commenced on the preparation of the three respective Forest Management Plans - Central, Dandenong and Central Gippsland - in 1989. 'Have Your Say' brochures were published and responses received from organisations and individuals representing a wide range of interests. These correspondents were placed on registers so they could be kept up to date with progress of the plans. Three FMA Advisory Committees were formed to debate major issues and to assist development of the plans. They played an important role in ensuring that the interests and opinions of a cross-section of the community were considered.

Statements of Resources, Uses and Values (SRUV) were produced in 1991 (Dandenong), 1992 (Central) and 1993 (Central Gippsland). From 1992, drafts of the Forest Management Plans were produced but, due to a number of factors, including the Land Conservation Council's (LCC) review of District 2 of its Melbourne study area and the Joint Forest Assessment, it was decided to delay further work on the plans until 1994, when the results of these studies were available.

Work began again on the separate plans in 1994 but, before they were completed, it was decided to produce an integrated plan for the entire Central Highlands, to expedite progress on a Regional Forest Agreement (RFA). RFAs aim to clearly outline the objectives of both the State and Commonwealth Governments for a particular forested region. RFAs for every forested region in Australia are expected to be in place by the year 2000. The RFA for the Central Highlands, one of five RFA Regions in Victoria, was signed in March 1998. This plan both provided the basis for the RFA and implements that agreement where it refers to the management of State forest. The RFA is to apply for 20 years.

The proposed plan was released for public comment in January 1997. Fifty eight submissions were received from individuals and organisations, the names of which are listed in Appendix U. These submissions were considered during the preparation of this plan.

Final Plan

The following is a summary of the main changes made to produce this, the final plan. The changes are a result of public consultation, new information, and additional input from NRE staff.

Zoning

The areas of the management zones (shown in Table 2.1) have changed from the proposed plan. The principal reasons for the changes to the zoning are listed below.

- The planning area boundary accords with the Central Highlands RFA boundary.
- Increased protection has been provided to rainforest within high-priority areas in Sites of National Significance for Rainforest.
- More accurate mapping of areas of Leadbeater's Possum Zone 1A habitat was available for a number of forest blocks.
- Barred Galaxias was located in the Steavenson River catchment.
- Practical management boundaries were identified for a number of values, particularly old growth forest.
- Following the addition of areas into the Special Protection Zone (SPZ), other areas of SPZ were then no longer required to meet specific targets. These areas were included in the General Management Zone (GMZ).

Biodiversity Conservation

- Some of the conservation guidelines or prescriptions have been clarified to assist in understanding and to provide greater consistency with other Forest Management Plans.
- A table listing the degree of protection given to each priority area within each Site of Significance for Rainforest has been included.
- To be consistent with the draft Action Statement, the area of forest to be reserved in SPZ for a pair of Powerful Owls is to comprise at least 500 ha.
- A Baw Baw Frog Management Guideline has been included following the discovery of the Baw Baw Frog on State forest.

Cultural Values

- The SPZ for landscape around Woods Point has been re-zoned to Special Management Zone (SMZ) to continue to allow minor forest produce collection.
- The section on Recreation Management Zones has been clarified to better reflect the availability of all State forest for recreational activities.
- A number of walking track proposals have been included in Appendix Q.
- Those tracks on which only foot-based recreation will be encouraged are specified in Appendix Q.

Streams and Catchments

- Arrangements for the development of the long-term timber harvesting and water production strategy in the Thomson Reservoir catchment have been clarified.

Forest Production

- Additional information about the importance of the timber industry in the Central Highlands has been included.
- The plan makes clear that existing legislated sawlog sustainable yield levels can maintain the timber production capacity of State forest in terms of volume, species and quality.
- The table showing sawlog yield estimates has been removed to eliminate confusion about its relationship with the legislated sustainable yield.
- A clause stating that changes to the zoning scheme will not reduce the productive capacity of the forest has been included.
- Management Guidelines for Salvage, Thinning, Reforestation, Bee-keeping, Grazing and Seed Collection, Storage and Use have been included.

Other Public Land Issues

- NRE's responsibilities under the *Catchment and Land Protection Act* 1994 have been emphasised.
- A Management Guideline for Pest Species Control Programs which establishes a rolling three-year control program is included.
- Areas of recently disturbed soil have been included as a priority area for pest species control.
- A need to develop weed hygiene measures is stated.
- The Management Guideline for Myrtle Wilt has been clarified to better reflect available management options.
- A Management Guideline for Licences and Leases has been included.

The SRUVs and the extensive biological and cultural data available as a result of the Joint Forest Assessment, which includes the results of the Central Highlands Old-growth study, provide much of the background information on which this plan's management strategies are based. Many specialists both within and outside NRE have provided input and comment on the plan, either directly or through the various reviews or studies conducted in the area.

Chapter 2

FOREST MANAGEMENT ZONES

2.1 ZONING SCHEME

To achieve the aims of this plan, State forest has been divided into three zones (see Table 2.1, Figure 2.1 and Map 2):

- **Special Protection Zone (SPZ)** will be managed for conservation, and timber harvesting will be excluded. This zone forms a network designed to link and complement established conservation reserves;
- **Special Management Zone (SMZ)** will be managed to conserve specific features, while catering for timber production under certain conditions;
- **General Management Zone (GMZ)** will be managed for a range of uses, but timber production will have a high priority. Unproductive forest (less than 28m mean stand height) is included in the GMZ.

2.2 SPECIAL PROTECTION ZONE

Most of this zone has been generated by applying the management guidelines, prescriptions and actions set out in the following chapters. Larger components of the zone are based on:

- old-growth forest
- habitat for Powerful, Sooty and Masked Owls
- habitat for Leadbeater's Possum
- representative examples of Ecological Vegetation Classes
- areas of rainforest and associated buffers
- reserves for Tall Astelia.

These are linked to each other and to conservation reserves by other parts of the SPZ which include:

- natural feature zones as described by the LCC
- linear reserves of minimum 200 m width
- areas protected by prescription, including stream buffers and all rainforest stands with their associated buffers
- walking tracks and their associated buffers.

A number of smaller areas such as historic and recreation sites are also included in the SPZ.

Appendix A provides a comprehensive list of the key values for major components of the SPZ and SMZ. Each component is referred to by a specific site number, which is identified on Map 2.

Timber resources in the SPZ will not be included in sawlog sustainable yield forecasts.

Each component of this zone will be managed to minimise disturbances or processes which threaten conservation values, and timber harvesting will be excluded (see Table 2.2).

2.3 SPECIAL MANAGEMENT ZONE

This zone primarily includes areas of high landscape value, the protection of which require modification to timber harvesting or other land use practices rather than their exclusion.

Management of the SMZ will be considered on a case-by-case basis within the constraints outlined in this plan. The development of operational plans will be undertaken at the local level.

Timber and other forest produce may be harvested from this zone. As with the GMZ, this zone forms part of the area that contributes to the sustainable yield of sawlogs, provided that modifications to normal management practices adequately address the protection of the identified values, or positively contribute to their conservation.

2.4 GENERAL MANAGEMENT ZONE

Forest in this zone will be managed for the sustainable production of sawlogs in accordance with the Code and more detailed local management prescriptions. Other management aims include protection of landscape and water quality, provision of recreation and educational opportunities, fire protection and conservation of natural values to complement adjacent zones. The GMZ has two sub-zones, one for 'timber production' and one for 'other uses'.

Timber production subzone

This subzone will be used to produce sawlogs on a sustainable basis in accordance with the Code. It corresponds to the net area in the GMZ that is both available for and capable of producing sawlogs after exclusions have been made for factors such as steep slopes and low productivity. It generally corresponds to sites where soil and rainfall conditions enable suitable tree species to grow to a height of about 28m or greater. Harvested areas will be regenerated with local species, and the regrowth across the sub-zone will produce a mosaic of native forest of different ages.

Other uses subzone

A proportion of the forest within the GMZ is unsuitable for sawlog production because either its productivity is too low or slopes are too steep for timber harvesting using current ground-based logging systems. Nevertheless, this subzone contributes substantially to the conservation of drier forest types and their attendant fauna. While activities such as fuel-reduction burning, harvesting of other forest produce (such as firewood, poles and honey) and recreation are permitted, they will generally be localised, leaving much of the area relatively undisturbed.

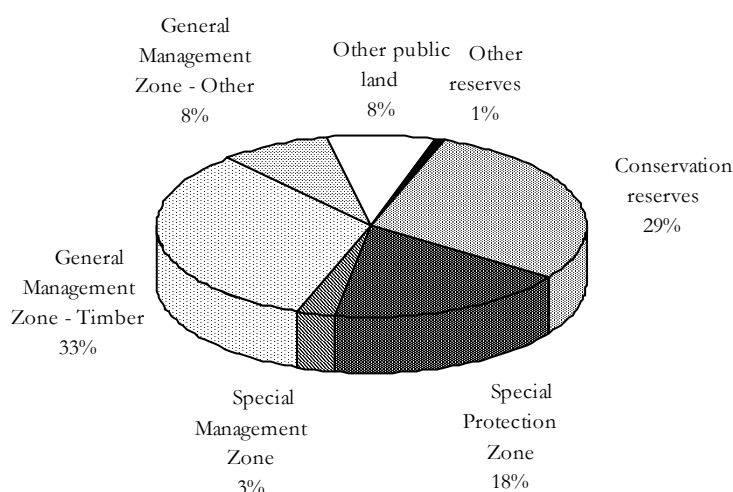
Table 2.1 Extent of forest management zones and other land categories in the Central Highlands

	Area (ha)	Proportion of all land (%)	Proportion of public land (%)	Proportion of State forest (%)
STATE FOREST				
Special Protection Zone	115 400	10	18	30
Special Management Zone	17 900	2	3	5
General Management Zone	256 300	23	41	66
Timber production ¹	203 600	18	33	52
Other uses	52 700	5	8	14
State forest sub-total	389 600	35	62	100
OTHER PUBLIC LAND				
Conservation reserves ²	180 700	16	29	
Informal Reserves	1 000	0	0	
Other reserves ³	3 800	0	1	
Other Public Land ⁴	37 400	3	6	
Water bodies	13 800	1	2	
Other public land total	236 700	21	38	
Public land sub-total	626 300	55	100	
PRIVATE LAND	503 700	44		
Total for the Central Highlands	1 130 000	100		

Notes:

1. This is the estimated net productive area of forest both available and suitable for sawlog production in the GMZ. Streamside reserves are included in the SPZ. Unproductive areas and steep slopes are included in the GMZ 'other uses' category.
2. Although not subject to this plan, these areas, which include parks, were taken into account in formulating management strategies for State forest.
3. The LCC's Final Recommendations for the Melbourne Area District 2 Review identified a number of regional parks and historic and cultural features reserves. These reserves are set aside primarily for recreation or historic purposes but other uses, such as timber harvesting, are permitted. They include the Rubicon Valley, Comet Sawmill, Mississippi No. 1 Mill settlement, Ada River sawmills, Kirchubel's Tramway and Mill and Coopers Creek Copper Mine Historic and Cultural Features Reserves, and Kurth Kiln and Tyers Regional Parks.
4. The area of public land not managed by NRE includes land managed by the Victorian Plantations Corporation, Melbourne Water and other water-supply authorities.

Figure 2.1 Proportion of public land in forest management zones and conservation reserves



Combined with scheduled parks under the *National Parks Act 1975* and other conservation reserves, the forest management zones provide an integrated conservation reserve network and a framework for sustainable forest use. Map 2 provides a general illustration of the zoning scheme across the whole Central Highlands. The map does not show many areas of SPZ which are less than 20 ha nor stream or rainforest buffers required under the Code. The inset on Map 2 illustrates a section of the zoning system in detail. Appendix A lists the attributes of all major components of the SPZ and SMZ.

Table 2.2 indicates the activities permitted in each zone. Soil and water conservation, maintenance of native forest cover and wildfire suppression are high priorities in all zones.

Table 2.2 Permitted activities in management zones

<i>Activity</i>	<i>See Chapter</i>	<i>Special Protection Zone</i>	<i>Special Management Zone</i>	<i>General Management Zone (timber production)</i>	<i>General Management Zone (other uses)</i>
Sawlog and residual log production	6	No	Cond.	Yes	Cond.
Firewood, posts, poles	6	No	Cond.	Yes	Yes
Apiculture, seed collection	6	Cond.	Yes	Yes	Yes
Road construction	7	Cond.	Cond.	Cond.	Cond.
Fuel-reduction burning	8	Cond.	Cond.	Cond.	Cond.
Gravel production	6	No	Cond.	Cond.	Cond.
Recreation	4	Cond.	Cond.	Yes	Yes

Key:

Yes: Permitted under standard conditions

Cond.: Permitted with additional conditions specified in this plan, or to the extent it does not conflict with the values identified for the respective areas

No: Not permitted

Chapter 3

BIODIVERSITY CONSERVATION

Background

Biodiversity conservation is a key aim of forest management. Biodiversity (or biological diversity) refers to the variety and variability within and between living organisms and the ecological processes on which they depend. The *Timber Industry Strategy* (Government of Victoria 1986); the NFPS and the *National Strategy for Ecologically Sustainable Development* (Commonwealth of Australia 1992b) all refer to the importance of ensuring that forest management maintains the diversity of forest flora and fauna, and that areas of special conservation significance are protected. Further, NRE is obliged under Victoria's *Flora and Fauna Guarantee Act* 1988 to guarantee that all taxa of Victoria's flora and fauna can survive, flourish and retain their potential for evolutionary development in the wild.

This plan, coupled with Action Statements issued under the *Flora and Fauna Guarantee Act* 1988, is the primary plan for implementation of Victoria's Biodiversity Strategy (NRE 1997a) in the Central Highlands State forests.

The biodiversity conservation strategies in this plan include:

- the protection of a significant proportion of all vegetation classes across all public land tenures
- the maintenance and creation of a mosaic of forest growth stages within a managed environment which includes natural and human induced disturbances
- specific conservation measures for known rare or threatened species to maintain species and genetic diversity.

Biodiversity conservation is addressed in the context of all public land across the Central Highlands. Protected areas include national and State parks, public land not managed by NRE but managed for conservation purposes, and the SPZ within State forest. The Special Management Zone (SMZ) and General Management Zone (GMZ) in State forest and specific prescriptions governing forest operations also contribute to biodiversity conservation as large areas of the GMZ are unsuitable for timber harvesting for various reasons while forests that are harvested and regenerated still provide habitat and resources for many species.

Aim

To ensure that all indigenous plant and animal species and communities survive and flourish throughout the Central Highlands.

3.1 ECOSYSTEM DIVERSITY

Classification of ecosystems

An ecosystem is a community formed by living organisms together with their associated physical environment. This plan uses the Ecological Vegetation Class (EVC) classification system developed by NRE (Woodgate *et al* 1994) to identify the variety of ecosystems which occur naturally throughout the Central Highlands' forests. An EVC is comprised of one or more floristic communities with defined floristic, structural, biophysical and ecological characteristics. Twenty-three EVCs have been identified on State forest in the Central Highlands. These are briefly described in Appendix B along with their area and relative abundance on public land.

Protection of ecosystems

One of the goals of the NFPS is to protect nature conservation values through a comprehensive, adequate and representative network of dedicated and secure reserves. In the Central Highlands, these comprise formal reserves such as national parks, State parks, nature conservation reserves, reference areas, and State forest SPZ. In addition, the Land Conservation Council in its Melbourne Area District 2 Review recommended that, where biological values were not adequately represented in the conservation reserve system, further protection was warranted in State forest. The SPZ, SMZ and specific management actions identified in this plan provides for this additional protection.

Conservation of species and communities across their natural range is fundamental to sound nature conservation. Protecting multiple populations across a species' range conserves local diversity and genetic variation, and guards against the risk of species extinction as a result of isolated populations being destroyed by natural disasters or other factors.

To ensure that the variation within EVCs is represented in the reserve system, the location of floristic communities and the extent of EVCs in each Geographic Representation Unit (GRU) was considered during the preparation of this plan's zoning scheme. Viable samples of each EVC have been reserved, wherever possible, within each GRU. The Central Highlands contains ten Geographic Representation Units (GRUs), each of approximately 120 000 ha (see Map 3). They are based on similar land form, geology, vegetation and climate. Their boundaries generally follow topographic features such as streams and ridges. GRUs cover both public and private land.

MANAGEMENT GUIDELINE

Representative conservation of Ecological Vegetation Classes

The following proportion of each EVC should be incorporated into conservation reserves or the SPZ:

- 30% of EVCs that occupy more than 1% of the public land in the Central Highlands
- between 30% and 90% of EVCs that occupy between 0.1% (approximately 6000 ha) and 1% of the public land in the Central Highlands, depending on the extent of the particular EVC
- 90% of EVCs that occupy less than 0.1% of the public land in the Central Highlands.

To meet the EVC reservation targets, EVCs should, where possible, be selected from areas:

- in existing conservation reserves and the SPZ
- identified as being good representative examples of the EVC
- identified as containing threatened wildlife, flora or communities
- identified as containing concentrations of endemic, edge-of-range or disjunct flora
- identified as containing high levels of floristic and faunal richness
- which are minimally affected by recorded human disturbance
- containing other significant biological values
- that are unsuitable for timber production.

Appendix C shows the area and proportion of each EVC in each public land category across the Central Highlands. Appendix D indicates the proportion of each EVC protected in conservation reserves and the SPZ across all GRUs. Collectively, conservation reserves and the SPZ total about 296 000 ha or 47% of the public land within the Central Highlands.

Rainforest

The general ecosystem conservation measures described above should ensure protection for an adequate representation of all EVCs across their range. Due to its sensitivity to disturbance, protection of the Cool Temperate Rainforest EVC has also been considered in terms of the significance of each stand.

Cool Temperate Rainforest in the Central Highlands is dominated by Myrtle Beech and Southern Sassafras with an understorey of ferns, mosses and liverworts. Scattered emergent eucalypts may be present, as well as Blackwood. A working definition for field identification of rainforest in the Central Highlands is provided in Appendix E. Cool Temperate Rainforest in the Central Highlands is generally restricted to linear strips along sheltered streams, except between Mount Donna Buang and the O'Shannassy River catchment, where rainforest patches are more extensive. Sufficient and stable moisture regimes and the long-term absence of fire are the key determinants of its distribution.

Protection of Rainforest

The Code requires that all rainforest and a surrounding buffer be excluded from timber harvesting. The Code also provides guidelines for rainforest protection which include increased protection measures for significant stands of rainforest and a consideration of regional characteristics when developing protection strategies in Forest Management Plans.

This plan establishes a rainforest protection strategy which is based on the application of buffers of varying dimension depending on the significance of stands. The width of buffers surrounding rainforest in State forest in the Central Highlands range from a minimum of 40 m to over 100 m. A number of stands receive sub-catchment protection. The minimum buffer of 40 m is considered to adequately protect rainforest stands from increased exposure to light, temperature and wind as a result of timber harvesting operations outside the buffer. It is also considered to provide adequate protection against physical disturbance from forest operations, which is relevant to minimising the spread of Myrtle Wilt. Annual audits of the implementation of the Code and related prescriptions on State forest indicate that in general, more than 95% of edges to streamside reserves or other reserved areas (which include patches of rainforest) remain intact. In other words, disturbance to buffers surrounding rainforest from forest operations is negligible.

A discussion on Myrtle Wilt prevention and spread minimisation can be found in Section 8.1.

Sites of Significance for Rainforest

NRE has identified all patches of rainforest within the Central Highlands through a program of aerial photography and field reconnaissance.

Some of these patches are assessed to contain rainforest of regional, State or national significance using the following criteria: ecological integrity and viability, richness and diversity, rarity, representation, evolutionary development and scientific reference and education. Other patches of rainforest are considered to be locally significant.

The sub-catchment containing the regionally, State or nationally significant rainforest is called the 'Site of Significance for Rainforest'. The Central Highlands contains 34 Sites of Significance for Rainforest, 28 of them in State forest (NRE in prep).

'Priority areas' within each Site of Significance for Rainforest identify the most important areas for rainforest conservation. These 'Priority Areas' are ranked according to their relative importance and are based on:

- the size of individual rainforest stands or the highest concentration of stands within each Site of Significance for Rainforest
- rainforest stands surrounded by relatively undisturbed forest or old-growth forest as defined by Woodgate *et al* (1994)
- stands with concentrations of rare or threatened flora
- areas with identifiable management boundaries such as sub-catchment divides, roads or topographic features.

Priority areas and stands of local significance are incorporated into the zoning scheme in line with the rainforest conservation guideline below. Appendix F lists the proportion of each priority area within each public land category in each Site of Significance for Rainforest in the Central Highlands.

MANAGEMENT PRESCRIPTION

Cool Temperate Rainforest

The width of rainforest buffers varies according to the significance of the rainforest stand and the priority area. The following minimum buffers apply:

Sub-catchments for those rainforest stands where the priority area is substantially undisturbed or the conservation requirements of other species or values are coincident with rainforest values

100 m for priority 1 and 2 areas within sites of national significance

60 m for priority 3 and 4 areas within sites of national significance and for priority 1 and 2 areas within sites of State significance

40 m for priority 3 and 4 areas within sites of State significance and all sites of regional or local significance

Larger buffers will be retained in many areas because of the protection of other values in the SPZ or in areas with steep slopes.

Mixed forest

Mixed forest usually occurs in association with Cool Temperate Rainforest and Wet and Montane Wet Forest EVCs in the Central Highlands. It is characterised by an emergent eucalypt overstorey and an understorey canopy of rainforest trees. The largest recognised area of mixed forest in the Central Highlands occurs in the Yarra Ranges National Park, with perhaps the best example occurring between the headwaters of the O'Shannassy and the Acheron Rivers. Areas of mixed forest also occur in high elevation areas from the Baw Baw plateau to the Mount Toorongo plateau.

Mapping of mixed forest is incomplete for the Central Highlands. Once completed, an assessment will be made of its status. Reservation will be in accordance with the EVC conservation guideline. Most stands, however, are included within conservation reserves or the SPZ.

Broad-scale Sites of Biological Significance

Prior to the Joint Forest Assessment (AHC & CNR 1994b), a range of studies by NRE, Universities and other organisations have identified Sites of Botanical, Zoological, Geological and Geomorphological Significance. The major values identified in these reports are listed in Appendix G. Those values were assessed by the Joint Forest Assessment, which subsequently provided a more comprehensive and detailed report of natural values and placed them in the context of the whole of the Central Highlands.

The biological values addressed by this more recent and comprehensive process provided the basis for the zoning system used in this plan. Appendix H lists conservation measures for natural National Estate values identified as being sensitive to disturbance.

Forest Structure

Classification of Structural Diversity

The structural diversity of a forest can be considered in terms of growth stages and habitat components. As a forest stand ages, its changing structure is reflected by:

- vertical structural diversity - the different tree, shrub, and ground layer components;
- increasing size of trees;
- the presence of relatively large, living and dead standing trees and fallen trees;
- the presence of gaps in the vegetation cover created by small-scale disturbances and death of individual trees.

Growth stages for forest EVCs were identified as part of the Joint Forest Assessment. The senescent, mature and regrowth growth stages identified were based largely on the description of growth characteristics of canopy trees by Jacobs (1955).

Each growth stage contributes to the maintenance of biodiversity through its particular floristic composition and by providing habitat for wildlife. Forests containing mature and senescent trees, for example, provide a range of habitat resources that are utilised by many species including large forest birds and hollow dependent wildlife. Younger, regenerating forest provides resources which are utilised by a different suite of species.

Old-growth forest

Some areas of senescent and mature forest are considered to be 'old-growth'. Old growth forest is defined as "Forest which contains significant amounts of its oldest growth stage in the upper stratum - usually senescent trees - and has been subject to any disturbance, the effect of which is now negligible" (Woodgate *et al* 1994). The Joint Forest Assessment identified old-growth forest within a number of EVCs across the Central Highlands. The results of this study are reported in the 'Study of Old Growth in Victoria's Central Highlands' (NRE 1996b). Appendix I indicates the area of old-growth forest in each EVC and the degree of protection across the Central Highlands.

MANAGEMENT PRESCRIPTION **Old-growth forest**

The extent of old-growth forest changes over time. Stands will become 'old-growth' as trees reach their oldest growth stage, or as the effects of past disturbance become negligible. To ensure adequate areas of old-growth forest are conserved:

- all stands (greater than 5 ha) of old-growth forest in State forest in the Wet, Montane Wet, Damp, Montane Damp and Riparian Forests, Sub-alpine Woodland, and non-eucalypt EVCs are included in the SPZ, because of their current rarity across the Central Highlands;
- at least 60% of old-growth forest in the Montane Dry Woodland, Heathy Dry Forest and Heathy Woodland EVCs are included in conservation reserves and the SPZ.

Selection of areas to be included in the SPZ were based on:

- analysis of the representation of the old-growth component of each EVC in each GRU
- combining old-growth forest conservation with other strategies to create larger, consolidated areas in the SPZ, with identifiable management boundaries

Retention of hollow-bearing trees

Many Australian birds, bats, arboreal mammals and reptiles are dependent on tree hollows for nesting and roosting. For the majority of eucalypts in the Central Highlands, hollows are thought to form in trees from about 100 to 150 years of age. Trees of mature and senescent growth stage generally contain more hollows than regrowth trees. The loss of hollow-bearing trees from Victorian native forests is listed as a threatening process under the *Flora and Fauna Guarantee Act* 1988.

The Code of Forest Practices for Timber Production (Code) specifies the need to retain an appropriate number and configuration of habitat trees, to provide for the replacement of old hollow-bearing trees within and around coupes, and to protect these trees during harvesting and subsequent management.

The location and density of hollow-bearing trees varies across the Central Highlands. Many areas of forest have been utilised for timber harvesting since around 1900 and the 1939 wildfires killed large areas of mature and senescent ash-eucalypt (Alpine and Mountain Ash and Shining Gum) forest. The subsequent regrowth forest generally contains only low numbers of mature and senescent trees.

Predictive modelling of the number of hollow-bearing ash eucalypts indicates that a steady decline will occur until about 2065. After this, the number of trees containing hollows will increase. This forecast is based on research into Leadbeater's Possum that indicates that ash-eucalypt trees with hollows are collapsing at a rate of 3.6% of the total population each year (Lindenmayer *et al* 1990). This decline is largely attributable to the natural deterioration and collapse of the 1939 fire-killed stags. Protection of

existing live hollow-bearing trees and recruitment of trees to grow on to maturity is therefore required to ensure the long-term availability of this component of wildlife habitat.

In other areas of the Central Highlands, particularly in the mixed-species forests in the east of the planning area, hollow-bearing trees are more abundant. In these areas, the trees retained on timber harvesting coupes will be a mixture of existing and potential hollow-bearing trees.

This plan provides a precautionary approach to maintaining hollow-dependent wildlife populations on State forest. At the strategic scale, large areas of forest containing mature and senescent trees are protected within the SPZ. In total, about 64% of the forested public land is not available for sawlog harvesting. At the detailed scale, the guideline below provides for hollow-bearing tree retention and recruitment on timber harvesting coupes.

During the implementation phase of this plan, NRE will examine ways of addressing habitat retention and recruitment on a broader level than individual timber harvesting coupes. This approach will involve determining the configuration of retained areas of vegetation and future timber harvesting coupes at a subcatchment level (generally an area of between 500 and 1000 ha). This will ensure that decisions about habitat retention and recruitment and the placement of timber harvesting coupes are made in a broader context. Priority for implementing this approach will be directed towards areas of particular sensitivity.

MANAGEMENT GUIDELINE
Tree retention on timber harvesting coupes

Trees should be retained on timber harvesting coupes to assist in the provision of hollows for hollow-dependent wildlife on State forest. The following should be taken into account when the number of existing and potential hollow-bearing trees to be retained on a timber harvesting coupe is determined:

- the species and likely density of hollow-dependent wildlife inhabiting the area
- the existing mix of eucalypt species, their size and the availability of hollows
- the short- and medium-term rarity of hollow-bearing trees within and surrounding the coupe
- the proximity of areas unavailable for timber production (for example streamside reserves, other areas of SPZ or GMZ-other)
- the likelihood of windthrow of retained trees.

On timber harvesting coupes in the Central Highlands:

- all ash eucalypts originating before 1900 should be retained
- at least 40 trees per 10 hectares should be retained for the length of the rotation in ash-eucalypt forest originating since 1900, and in all mixed-species forests
- retained trees should be a mixture of:
 - hollow-bearing trees (where present)
 - other trees most likely to develop hollows in short term

Distribution of retained trees:

- In mixed-species forest retained trees should remain scattered across the timber harvesting coupe
- Potential hollow-bearing ash eucalypts should be retained in clumps to increase their protection from exposure, windthrow and fire
- Within 150-m of retained vegetation there is no requirement to retain potential hollow-bearing trees (although at least 40 trees per 10 hectares should be retained across the coupe)
- Trees should be retained where they can be most easily protected from damage during harvesting and site preparation treatment.

Management of processes affecting the distribution and structure of ecosystems

A number of natural and human-induced processes have the potential to affect the distribution and structure of ecosystems and their attendant flora and fauna. Several of these potentially threatening processes are listed in Schedule 3 of the *Flora and Fauna Guarantee Act 1988*. The potential impact of wildfire, clearing of native vegetation and forest operations and NRE's management of these processes

is described below. Other potentially threatening processes and associated management actions are listed in Table 3.1.

Wildfire

Wildfire has significantly influenced the structure of the forest over time. Some EVCs, such as Shrubby Foothill Forest, recover quickly from fires while others, such as rainforest, can be destroyed by wildfires. The greatest impact on the Central Highlands' ash-eucalypt forests in recent times was the 1939 wildfires and subsequent salvage harvesting. Large areas of mostly single-aged forest were subsequently created, with only small areas of older or mixed-age ash-eucalypt forest remaining. As wildfires do not generally kill the drier forest eucalypts, large areas of drier forest containing mature and senescent trees are still present across the Central Highlands. Cooler fires in both forest types can create opportunities for the establishment of regeneration under the canopy trees, resulting in a mixed-age forest.

Prior to European settlement, wildfires burnt until extinguished by natural causes. However, due to the close proximity of settlements to the forests, and the importance of the water and timber resource, all wildfires are now extinguished as soon as possible. NRE has a statutory duty under the *Forests Act 1958* to “carry out proper and sufficient work for the prevention and suppression of fire in every State forest and national park and on all protected public land”.

To protect settlements and forest assets from wildfire, NRE aims to reduce the intensity of wildfires by employing a strategic fuel-reduction burning program. These burns reduce the amount of fine woody fuel on the forest floor, generally on a five- to ten-year cycle (see Section 8.2). The long-term response of forest ecosystems to the artificial regulation of fire intensity, frequency and seasonality is unknown. Nevertheless, NRE regional Fire Protection Plans generally exclude fuel-reduction burns from fire-sensitive EVCs.

Clearing of native vegetation

Early this century large areas of forest in the Central Highlands were reserved, mainly for water and timber production. Large tracts of land around the perimeter of the Central Highlands' forests were, however, cleared for agriculture, mining and settlement. As a consequence, some EVCs within the planning area are now considered rare. Where they occur on State forest, all viable stands are included in the SPZ.

Forest Operations

European occupation has affected the structural diversity of some EVCs. Natural fire regimes have been altered and timber harvesting has, particularly since the 1960s, created a mosaic of small, generally even-aged stands throughout the ash-eucalypt forests in State forest. Natural regeneration, which may produce a more mixed-age structure, can occur in the 62% of the Central Highlands' forests that comprises conservation reserves, the SPZ and other areas unavailable or unsuitable for timber production. In addition, all hollow-bearing trees in ash-eucalypt forest and at least 40 trees per 10 hectares in mixed-species forest should be retained across the GMZ. Structural diversity will therefore be retained across the Central Highlands' forests as a whole.

Forest operations may also cause changes in understorey composition. Weeds, particularly blackberries, may have increased opportunities to become established, while mechanical disturbance may inhibit the regeneration of resprouting native species such as tree-ferns and *Olearia* species. Strategies for weed control are outlined in Section 8.1. To aid the retention of resprouting species, mechanical disturbance will be excluded from appropriate areas during timber harvesting operations in wet forest coupes. Harvestable trees may be removed from these ‘understorey islands’. Operational trials of these ‘islands’ will continue and their on-ground implementation and effectiveness will be monitored.

Table 3.1 Management actions for potentially threatening processes

<i>Threatening process</i>	<i>Management action</i>
Loss of hollow-bearing trees from Victorian native forests (Flora & Fauna Guarantee listed)	<ul style="list-style-type: none"> Existing and potential hollow-bearing trees will be retained according to the 'Tree retention on timber harvesting coupes' Management Guideline.
Alterations to the natural temperature of rivers and streams (FFG listed)	<ul style="list-style-type: none"> Application of minimum 20-m streamside buffers. Shading by riparian vegetation serves to minimise temperature variations that might otherwise result from additional exposure to the sun.
Prevention of passage of aquatic biota as a result of the presence of in-stream structures (FFG listed)	<ul style="list-style-type: none"> Stream crossings will be constructed in accordance with the Code, and the Roding Prescriptions for Timber Production in the Central Highlands which state that 'care must be taken to prevent the free-falling of water from culvert outlets which could retard or prevent movements of aquafauna'.
Increase in sediment input into rivers and streams due to human activities (FFG listed)	<ul style="list-style-type: none"> Application of minimum 20-m streamside buffers and other Code measures.
Input of toxic substances into Victorian rivers and streams (FFG listed)	<ul style="list-style-type: none"> Addressed by the Code requirements for safe handling of fuel and lubricants which restricts the location and conduct of refuelling operations
Use of <i>Phytophthora</i> -infected gravel in the construction of roads, bridges and reservoirs (FFG listed)	<ul style="list-style-type: none"> Refer to Section 8.1
Invasion of native vegetation by environmental weeds (FFG listed)	<ul style="list-style-type: none"> Refer to Section 8.1
Degradation of riparian vegetation (FFG listed)	<ul style="list-style-type: none"> Application of minimum 20-m streamside buffers. Refer to Section 8.1 regarding the control of weeds (particularly blackberries) at road or track crossings.
Predation of native wildlife by the introduced Red Fox (<i>Vulpes vulpes</i>) (FFG listed)	<ul style="list-style-type: none"> Refer to Section 8.1

ACTIONS

Complete mapping of the mixed forest community in the Central Highlands.

Manage ecosystems and threatening processes according to the above management guidelines, prescriptions and Table 3.1.

Retain trees on timber harvesting coupes in accordance with the above management guideline.

Encourage research into the long-term effects of artificial fire regimes and timber-harvesting operations on forest ecosystems.

Continue to trial 'understorey islands' or other methods for maintaining important understorey elements in wet forest timber harvesting coupes and monitor their on-ground implementation and effectiveness.

3.2 SPECIES AND GENETIC DIVERSITY

General Strategy

The *Flora and Fauna Guarantee Act* 1988 aims to ensure that Victoria's native flora and fauna survive, flourish and retain their potential for evolutionary development. Schedule 2 of the Act lists species and communities which are threatened. NRE has obligations under the Act to manage listed species and communities according to individual Action Statements.

The long-term protection of all flora and fauna is best achieved by protecting representative and viable examples of all ecosystems, and by reducing the impact of threatening processes. These strategies provide a base level of security for populations of most native flora and fauna. Some species, however, occur as isolated populations, as populations with very low numbers, or may be particularly sensitive to some forest management practices. These require specific actions aimed at ensuring the survival of populations and, therefore, the maintenance of biodiversity.

Species known, or suspected, to be at risk of extinction require greatest attention in the development of management actions and prescriptions. Effective management for such species requires prediction of and control over the types of environmental changes that threaten populations. This requires detailed knowledge of the ecology of individuals and populations and an understanding of the nature of threatening processes. As knowledge of the ecology and threatening processes is incomplete, the management strategies outlined in this plan are conservative and may be subject to review as knowledge increases.

Genetic diversity refers to the variety of genetic information contained in all of the individual plants, animals and micro-organisms that inhabit our planet. Genetic diversity occurs within and between the populations of organisms that comprise individual species as well as among species.

Management for rare or threatened, endemic, disjunct and edge of range flora

Thirty-six plant species recorded within State forest in the Central Highlands are listed as 'Victorian Rare or Threatened Species' (VROTS). Appendix J lists these species and measures for their protection. The majority of VROTS grow in riparian areas or in EVCs which are not harvested for timber. However, some VROTS are found in areas available and suitable for timber production. NRE field staff need to be competent in the identification and the effective management of these species.

Tall Astelia

The Tall Astelia, *Astelia australiana*, is a perennial herb up to 2 m tall found primarily in Cool Temperate Rainforest dominated by Myrtle Beech. Two colonies occur in Riparian Thickets. Most occurrences are in gullies on undulating, upland plateaux. The species is endemic to Victoria - all 12 known colonies of Tall Astelia are within a relatively small area in the Powelltown–Beenak area of the Central Highlands, except for one colony in the Lavers Hill area of the Otway Ranges. The species is listed as vulnerable in Victoria and Australia.

Tall Astelia is potentially threatened by wildfire, physical damage through site disturbance, high rates of sediment deposition in streams, competition from other plants, and disease.

MANAGEMENT PRESCRIPTION

Tall *Astelia*

The following conservation measures are based on the Flora and Fauna Guarantee Action Statement (DCE 1991a) prepared for the species.

- Sub-catchment protection for the colonies in Bjorksten, Seven Acre and Tomahawk Creeks
- 100 m buffer around Cool Temperate Rainforest or Riparian Thicket EVCs supporting Tall *Astelia*
- 40 m streamside buffer upstream of colonies
- 40 m buffer on isolated plants growing on road batters

Endemic, Disjunct and Edge-of-Range Flora

Some species of plants are endemic to the Central Highlands, some reach the edge of their range in this area. Others have a disjunct population in the Central Highlands, that is, they are separated from their strongholds elsewhere in Victoria or Australia.

The endemic, disjunct and edge-of-range flora and concentrations of those flora found in the Central Highlands are listed in AHC & CNR 1994b. Areas which contain concentrations of these flora include the environs of Mt Baw Baw, Lake Mountain, Mt Bullfight, Bunyip State Park, and the headwaters of the Bunyip and Tarago Rivers and Pioneer Creek. Most of these areas are in national or State Parks. Within State forest, concentrations of endemic, disjunct and edge-of-range flora are well represented in areas of SPZ.

Appendix J lists the endemic, disjunct and edge of range flora which are rare or threatened. Standard forest management practices and prescriptions will apply in areas of GMZ containing those endemic, disjunct or edge of range species which are not rare or threatened. Some of these species will be used as indicator species in monitoring programs (refer to Section 3.3).

Management for threatened fauna

Populations of most species of vertebrate fauna recorded in the Central Highlands will be maintained by implementing the ecosystem conservation measures outlined above and reducing the impact of processes that have the potential to change the distribution and structure of ecosystems. Some fauna, particularly threatened species, are less capable of tolerating the disturbance caused by human use and management of forests. Threatened fauna are those species listed in either Schedule 2 of the *Flora and Fauna Guarantee Act* 1988, or are listed as threatened in Threatened Fauna in Victoria (CNR 1995a).

Species most vulnerable to forest management and utilisation activities are those that:

- forage over large areas of forest (large forest owls, Spot-tailed Quoll)
- are at or near the top of the food chain (large forest owls, Spot-tailed Quoll, diurnal forest raptors)
- require combinations of varied specialised habitat resources for nesting, roosting, foraging, perching or basking (forest owls, Leadbeater's Possum, parrots and cockatoos, possums and gliders, many insectivorous bats, frogs and fish)
- naturally occur at low densities (large forest owls, Spot-tailed Quoll, Brush-tailed Phascogale)
- are colonial or social in population structure (several forest bats, some birds and fish).

Appendix K lists threatened fauna found in State forest in the Central Highlands and measures for their protection.

Leadbeater's Possum

A small possum endemic to the Central Highlands of Victoria, Leadbeater's Possum is classified as an Endangered species (CNR 1995a, ANZECC 1991). It is found mainly in mountain forests dominated by Mountain Ash, Alpine Ash and Shining Gum and has recently been recorded in Snow Gum woodland at Lake Mountain. A small population also exists in Yellingbo State Nature Reserve, in lowland swamp forest. The habitat of the species in mountain forests is primarily determined by:

- nest-tree abundance and distribution
- food availability, particularly wattle in the understorey
- vegetation structure which allows the possum to move freely through the forest in search of food.

Young regeneration or uneven-aged ash-eucalypt forest that contains wattles and an ample supply of hollow-bearing trees is ideally suited for the species. The fire-killed remnants of mature forest and resultant regrowth from the 1939 fires has provided abundant feeding and nesting habitat during the past 30 years. However, as the fire-killed nest trees decay and fall, the extent of this type of habitat is diminishing. Loss of potential nest trees due to timber harvesting is incremental to this.

Habitat Classification and Management

The Flora and Fauna Guarantee Action Statement which has been prepared for the species (CNR 1995b) defines the three zones of Leadbeater's Possum habitat.

1. Zone 1A habitat contains living older trees and is expected to be important for the long-term conservation of the species. Zone 1A habitat is protected in either conservation reserves or the SPZ. Appendix L indicates the extent of existing Leadbeater's Possum Zone 1A habitat and ash-eucalypt forest across its known range.
2. Zone 1B habitat currently contains good habitat, but most of the existing hollow-bearing trees are dead and are likely to collapse in the near future. Zone 1B habitat in the GMZ is excluded from timber harvesting until either of the Zone 1B habitat attributes (the presence of dead mature or senescing trees, or wattle understorey) no longer exist.
3. Zone 2 habitat consists of the remaining ash-eucalypt forests.

Table 3.2 defines Zone 1A, Zone 1B and Zone 2 habitat. To promote the development of Zone 1A habitat and mixed-aged forest, NRE will continue research into, and operational trials of, the Retained Overwood silvicultural system in regrowth stands adjacent to stands of veteran trees.

Table 3.2 Leadbeater's Possum habitat Zones

<i>Zone</i>	<i>Density of hollow-bearing trees¹</i>	<i>Hollow-bearing tree¹ type</i>	<i>Wattle density²</i>	<i>Management</i>
1A	> 12 per 3 ha in patches greater than 3 ha	Living trees containing hollows	n/a	Special Protection Zone
1B	> 12 per 3 ha in patches greater than 10 ha	Dead or living trees containing hollows	> 5 m ² /ha	General Management Zone but excluded from timber harvesting while Zone 1B attributes remain.
2	Regrowth ash forest of varying ages; or areas with features of Zone 1A or Zone 1B but <3 ha or 10 ha respectively	n/a	n/a	General Management Zone

Notes:

1. Hollow-bearing trees are Mountain Ash, Alpine Ash or Shining Gum, either living or dead.
2. Density is expressed as basal area - the sum of the cross-sectional area of the boles of the trees.

System of Retained Habitat for Leadbeater's Possum

In accordance with the Action Statement, NRE aims to conserve Leadbeater's Possum over its known range.

The known range of the possum has been divided into 21 Leadbeater's Possum Management Units (LMUs). The LMU boundaries are based on the extent and spatial distribution of ash-eucalypt type forest (see Map 4). LMUs contain between 4 000 ha and 15 000 ha of ash-type forest with an average of 7940 ha (see Appendix L). They are composed of one or more adjacent forest management blocks, containing contiguous patches of ash-eucalypt forest. The target for the conservation of Leadbeater's Possum is to maintain viable populations of the species in all LMUs. The LMU boundaries may be revised following completion of mapping of the ash-eucalypt forest across the Central Highlands being undertaken by the Statewide Forest Resource Inventory (see Section 6.1).

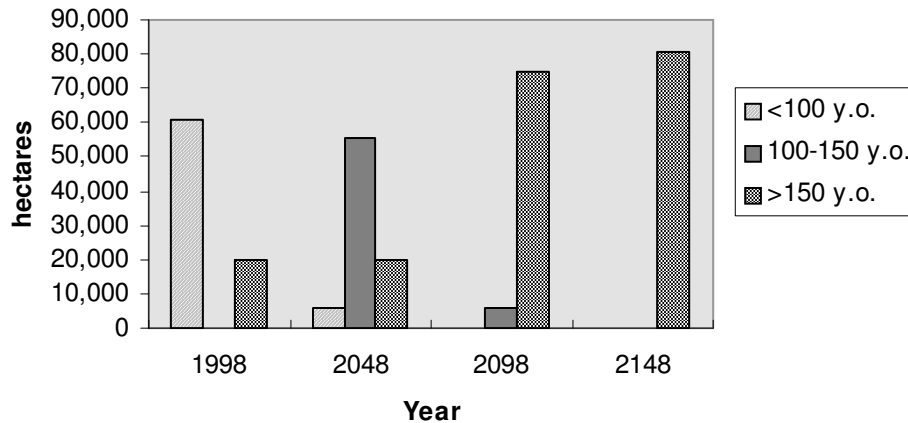
Habitat for Leadbeater's Possum is provided by retaining patches of ash-eucalypt forest in each LMU. The area and configuration of the patches was determined after taking into account:

- the target to retain at least 600 ha of ash-eucalypt forest in each LMU in either conservation reserves or the SPZ;
- the aim to retain patches of between 50 and 100 ha in area;
- the aim to link the retained patches, where feasible, through the linear reserve system;
- the area and spatial distribution of high-quality and low-quality habitat within each LMU;
- the area and spatial distribution of retained ash-eucalypt forest in adjacent LMUs;
- the total area of Zone 1A habitat retained in each LMU (see Appendix L);
- the total area of ash-eucalypt forest retained across the Central Highlands.

This plan retains patches of ash-eucalypt forest totalling at least 600 ha in 15 of the 21 LMUs. Many of the retained patches include existing Zone 1A habitat. Ash-eucalypt forest in the six remaining LMUs is primarily 1939 regrowth. This forest will not start to develop Zone 1A habitat characteristics for another 50 to 100 years. By the year 2100, at least 45% of the total area of ash-eucalypt forest in the Central Highlands will be over 150 years old (see Figure 3.1). This future relative abundance of suitable habitat provides a significant opportunity to adapt the system of retained habitat for Leadbeater's Possum to future management requirements.

NRE will assess the adequacy of the system of retained habitat for Leadbeater's Possum when the results of a computer-based habitat model become available. This model ranks the forest according to its suitability for Leadbeater's Possum habitat, using age class, density of live and dead hollow-bearing trees and slope data, for each patch of forest. Map 5 shows an example of the results of the modelling.

Figure 3.1: Area by age-class distribution of ash-eucalypt forest in conservation reserves or the SPZ in the Central Highlands



Notes:

1. The total area of ash-eucalypt forest in the Central Highlands is 181 000 ha. Of this, approximately 85 000 ha or 47% is in conservation reserves or the SPZ (includes 4500 ha of ash-eucalypt forest which is considered unstocked from a commercial point of view).
2. Assumes no wildfires
3. Assumes that existing 'mature' forest is over 150 years old
4. Assumes that unstocked ash-eucalypt forest in conservation reserves and the SPZ will not be restocked
5. Excludes ash-eucalypt forest in GMZ - Other and in Other Public Land (see Section 2.1)

MANAGEMENT PRESCRIPTION

Leadbeater's Possum

- Include Leadbeater's Possum Zone 1A habitat (living mature and senescing trees - see Table 3.2) in the SPZ.
- Exclude Zone 1B habitat from harvesting until either of the Zone 1B habitat attributes (the presence of dead mature or senescent trees, or wattle understorey) no longer exist.
- On completion of the modelling of the suitability of forest for Leadbeater's Possum habitat, review the adequacy of the retained habitat system established in this plan.

Large Forest Owls

The Powerful, Masked and Sooty Owls are considered Rare (CNR 1995a) and have been listed as threatened species under the *Flora and Fauna Guarantee Act 1988*. Their habitat generally comprises extensive areas of forest with hollow trees that provide nest sites and support substantial populations of prey (especially possums and gliders). They defend large territories, in the order of 500 to 1000 ha. Consequently they are potentially sensitive to the effects of clear-felling and may be among the most difficult fauna to conserve in forest used for timber production.

To maintain populations of these species across the Central Highlands, good-quality habitat to support at least 100 pairs of Sooty Owls, 50 pairs of Powerful Owls and 20 pairs of Masked Owls will be protected. The targets for each species are apportioned to GRUs, according to the amount of suitable habitat in each GRU (see Appendix M for the definition of suitable habitat and target number for each GRU). Both conservation reserves and State forest contribute to the protection of owl habitat. This plan provides for the long-term protection of large forest owls in State forest by reserving in SPZ areas

around recent sightings, known breeding sites or areas of suitable habitat. This strategy should ensure that habitat for viable populations of those species is maintained across the Central Highlands.

MANAGEMENT GUIDELINE
Powerful, Sooty and Masked Owls

Area of habitat reserved for pairs of each species:

- Powerful Owl: At least 500 ha of suitable habitat will be reserved in the SPZ or in conservation reserves. Depending on habitat type, additional areas will be included in the SPZ or SMZ. Timber harvesting operations will be permitted within the SMZ, subject to higher retention levels of existing or potential hollow-bearing trees.
- Sooty Owl: At least 300 ha of suitable habitat will be reserved in the SPZ or in conservation reserves. Depending on habitat type, additional areas will be included in the SPZ or SMZ. Timber harvesting operations will be permitted within the SMZ, subject to higher retention levels of existing or potential hollow-bearing trees.
- Masked Owl: 500 ha of suitable habitat will be reserved in the SPZ or conservation reserves.

Distribution of retained habitat:

- Areas of State forest reserved for owls should be located within a circle of 3-km radius and comprise patches of suitable habitat, greater than 100 ha in area and contiguous where possible.
- New owl records may be used to adjust the zoning scheme. The target number of pairs, the area reserved for each pair, and the locations of the reserved areas will be reviewed when results of further research and survey into owl populations, habitat requirements and owl sightings becomes available.

Other conservation measures:

- A 250-metre radius SMZ around nesting or residency sites should be established for trees used within the last 5 years. Within this SMZ, timber harvesting operations, road construction and other activities likely to disturb breeding activity will be excluded during the breeding season, and nest trees and all trees within a radius of 100 metres from the nest tree will be protected.
- Retention of ash eucalypts originating before 1900 in timber harvesting coupes.
- Protection of a minimum of 30% of each EVC.
- Protection of at least 60% of old-growth forest.

Spotted Tree Frog

The Spotted Tree Frog is a medium sized frog known from 11 populations in Victoria and one in New South Wales. It is considered to be Endangered (CNR 1995a). The frog is found in swift-flowing upland streams and uses vegetation adjacent to the streams for sheltering and basking. It is not known how far it moves away from streams into the adjacent forest.

Changes to the physical or biotic habitat in and adjacent to streams may threaten the species. Threats include predation by trout, increased sedimentation and changes in stream flow rates. The Code outlines measures to protect water quality, but due to the frog's threatened status, additional protective measures are warranted.

MANAGEMENT PRESCRIPTION
Spotted Tree Frog

To achieve long-term conservation for the Spotted Tree Frog, the following actions, based on the draft Flora and Fauna Guarantee Action Statement, should be taken on State forest:

- Until the critical habitat zone adjacent to streams is known, 300 m on each side of confirmed and potential frog locations will be included in the SPZ. Timber harvesting, road construction, fuel reduction burning and other potentially threatening activities will not be permitted in that zone.
- Stream buffers and filter strip widths will be according to Table 3.4 for at least 1 km upstream of the frog's confirmed and potential locations.
- No new roads or stream crossings should be constructed within one kilometre upstream of the frog's confirmed and potential locations.
- New roads or stream crossings in catchments containing Spotted Tree Frog should be constructed according to the recommendations in O'Shaughnessy (1996).
- All roads or tracks not required for management, harvesting or protection purposes in catchments containing Spotted Tree Frog should be progressively closed and rehabilitated (see Chapter 7). Where appropriate, all other roads in those catchment should be seasonally closed.
- Roads and tracks which are retained in catchments containing the Spotted Tree Frog should be progressively upgraded to the standards outlined in O'Shaughnessy (1996). The catchments, listed in priority order, in which remedial works should be undertaken are the Taponga River system, Goulburn River, Big River and Thomson River.
- The number of stream crossings over permanent and temporary streams and drainage lines in catchments containing Spotted Tree Frog should be minimised.
- Close and rehabilitate the Taponga River camping ground. This camping ground is adjacent to a known population. Alternative places for camping will be provided in nearby areas.

Baw Baw Frog

The Baw Baw Frog is a medium sized frog (45 mm to 50 mm body length) found until recently only in Subalpine Wet Heathland, Montane Riparian Thicket and sphagnum bog vegetation on the Baw Baw Plateau. The frog is considered Endangered (CNR 1995a) and a Flora and Fauna Guarantee Action Statement (CNR 1993) and a draft Recovery Plan has been prepared.

Recent survey work subsequently recorded the frog in Subalpine Woodland and Montane Wet Forest EVCs on the south-west face of the Baw Baw plateau in the Baw Baw National Park and Alpine Resort. Further surveys in 1996 found the frog in Montane Wet Forest and Subalpine Wet Heathland on the south-west face of the Baw Baw escarpment on State forest, generally above the 1100 m contour. Based on the shape and extent of drainage patterns, the northern escarpment also contains potential habitat, though survey work during the 1997/98 season did not locate the frog on State forest in this area.

Baw Baw Frog breeding habitat is found mainly along drainage lines. Following the breeding season (October to December) frogs may move away from the drainage lines, but how far is presently unknown.

Threats to the Baw Baw Frog on State forest may include physical disturbance, habitat modification and fragmentation and increased sedimentation of drainage lines in the Montane Wet Forest and Montane Riparian Thicket.

To ensure that viable populations of the Baw Baw Frog persist in the long-term, a sufficient area of its habitat must be protected. Areas of habitat on State forest will be protected once the frogs' use of breeding and non-breeding habitat is better understood. To achieve this, the following research and survey work has commenced:

- identification of breeding and non-breeding habitat;
- survey for the presence of the frog on the northern face of the Baw Baw plateau;
- further survey and monitoring of populations on the southern face of the Baw Baw plateau;
- the seasonal use of breeding and non-breeding habitat;
- response to disturbance in the Montane Wet Forest.

The draft Baw Baw Frog Recovery Plan includes research proposals which will increase knowledge of the frog's biology, ecology and habitat distribution.

MANAGEMENT GUIDELINE
Baw Baw Frog

The results of the research and survey listed above are expected to be available in one to two years. In the interim, NRE will adopt a precautionary approach above the 1000 m contour surrounding the Baw Baw plateau by:

- scheduling new coupes only in areas determined not to contain Baw Baw Frog habitat;
- minimising fragmentation of Baw Baw Frog habitat by utilising existing roads wherever possible.

Where timber harvesting above the 1000 metre level on the Baw Baw Plateau is proposed prior to the results of the survey and research, this interim strategy provides for:

- training of NRE field staff in the identification of potential breeding habitat;
- field survey, prior to harvesting, to confirm the presence/absence of the species;
- protection of identified breeding habitat and associated interim protection zone of up to 200 metres. Potential breeding habitat will be initially identified by aerial photograph interpretation and then confirmed through field inspection;
- access for timber harvesting under standard prescriptions only in areas not containing potential habitat.

Long-term protection measures for the Baw Baw Frog will be guided by the results of the survey and research obtained during the next one to two years. It is expected that these measures will be a combination of zoning for conservation and guidelines for scheduling and spatial distribution of timber harvesting coupes. NRE will revise the Baw Baw Frog Action Statement by the end of 1999.

Barred Galaxias

The protection of habitat for fish and other fresh-water fauna is made through the provision of stream-side buffers, linear reserves, rainforest buffers and the SPZ. These buffers and other provisions under the Code minimise siltation, pollution and physical disruption within the stream and maintain shade. The Barred Galaxias warrants additional security because of its threatened status.

The Barred Galaxias is a small fish restricted to streams above 400 m altitude. It appears to be non-migratory and completes its entire life cycle in fresh water. It is currently known from only one locality in each of 12 streams and it appears that the present distribution represents the fragmentation of a previously much wider range. The Barred Galaxias is listed as Endangered in Victoria and Australia (CNR 1995a).

The viability of all populations is in doubt due mainly to the increasing presence of Brown and Rainbow Trout which compete with and prey on Galaxiid. Other possible threats to the species include an increase in toxic residues and sediment in streams.

MANAGEMENT PRESCRIPTION	
Barred Galaxias	
To protect known Barred Galaxias populations from increased sedimentation of streams, NRE will:	
<ul style="list-style-type: none"> • increase permanent and temporary stream buffers upstream of Galaxias sites according to Table 3.4. This measure will be reviewed when 30 Barred Galaxias populations have been located; • progressively close and rehabilitate all roads or tracks not required for forest management, harvesting or protection purposes in catchments containing Barred Galaxias (see Chapter 7); • minimise stream crossings over permanent and temporary streams and drainage lines in catchments containing Barred Galaxias; • where possible, seasonally close roads in catchments containing Barred Galaxias. 	

Table 3.4 Minimum stream buffer and filter strip widths to be applied upstream of Barred Galaxias populations and 1 km upstream of Spotted Tree Frog locations

<i>Stream class</i>	<i>Soils with high permeability ** and low potential for overland flow</i>	<i>Soils with low permeability** and high potential for overland flow</i>	
	Slope* 0-30°	Slope* 0-20°	Slope* 21-30°
1. Permanent streams	30 m B	40 m B	50 m B
2. Temporary streams	20 m B + 10 m F	20 m B + 20 m F	30 m B + 20 m F
3. Drainage Lines	10 m F	10 m F	15 m F
4. Wetlands	30 m B	40 m B	50 m B

* Slope should be generally regarded as the average slope of the coupe area in the vicinity of the water body and within the catchment

** Post harvest condition, excluding lands and major snig tracks, and for all but very infrequent intensity storm events

B Buffer. Timber harvesting excluded

F Filter strip in which timber harvesting is permitted, but without machine entry

Genetic diversity

The conservation reserve system, the protection of representative samples of EVCs, the large areas of forest reserved for protection of owls and Leadbeater's Possum habitat, other areas protected by the SPZ, and the strategies to conserve veteran trees should provide a high level of protection for the most significant wildlife habitat and species within the Central Highlands.

Strategies to maintain the genetic diversity include:

- reserving a proportion of each EVC across public land in the Central Highlands
- reserving viable samples of each EVC across GRUs
- maintaining a range of forest growth stages
- establishing a system of linear reserves with an average width of 200 m
- ensuring that linear reserves link areas of high conservation value forest and include areas of riparian vegetation, mid-slope and ridge vegetation
- ensuring that some linear reserves cross altitudinal gradients
- reserving areas demonstrating primary and secondary succession, particularly ecotones
- developing conservation strategies for each VROT and each threatened faunal species.

These measures all contribute to the maintenance of the genetic diversity within State forest at ecosystem and species levels and are expected to facilitate gene flow in response to climatic change, including the effect of the predicted Greenhouse Effect.

When forest is harvested there is a need to ensure that the genetic integrity is maintained when it is regenerated. The Code states: "*Native forests should as far as possible be regenerated or reforested with species and provenances native to the area or general locality so as to maintain species patterns and genetic pools present prior to harvesting*".

ACTIONS

Manage flora VROTS in accordance with Appendix J and the management prescription for Tall Astelia.

Develop competencies in field staff in the identification of VROTS and the management of their habitat, in areas available and suitable for timber production.

Identify and map Leadbeater's Possum Zone 1B habitat in conjunction with the planning for forest operations.

On completion of the modelling of the suitability of forest for Leadbeater's Possum habitat, review the adequacy of the retained habitat system established in this plan.

Continue survey and research programs to increase understanding of the Baw Baw Frog's use of breeding and non-breeding habitat.

Manage threatened fauna and their habitat in accordance with Appendix K and the above management guidelines, prescriptions and relevant tables.

3.3 MONITORING

Monitoring Changes in Biodiversity

The Victorian Government is committed to monitoring forest management and utilisation activities in the forests of the Central Highlands, with the aim of achieving ecologically sustainable forest management. Monitoring programs to be conducted on public land in the Central Highlands will be based on relevant regional indicators which will be consistent with the criteria established under the Montreal Process, and will take into account the framework of regional indicators developed by the Montreal Process Implementation Group. The Montreal Process criteria and indicators listed in 'Australia's First Approximation Report for the Montreal Process' (Montreal Process Implementation Group 1997) are tools for assessing national trends in forest conditions and management, and provide a common framework for describing, monitoring and evaluating progress towards sustainability at the national level.

Maintenance of biodiversity in the Central Highlands requires an understanding of the impact of threatening processes on the distribution, structure and species composition of ecosystems. The impact of these processes can be assessed by the establishment of programs which monitor populations of flora and fauna in relation to the condition of forest ecosystems. As monitoring the population of every common species is not practical, monitoring a representative group of them, particularly those which are threatened, endemic, disjunct or at the edge of their range, should provide the information required to assess the effectiveness of the conservation strategies outlined in Sections 3.1 and 3.2.

Table 3.5 identifies threatening processes for certain EVCs. No widespread identified threatening process affects the remaining EVCs found on public land in the Central Highlands. Assessing the impact of those threatening processes will be achieved by monitoring populations of species within those EVCs listed in Table 3.5.

NRE's data bases are dynamic. They are continually updated with both new records and revision of the taxonomic and conservation status of species in response to research and monitoring. Records are periodically reviewed to indicate whether the broad biodiversity conservation objectives are being met and whether more specific quantitative monitoring of particular values or species is required. The key data sets for this work are EVC, growth stage and flora and fauna records. By establishing a formal monitoring process based on the Montreal Criteria and indicators, NRE will become more effective in assessing trends in biodiversity and in progressing towards ecological sustainable forest management.

Table 3.5 Threatening processes for EVCs on public land

<i>EVC</i>	<i>Threatening process</i>
Riparian Forest	Weed invasion
Wet Forest	Physical disturbance to resprouting species by timber harvesting activities
Cool Temperate Rainforest	Spread of Myrtle Wilt
Lowland Forest	Spread of <i>Phytophthora cinnamomi</i>
Heathy Dry Forest	Too frequent fire regimes
Heathy Woodland	Spread of <i>Phytophthora cinnamomi</i>
	Too frequent fire regimes

ACTIONS

Develop programs conforming with relevant regional indicators consistent with the Montreal Process to monitor populations of VROTS, threatened fauna, endemic, disjunct and edge-of-range species.

Determine which common plant and animal species will be used for monitoring purposes and develop programs to monitor the effectiveness of the conservation strategies outlined in Sections 3.1 and 3.2. using these species.

Chapter 4

CULTURAL VALUES

4.1 ABORIGINAL AND HISTORIC PLACES

Background

The State forests of the Central Highlands contain evidence of past human use, including occupation by Aboriginal peoples and European and Chinese settlers. Evidence of their settlements, travel routes, mining and timber-getting practices are scattered throughout the forests. Some have been destroyed by past fires or concealed by vegetation growth.

Places of traditional significance for Aboriginal people and other areas highly valued for their aesthetic, historical, social or landscape values also form part of our cultural heritage.

The Statements of Resources, Uses and Values and the Joint Forest Assessment (AHC & CNR 1994a) provide more detail of the values in the area.

Aims

To protect significant Aboriginal and Historic values and places from potentially damaging human activity.

To use selected historic places for the education and enjoyment of the public.

Aboriginal places

Aboriginal places include areas of traditional and continuing significance to Aboriginal communities and sites with material evidence of Aboriginal occupation and use. Aboriginal archaeological sites have been recorded across the Central Highlands. Those located on State forest may be threatened by timber harvesting, road construction or other activities but their location is as yet uncertain. Other sites may only become evident when the vegetation or soil surface is disturbed. When found, their location will be treated as confidential. Close consultation with local Aboriginal communities and Aboriginal Affairs Victoria (AAV) is essential to ensure that Aboriginal sites are protected.

Protection of Aboriginal places and consultation with Aboriginal communities with an interest in the place are required under State and Commonwealth legislation.

In accordance with the Central Highlands Regional Forest Agreement, the Commonwealth and Victorian State Government agreed to jointly develop a package of measures that will be implemented by NRE to ensure the appropriate management of Aboriginal heritage including the maintenance of traditional historic uses and values in the Central Highlands. These measures are:

- the development of Statewide guidelines for the management of cultural heritage values;
- provision of participation and negotiation through the establishment of formal consultation mechanisms with local Aboriginal communities;
- modelling to establish priority areas for future surveys of Aboriginal sites; and,
- training of staff.

Forest Management Plans are not intended to influence either current or future Native Title claims in any way.

Historic places

More than 400 places identified as having historical significance have been found in State forest in the Central Highlands. The majority of these places relate to early timber utilisation or mining activities. Documentation and assessment of these historic places was undertaken as part of the Land Conservation Council (LCC) Melbourne Area District 2 Review by Supple *et al* (1989) and as part of the Joint Forest Assessment. Appendix N lists identified historic places on State forest, and relevant Historic and Cultural Features Reserves and their proposed management.

Heritage Victoria is the State government authority responsible for maintaining the Heritage Register and the Heritage Inventory. The inventory includes all known areas where archaeological relics are located and all known occurrences of archaeological relics. Some of these may be registered with the Heritage Register. Any survey, excavation or demolition of an archaeological site requires a permit from Heritage Victoria. All archaeological places are protected under the *Heritage Act* 1995, whether or not they are listed on the Heritage Register of Heritage Victoria.

Historic and Cultural Features Reserves in which timber harvesting may occur

The LCC, in its Final Recommendations for the Melbourne Area District 2 Review, identified a number of Historic and Cultural Features Reserves in which the primary management would be to protect the specific historic values but in which other uses, such as timber harvesting, would be permitted.

The Historic and Cultural Features Reserves in which timber harvesting is permitted are: Rubicon Valley, Comet Sawmill, Mount Disappointment, Woods Points Gold-mines, Mississippi No. 1 Mill settlement, Ada River Sawmills and Kirchubel's Tramway and Mill and Tanjil Bren. Protection measures for historic places within these reserves will be in accordance with the Management Guideline below. The sites and management actions are listed in Appendix N.

MANAGEMENT GUIDELINE

Historic Places

NRE follows the principles and guidelines of the Burra Charter of Australia for the identification, assessment and management of historic places on public land. The major emphasis of management is to protect historical sites from inappropriate human disturbance and development and wildfire.

Specialist historic place management advice (currently NRE's Historic Places Section) should be sought where proposed forest management or utilisation activities may disturb historic places.

Protection measures have been determined for historic places listed in Appendix N. These measures, summarised below, vary according to the type of place, its significance, condition and the threat of disturbance:

- 50 m buffer:** No timber harvesting or machine movement within 50 metres of the place
20 m buffer: No timber harvesting or machine movement within 20 metres of the place
20 m no machine movement: No machine movement within 20 metres of the place
Protect historic fabric: Any historic artefact should be left *in situ*.

Other measures to protect historic places may include:

- ensuring movement of heavy machinery is restricted to specified crossing points;
- removal of vegetation that may cause damage to the historic place;
- improving drainage around a historic place;
- erecting signs explaining the reasons for leaving artefacts on the site and the penalties for removal.

Proposals for off-site use of historic artefacts or the development or interpretation of historic places for tourism or educational purposes will be evaluated on a case-by-case basis. Management plans for historic places or themes should be progressively developed, having regard to the significance of the place and its susceptibility to loss. Places that could potentially be used for education and interpretation purposes should be:

- accessible;
- close to recreation facilities or a grouping of sites illustrating a theme(s) of forest activity;
- robust to disturbance so that the integrity of the place is maintained.

ACTIONS

Develop and implement the measures identified in the Central Highlands Regional Forest Agreement to facilitate the appropriate management of Aboriginal heritage values.

When located, determine management requirements of Aboriginal places in consultation with Aboriginal Affairs Victoria and local Aboriginal communities.

Maintain liaison with Aboriginal Affairs Victoria and local Aboriginal communities to facilitate information sharing and to provide opportunities for input into forest management decisions.

Manage historic places in accordance with Appendix N and the Management Guideline.

4.2 LANDSCAPE

Background

One of the attractions of the Central Highlands to both residents and visitors is the scenery. Protection of the area's scenic quality is important and, if managed carefully, impacts on the scenery by forestry activities such as timber harvesting and road construction can be minimised.

Landscape management on public land is guided by NRE's Visual Management System (VMS) (Williamson and Calder 1979). This uses a combination of scenic quality, visitor sensitivity and distance classes to set 'visual quality objectives' for an area. In preparing this plan, the results of the VMS, the Joint Forest Assessment and advice of field staff and the public were used to identify the key areas of State forest where additional care will be required to protect landscape and aesthetic values. How much care is required will vary according to the quality and type of landscape, the number of visitors to an area and their likely expectations.

The Statements of Resources, Uses and Values provide more background information on landscape values across the Central Highlands.

Aim

To minimise the impact of forest management or utilisation operations on the landscape, particularly in areas of high scenic and aesthetic quality.

MANAGEMENT GUIDELINE
Areas of High Scenic Quality

Appendix O lists areas of high scenic quality and their management. These areas include the vegetation adjacent to popular travel routes and areas seen from some roads, towns and lookouts. Timber harvesting will be permitted in the majority of these areas but special attention will be given to landscape values.

Alterations to the foreground landscape of these areas should be temporary, subtle and not evident to the casual observer. Where possible, timber harvesting coupes and new road alignments or easements should be screened from view. Retention of buffering vegetation between roads and timber-harvesting coupes should be the main method of screening. The width of the vegetation screening should vary with local variations in topography and vegetation type, although 20 m should be a minimum. Selection harvesting may occur in the buffer provided an effective screen is maintained.

Landscape alterations in the middle ground may be evident in the short term, but should only be subtly apparent within five years of the alteration. Timber harvesting coupes, new roads and easements in these areas should be shaped, positioned and timed to minimise their visual impact.

The following strategies will help protect the scenic quality of these areas:

- selective harvesting around the edges of timber harvesting coupes
- using silvicultural regimes such as overwood retention or selective harvesting
- minimising the width of road alignment clearing
- restricting the area of timber harvesting coupes which can be seen from popular travel routes or towns
- curved boundaries of timber harvesting coupes
- ensuring the spatial and temporal distribution of timber harvesting coupes.

The actual strategies adopted will be set out in the Coupe Plans prior to harvesting.

Places of aesthetic and other identified landscape values

The Joint Forest Assessment (AHC & CNR 1994b) identified places of aesthetic value within the Central Highlands. The aesthetic value was defined as “*the response derived from the experience of the environment or particular natural and cultural attributes within it*”. Aesthetic value takes into account people's perception of form, scale, colour, texture and material, smell and sound. Appendix O also lists the sites identified by the Joint Forest Assessment containing aesthetic value and their management.

The LCC (1994) recommended areas of State forest to be protected for their landscape values and the National Trust has classified or recorded the cultural, scientific and aesthetic quality of areas in the Central Highlands. These areas and their management are listed in Appendix O.

ACTION

Manage the landscape seen from major tourist roads, towns and recreation facilities according to Appendix O and the above Management Guideline.

4.3 NATIONAL ESTATE

A study conducted by the Australian Heritage Commission and the Department of Conservation and Natural Resources (AHC & CNR 1994a) assessed national estate values in the Central Highlands and provides more detail on the natural and cultural values in the region.

Conservation measures for the natural values identified as being sensitive to disturbance by the Joint Forest Assessment (AHC & CNR 1994a) have been developed. These measures are encompassed in strategies for biodiversity conservation (chapter 3) and are listed in Appendix H. Conservation of other

National Estate values are achieved through conservation and management guidelines and actions set out throughout this plan.

The RFA recognises that many of the national estate values are well reserved in the CAR reserve system and that this plan and other mechanisms provide for the conservation of many other national estate values in the region. All national estate values in the Central Highlands will be conserved through the application of the principles for managing national estate values as detailed in this plan.

Management zone boundaries may require review in implementing this plan as outlined in chapter 9. In accordance with the Central Highlands RFA, best endeavours will be used by NRE to maintain the levels of protection of national estate values in a regional context, however, minor changes to the levels of protection of individual values may occur as a result of changes to the SPZ through time as new information becomes available.

4.4 RECREATION AND TOURISM

Background

The State forests of the Central Highlands currently attract about 850 000 visitors each year (Read & Sturgess 1995) and there are opportunities for market growth which can benefit local communities. It is estimated that the current level of tourism and recreational use of State forests alone benefits the local region by between \$17 to \$42 million per year (*ibid*), with usage predicted to grow by 3% to 5% per year. State forest forms an integral part of this nature-based tourism asset, complementing higher profile attractions such as the snowfields, wineries, and national parks. The recent declaration of the Yarra Ranges National Park will increase the profile of the Central Highlands as a tourist destination and may lead to increased use of the surrounding State forest.

The Statements of Resources, Uses and Values and the Joint Forest Assessment provide more detail of the values in the area.

Aims

To provide for a wide range of recreational activities in State forest which complement those available in parks and reserves.

To facilitate the participation of the private sector in the provision of tourism and visitor services.

To participate in and integrate tourism planning and promotion with peak tourism bodies and local government.

To minimise the environmental damage caused by recreational activities.

To educate and inform visitors about native forests and their management.

Recreation management zones

In managing public land NRE aims to provide a wide range of recreational opportunities while conserving the natural environment. Subject to relevant legislation, all forms of recreation are permitted in all areas of State forest. To assist in recreation planning and to minimise potential conflict between user groups, the State forests of the Central Highlands have been segmented into recreation management zones. The four zones (see Map 6) are areas where different recreational activities and development are more or less appropriate. The zones take into account current and potential recreational activities and facilities in State forest and in nearby parks and reserves. Activity and visitor use in Zone 1 is high and concentrated, and infrastructure may be well developed; in Zone 4, activity and visitor use is dispersed and infrastructure may be minimal to non-existent. Appendix P lists current and potential attractions for each recreation management zone.

Within each of these zones NRE will promote opportunities for particular recreational activities. In intensively-used areas, such as around Marysville and Warburton (Zone 1), where State forest is an important part of the area's tourism attraction, opportunities to participate in day walks, picnics and scenic drives with appropriately developed facilities will be encouraged. However, as many independent,

self-sufficient visitors seek access to more remote recreational opportunities, such as camping and four-wheel-driving along the Big River (Zone 4), access to and information on these areas will be of a lower standard, and facilities more limited. Table 4.1 indicates the suitability of Recreation Management Zones for various recreational activities.

Table 4.1 Suitability of recreational activities in each Recreation Management Zone

<i>Activity</i>	<i>Zone 1</i>	<i>Zone 2</i>	<i>Zone 3</i>	<i>Zone 4</i>
Picnicking	***	**	*	*
Short walks	***	**	*	*
Longer walks	*	***	**	**
Camping	*	**	**	**
Horse-riding	***	***	***	***
Fishing	***	***	***	***
Hunting	*	**	***	***
Two-wheel driving	***	***	**	*
Four-wheel driving	*	**	***	***
Trail-bike riding	*	***	***	***
Mountain-bike riding	***	*	*	**
Car rallies	**	**	**	*
Rogaining and orienteering	***	***	***	***
Canoeing and rafting	*	**	***	***
Rock climbing	***	***	***	***
Fossicking and prospecting	*	**	***	***
Defence force and emergency services training	*	*	**	*

Notes: 1. This table is to be used as a guide only
 2. *** high suitability, ** moderate suitability, * low suitability

Recreation Facilities

NRE currently maintains a large number of recreation facilities throughout the State forests of the Central Highlands. Appendix Q lists intended management actions for existing recreation facilities. Their management will be based on the recreation management zones described above, current usage, proximity to other facilities in parks or reserves, condition and the level of maintenance required.

The provision and location of new recreation facilities will also be guided by the recreation management zones. Table 4.2 lists the type of recreation facilities which are appropriate in each Recreation Management Zone. The development of new facilities will depend on availability of resources from either NRE or private sources. The use of volunteer groups and the private sector in the construction and maintenance of recreation facilities will be encouraged. Local government views and the needs of local tourism operators, including commercial tour operators, will be taken into account when planning or locating new recreation facilities. Included in Appendix Q is a list of proposed recreation facilities.

Table 4.2 Appropriate recreation facilities for each recreation management zone

<i>Type of recreation facility</i>	<i>Zone 1</i>	<i>Zone 2</i>	<i>Zone 3</i>	<i>Zone 4</i>
Camping sites		3	3	
Commercial tours	3	3	3	3
Walking tracks / fire places	3	3	3	
Forest drives	3	3		
Horse riding facilities	3	3	3	
Information	3	3		
Picnic tables / Toilets	3	3		

Note: This table is to be used as a guide only. The actual type of facility provided in a particular site will vary according to the site’s location and current usage.

MANAGEMENT GUIDELINE
Recreation in State forest

To manage recreational use in State forest in the Central Highlands, the following should be undertaken:

- Planning and management of recreation for both State forest and adjoining parks and reserves should be co-ordinated;
- Recreation activities that are excluded or restricted in parks and reserves (like hunting, walking of dogs, large scale organised recreation events) should be provided for in appropriate areas of State forest;
- Opportunities for recreational activities listed in Table 4.1 should be promoted through the provision of information and public liaison;
- The provision and location of new facilities should be guided by the Recreation Management Zones;
- Recreation facilities should be closed, maintained or upgraded according to Appendix Q;
- Recreation groups or clubs or the private sector should be encouraged to maintain recreation facilities or, subject to approval, construct new facilities;
- Sign-posts to major recreation facilities should be provided;
- Maps showing appropriate access for the following should be made available: trail-bike riding, mountain-bike riding, conventional vehicles, buses, four-wheel drives, horse-riding, hunting, and for visitors with special needs;
- Foot-based recreation should be encouraged on particular bush-walking tracks in high visitor use areas (these tracks are listed in Appendix Q);
- Mountain bikes and horses should be encouraged to use existing roads, tracks or trails;
- Campers, horse-riders, hunters, four-wheel drivers, motorbike riders and bush-walkers should be encouraged to adhere to relevant 'Codes of Conduct';
- Commercially run recreation activities should be encouraged where they will increase participation in State forest recreation while remaining consistent with other management aims;
- Organisations which run commercial recreational activities or which run activities that have the potential to cause significant impact on forest values will be required to hold permits.

Commercial Tours in State forest

The private sector's role in providing a range of services to tourists and recreationalists is increasing in importance. Commercial tours are becoming a popular and safe means for tourists to enjoy forest areas. Types of tours available range from horse-riding and wildlife spotlighting to forest tours and outdoor education. These commercial activities are regulated through NRE's Commercial Tours Permit System, which operates across all public land.

NRE aims to nurture a viable tourism industry and provide opportunities for commercial development on State forest that generate appropriate returns to the operators and to the Government, and delivers quality service to the public. Opportunities for the involvement of the private sector include the development of wilderness type ecotourism/adventure tours in Zones 3 and 4, and an eco/cultural tourism operation in association with the Forest Discovery Centre at Toolangi. To encourage private sector involvement, a process of tenders or site leases may be granted to provide exclusive commercial use of certain areas. Public access would not be limited, however.

On-going and future commercial operations will be assessed on their merits and on their compatibility with the directions set by the recreation management zones, the Regional Tourism Development Strategy for the area, and through the appropriate participation of other stakeholders. NRE is receptive to suggestions from the private sector on potential development of perceived opportunities, which should be pursued initially through its local offices.

Tourism promotion

NRE has a role to play in the development and promotion of the Central Highlands area, particularly in some of the adjacent towns such as Marysville, Healesville and Warburton. Regional Tourism Boards coordinate tourism promotion, including the distribution of promotional material. Their membership is drawn from local tourist operators, business and local and State government representatives. NRE has membership on some of these Boards and liaises with them, local tourism associations, municipalities, and Tourism Victoria to promote attractions in the Central Highlands on an as-needs basis. In addition, information about NRE facilities and recreational opportunities will be made available to the Regional Tourism Boards for inclusion in tourism promotion activities.

Community Education and Interpretation

Community interest in the management and protection of the environment, particularly native forests, is growing. The Central Highlands provide important environmental study sites for a wide range of organisations including schools, tertiary institutions, clubs and community groups. Interpretation and education foster understanding and appreciation of the area's natural, cultural and economic values and these need to be related to NRE's management policies and practices.

NRE produces a wide range of information, such as brochures, maps, posters and pamphlets regarding activities designed to assist formal education groups and the general public. Some of this information is on NRE's Internet home page³. The format and distribution of this literature and information is currently under review so that target audiences are reached more effectively.

ACTIONS

Develop, as appropriate, and maintain recreational facilities in accordance with the recreation management zones and as specified in Appendix Q and the above Management Guideline.

Develop and distribute information suitable for inclusion in tourism promotions.

Prepare and distribute information which relates the forests' natural, cultural and economic values to NRE's management practices and policies. Make this information available where appropriate in NRE offices, on main roads and forest drives near accessible forest operations, in local tourism information centres, local government offices, retail outlets and on the Internet.

³ NRE's Internet home page address: <http://www.nre.vic.gov.au>

Chapter 5

STREAMS AND CATCHMENTS

Background

The catchments of the Central Highlands form an integral part of Victoria's water supply. They are a source of domestic water for over three million people who live in several major cities and towns, including Melbourne. The catchments also supply a large amount of water which is used by irrigators in Gippsland and the Goulburn-Murray area.

The water receives various levels of treatment depending on the nature of the catchment and the requirements of the communities being supplied. Any significant reduction in water quality could add to the costs of supply by necessitating either higher levels of treatment or the introduction of treatment where none is currently necessary. Accordingly, ensuring that water quality is maintained is a high priority for forest management.

Well planned and managed forest operations such as timber harvesting and road construction and maintenance will minimise excess water run-off, which can cause erosion, increased stream turbidity and sedimentation.

Maintaining water yield from individual catchments is another consideration of forest management, as a significant reduction in yield may necessitate diversions from, or the construction of reservoirs on other rivers. Research indicates that long-term water yields may decrease in ash-eucalypt forests following large-scale regeneration or reforestation activities or wildfires.

Maintaining water quality and yield are also issues for environmental reasons. Stream environments in forests are important habitats for a range of native aquatic flora and fauna and communities, some of which are sensitive to alterations in water quality. Maintaining water quality is therefore a significant factor in maintaining forest biodiversity.

The Statements of Resources Uses and Values provide more detailed information about catchments and water production.

Aims

To maintain biological values associated with rivers and streams.

To ensure water quality is suitable for current and likely future use.

To maintain at least current water yields from catchments used for domestic and irrigation water supply.

Code of Forest Practices Requirements

The Code of Forest Practices for Timber Production (Code) sets minimum standards for water quality protection and guidelines to protect water yield from catchments used for water supply.

The measures aimed at protecting water quality contained in the Code provide an appropriate level of water quality protection in the General and Special Management Zones. They include:

- the retention of riparian and other vegetation within 20 m of a permanent stream, permanent spring, swampy ground, wetland or other bodies of standing water. The Code recommends that this retention distance increase with slope on soils with low permeability and high potential for overland flow
- the retention of a filter strip at least 10 m wide on either side of temporary streams and drainage lines
- standards for the design, construction, maintenance and rehabilitation of roads, tracks, bridges, log landings and log dumps

- suspension of timber harvesting and log carting during periods of wet weather
- the application of a general maximum slope limit of 30 degrees for harvesting operations.

These are minimum standards and must be increased where other environmental factors require protection.

Heritage Rivers and River Zones

Following the Land Conservation Council's (LCC) Rivers and Streams Special Investigation (LCC 1991) the Government declared the corridors of the Yarra, Goulburn (below Lake Eildon), Big and Thomson Rivers to be Heritage River Areas because of their significant natural, scenic, cultural heritage and recreational values. Timber harvesting is excluded from the Heritage River corridors within this planning area. In State forest, these corridors are included in the Special Protection Zone (SPZ).

The LCC, in its recommendations following the Melbourne Area District 2 Review (LCC 1994) identified a 'River Zone' along other rivers and streams in the Central Highlands which contain significant natural, scenic or recreational value. These are the upper Goulburn, Murrindindi, Acheron, Latrobe and Toorong Rivers and Snobs Creek. The corridor to be protected along these rivers and streams varies according to local circumstances but generally extends between 100 m and 300 m from each bank. These areas are also included in the SPZ.

Water Quantity

Water yields may be affected by catchment management and land use. Kuczera's (1985) study of water yield from catchments showed that regenerating ash-eucalypt forests use more water than mature forests. The overall yield of water from catchments containing ash-eucalypt forests in the Central Highlands is expected to increase as the average age of the forest increases and a more balanced age structure is achieved. The change in water yield as mixed-species forest matures is less well understood. Further research into the impact of timber harvesting on water yields will enable NRE to provide a more detailed assessment of the impact of timber harvesting activities in individual catchments.

Water Quality

Salinity, turbidity, sediment load, discolouration, and bacteriological and chemical contamination affect the quality of water and its suitability for domestic, agricultural and industrial use. Water from undisturbed or sustainably managed forests is of high quality and will generally meet domestic use standards.

Research by Melbourne Water has shown that any changes in water quality following well-supervised silvicultural operations with well-constructed and maintained roads, are only temporary in nature and are masked in large catchments by the effects of dilution (Langford and O'Shaughnessy 1980). Roads and tracks present a greater hazard with regard to sedimentation of streams than do timber-harvesting operations (O'Shaughnessy 1996).

The Code, Forest Management Area timber harvesting prescriptions, and the Roding Prescriptions for Timber Production in the Central Highlands (DCE 1991b) have been developed to protect water quality during timber harvesting and road construction and maintenance activities. The Forests Service has established a system of audit to ensure compliance with the Code. This system provides a framework for monitoring the implementation of the measures for maintaining stream and catchment values outlined in this plan. Water quality protection measures on roads other than those used for timber extraction are not covered by the Code and timber harvesting prescriptions.

Special Water Supply Catchments and Special Area Plans

Fifteen areas (see Appendix R) in State forest in the Central Highlands are identified as Special Water Supply Catchments Areas under the *Catchment and Land Protection Act* 1994 (these were referred to as Proclaimed Catchments under the now-repealed *Soil Conservation and Land Utilisation Act* 1958). These are the basis for Special Area Plans which specify how particular land management issues in the Special Water Supply Area must be addressed. Land Use Determinations and Land Use Notices prepared for the Proclaimed Catchments now become Special Area Plans. NRE must have regard to any Special Area Plan applying to land under its control.

Special Water Supply Catchment Areas were identified because of their significance as water supply catchments. They vary in size, soil type and land-form characteristics and in the uses made of the water harvested from them. Because of these variations, Special Water Supply Catchment Areas do not provide a suitable basis for strategic forest management planning. Accordingly, they will be managed as part of the GMZ, subject to the relevant Special Area Plans, standard prescriptions and Code requirements.

Appendix R also summarises the specific requirements of particular Special Area Plans which may affect State forest management.

Thomson Reservoir Catchment

The Thomson Reservoir catchment, indicated by hatching on Map 2, produces large quantities of high-value ash-eucalypt timber for domestic and international markets and is a major source of water (including drought reserve) for domestic and industrial consumers in Melbourne. The water is also used by irrigators in Gippsland. In addition, the environmental flow of the river has significant benefit to aquatic ecosystems. All water currently supplied from the catchment is committed, and any increase that may become available can be used to service the increasing demand by Melbourne users, and thus may delay further augmentation from other Victorian rivers. The environmental and capital costs of constructing a new water storage facility to supply water to Melbourne is considerable.

Based on Kuczera's model of water yields from regenerating ash-eucalypt forests (Kuczera 1985), the production of timber and subsequent regeneration may be considered to be in competition with the production of water. Because of the competing value of wood and water produced from the Thomson catchment, two studies of the relative economic values of timber and water production in the Thomson catchment were commissioned jointly by Melbourne Water and the former Department of Conservation and Natural Resources. These studies (Read & Sturgess 1992; Read & Sturgess 1994) modelled timber yields for various timber harvesting options – no timber harvesting, harvesting using various age rotations or thinning, together with the resulting stream flows.

The results of the analyses indicated that strip thinning at 50 years, with the remaining stands harvested on a 200-year rotation, was the most favourable option. Other favourable options included clear-felling on a 200-year rotation, strip thinning at 50 years with a 120-year rotation, and the no-timber harvesting option. The consultants stated however that uncertainty remained about many issues central to the economic analysis.

A long-term timber harvesting and water production strategy for the Thomson Reservoir catchment will be prepared by NRE in consultation with Melbourne Water. The development of this strategy is dependent on revised timber resource data which is expected to be available in 1999. The strategy will provide:

- Melbourne Water with an expected water yield increase from the catchment. This will enable Melbourne Water to plan for the timing and location of the next major diversion and the resultant capital expenditure.
- NRE with an expected timber yield from the catchment. This will enable NRE to plan for and meet its long-term contractual commitments to sawlog and residual log licensees and underpin investments in the Central Gippsland timber industry.

To meet current sawlog licence commitments and to minimise the impact on long-term water yields, harvesting of ash-eucalypt forest within the catchment will be restricted to an average of 150 ha per year for the period 1987 to 2002. Current silvicultural systems (outlined in Section 6.2) will continue to be used. Strip thinning has been rejected due to the high cost of implementation, lack of suitable sites and problems associated with safety.

Prevention of Soil Erosion

Of the three main types of potential land degradation relevant to forested land (soil erosion, soil compaction and nutrient decline), soil erosion is the most significant in the Central Highlands. It can have undesirable on-site effects, such as the removal of nutrients and soil organisms important for plant growth, and off-site effects on water quality and stream values.

Minimising soil disturbance during timber harvesting and road construction and maintenance operations will reduce the risk of erosion and stream sedimentation. This is addressed by the Code, FMA timber harvesting prescriptions and the Roding Prescriptions for Timber Production in the Central Highlands. The Code includes a definition of stream buffers and filter strips according to soil type and slope. Streams in catchments with soils of low permeability and a high potential for overland flow should have larger buffers than those with soils of high permeability and low potential for overland flow.

Mapping of the different soil types in catchments is not yet available, but broad inferences on soil type and erosion hazard can be drawn from information such as land systems maps. Foresters and soil scientists must determine the appropriate management of harvesting and other operations on the basis of existing information, their assessment of local conditions and the nature of the operation. However, the prevention of soil erosion relies largely on judgements made at the coupe-planning level.

MANAGEMENT GUIDELINE Prevention of Soil Erosion and Stream Sedimentation

The construction of new roads, the maintenance of existing roads and other large-scale forest operations should be carefully evaluated during planning to determine appropriate techniques for preventing soil erosion and stream sedimentation. The following factors should be considered.

- **soil type** - granite-derived soils will generally have a greater erosion risk than soils derived from shales and siltstones
- **annual rainfall** - soils in areas with lower annual rainfall will tend to have a lower organic component and therefore a greater erosion risk than corresponding soils in higher rainfall areas which will generally be better-structured
- **seasonal rainfall** - erosion hazard and sediment runoff will be increased if operations are carried out during or shortly after periods of wet weather. Harvesting should be timed to minimise the possibility of operations coinciding with extended periods of wet weather.
- **slope** - steeper and longer slopes create a greater hazard than flatter and shorter slopes
- **logging technology** - use of rubber-tyred skidders, flexible-tracked machines or cable logging systems reduce soil disturbance and compaction compared with older-style tracked machines used to drag logs to landings
- **coupe planning and design** - management and location of landings, grade and location of snig tracks, widths of streamside reserves and filter strips, the proportion of trees retained on a coupe, and the nature of regeneration operations should be varied to minimise erosion risks
- **roads** - location, design and maintenance of permanent and coupe access roads

Particular attention should be given to preventing soil erosion in catchments containing threatened species which may be susceptible to increased stream sedimentation and in domestic water-supply catchments.

ACTIONS

Prepare field guides which classify soil type to assist assessment of the need for reduced slope limits or increased widths of stream buffers or filter strips.

Prepare management prescriptions consistent with the Code for roads other than those used for timber extraction.

Manage timber harvesting and road construction and maintenance operations in accordance with the Code, the above Management Guideline, the FMA timber harvesting prescriptions and the Roding Prescriptions for Timber Production in the Central Highlands.

Develop a long-term timber harvesting and water production strategy for the Thomson Reservoir catchment in consultation with Melbourne Water when revised timber resource data becomes available in 1999.

Chapter 6

FOREST PRODUCTION

Background

The National Forest Policy Statement, to which both Commonwealth and Victorian governments are signatories, sets out a strategy for the ecologically sustainable management of Australia's forests. The Statement acknowledges the contribution that forest-based industries make to the national economy and regional and local employment. The focus of hardwood production from Victoria's State forests is to supply a sawlog-driven industry which produces value-added wood products.

The forests of the Central Highlands contain timber and other resources of high economic value. Logs taken from State forest are processed into value-added products such as mouldings, furniture, flooring, kitchen benches and laminated beams. An increasing number of these products are sold on export markets. Logs are also sawn into green structural timbers for the Victorian market. The majority of residual logs, which are a by-product of sawlog harvesting, are used by Australian Paper to produce high quality printing and writing papers.

The forest industries which use hardwood logs from State forest are an important part of Victoria's economy. In recent years the industry has invested heavily in drying kilns, planing, moulding and other high-technology equipment. The industry has the potential to contribute to further economic growth and the expansion of employment opportunities. In the Central Highlands, the industry directly employs about 1730 people and provides indirect employment for many more.

The timber industry is well established and depends on a secure and sustainable supply of logs to continue investing in equipment and developing export markets. An emphasis of this plan is to provide the industry with a greater security of supply. This plan achieves this greater level of security by providing increased security for forest biodiversity and cultural values across the Central Highlands. The measures to achieve all of these outcomes are outlined in this chapter and Chapters 3 and 4.

Besides sawlogs and residual logs, other forest products include firewood, craftwood, fencing timber, poles, seed, rock and gravel. Refer to the Statements of Resources, Uses and Values for more detailed information about the availability and nature of these resources.

Aims

To provide a long-term non-declining supply of hardwood sawlogs to the timber industry.

To meet sawlog and residual log licence commitments.

To expand the area of eucalypt forest available for harvesting through reforestation and increase productivity where appropriate.

To use silvicultural treatments and prescriptions that are environmentally and economically sound.

To supply firewood, posts, poles and minor timber products, integrated as far as possible with other forest operations.

To provide for the controlled use of non-renewable resources such as rock and gravel.

To minimise the impact of timber production, exploration, mining or extraction activities on State forest values.

6.1 HARDWOOD TIMBER SUPPLY

Code of Forest Practices for Timber Production (Code)

The purpose of the Code is to ensure that commercial timber growing and timber harvesting operations are carried out on both public land and private land in such a way that:

- a) promotes an internationally competitive forest industry;
- b) is compatible with the conservation of the wide range of environmental values associated with the forest; and
- c) promotes the ecologically sustainable management of native forests proposed for continuous timber production.

The Code establishes goals for environmental care for all commercial timber production activities in Victoria and provides guidelines for the achievement of these goals. Forest Management Plans, Wood Utilisation Plans and Forest Coupe Plans will be consistent with the Code. Prescriptions will be primarily set at the local level in recognition of variable conditions across Victoria. They set minimum standards which are to be met by all licensed forest operators involved in harvesting operations. Operational conditions for each timber harvesting site on public land will be set out in a Forest Coupe Plan.

Net Productive Area

The area of public land designated as State forest and potentially available for sawlog production (among other things) was determined by the Victorian Government through the Land Conservation Council's Melbourne Area District Two Review Final Recommendations (LCC 1994). Within State forest, some forest is unavailable for sawlog production for management and conservation reasons or because it is inherently unproductive or too steep to harvest using ground-based logging systems.

The area of forest both available and suitable for sawlog production is called the net productive area. Sites suitable for sawlog production generally have soils and rainfall conditions that allow suitable eucalypt species to grow to a height of 28 m or greater.

In the Central Highlands, most sawlog harvesting will occur in the 'GMZ - timber production' subzone, which has a net productive area of 203 600 ha. The net productive area also includes 15 700 ha in the Special Management Zone (SMZ). Due to the additional constraints on harvesting to protect the particular SMZ value, only 50% of the sawlog volume from the SMZ was considered as contributing to future sawlog yields. Appendix S provides an area statement by forest management zone and forest type.

Resource Inventory and Yield Modelling

Forecasts of the sustainable yield of sawlogs require data on forest type, age structure, standing volume and growth. A number of inventories have been undertaken across the State forests of the Central Highlands in the past, using a variety of standards. The Statewide Forest Resource Inventory (SFRI) is assessing the forests of the Central Highlands for information including tree species, height, age and standing timber volume. This project commenced in the Central Highlands in 1996. Data for this area is expected to become available in 1999.

When preparing this plan, the STANDSIM growth model (Opie 1972) was used to simulate the growth of an intensive network of inventory plots to produce yield estimates for ash-eucalypt forests. The yield estimates for the mixed-species forests were based on limited sampling and expected harvest volumes. The SFRI program will collect additional yield information in both the ash-eucalypt and mixed-species forests.

Sustainable Yield

Sustainable yield is the rate of sawlog harvesting that can be maintained indefinitely without impairing the long-term productivity of the land while taking into account the present structure and condition of the forest. The sustainable yield of sawlogs from each of the 15 FMAs in Victoria is listed in Schedule 3 of the *Forests Act* 1958. The Central Highlands includes sections of three FMAs. The legislated sustainable yield rates for D+ sawlogs for these FMAs are:

Dandenong FMA	46 000 m ³ net/year ⁴
Central FMA	144 000 m ³ net/year
Central Gippsland FMA	225 000 m ³ net/year.

Beginning in July 1991, the legislated sustainable yield rate is to be reviewed in every five-year period, when there is significant change in the available sawlog resource, or at any other time the Minister considers appropriate.

The 1996 review was limited to converting the existing legislated sustainable yield rates to include all grades of sawlogs. The conversion was based on the proportion of C+ to D grade sawlog harvested in each FMA in the 1995/96 financial year and adjusted using the 1996 log grade audit. This ratio determined the volume of grade D sawlog to be added to the existing sustainable yield rates. Factors not taken into account in the 1996 review were:

- changes to the net productive area arising from the LCC's Melbourne Area District 2 Review – LCC recommendations resulted in a reduction of the net productive area of about 3400 ha across the Central Highlands; and
- changes to net productive area arising from the transfer of hardwood plantations in the Strzelecki Ranges to the Victorian Plantation Corporation – these plantations account for about 10% of the sustainable yield rate in the Central Gippsland FMA.

These factors were not taken into account as other key data associated with this plan were not then available. Too frequent reviews of sustainable yield, prompted by relatively minor changes in relevant data, are considered to have an undesirable effect on timber industry security.

The changes outlined above, together with:

- changes to the net productive area arising from the adoption of this plan's zoning scheme;
- changes to net productive area for the remainder of Central Gippsland FMA when a Forest Management Plan for that area is prepared;
- revised forest growth and yield estimates and forest inventory data supplied as a result of the SFRI; and,
- any required changes to timber harvesting strategies in the Thomson Reservoir catchment as a result of negotiations between NRE and Melbourne Water.

will be considered in the next review, which is due prior to the year 2001.

Plan development and sustainable yield

In developing this plan, consideration has been given to those factors not accounted for in the 1996 review of sustainable yield. Analysis of sawlog availability indicates that, allowing for these factors and for losses which may occur as a result of wildfire, the legislated sustainable yield in each FMA, together with commitments in the Regional Forest Agreement can be achieved. Nevertheless, as the legislated sustainable yield will be reviewed prior to 2001, variations in sawlog licence levels or significant alterations to zoning will not occur before that review is conducted.

RFA implications for sustainable yield

In accordance with the Central Highlands Regional Forest Agreement, the Dandenong, Central and Central Gippsland FMAs are expected to provide as a minimum the total of 415 000 m³ of D+ sawlogs

⁴ Net sawlog volume is the volume of a sawlog minus an allowance for defect.

per annum for the next twenty years, subject to periodic review. As a minimum, 345 000 m³ of licensed D+ sawlogs per annum comprising 20% Alpine Ash and 68% Mountain Ash/Shining Gum will be supplied for the next twenty years from these FMAs. These figures equate to 70 000 m³ of Alpine Ash and 233 000 m³ of Mountain Ash/Shining Gum. NRE will manage the forest estate in the Central Highlands to at least maintain its timber production capacity in terms of volume, species and quality.

Achieving a Non-declining Yield of Sawlogs

One aim of State forest management is to maintain a non-declining yield of sawlogs. The strategies which will be implemented so that the aim will be achieved include:

1. Creating a more balanced age class distribution. A balanced age class distribution provides for efficient long-term log allocation and an increased capacity to supply veteran trees for habitat purposes. The present forest has a high proportion of ash-eucalypt regrowth from the 1939 wildfires and, in the Dandenong FMA, the 1983 wildfires. The major legacy of these fires and the related salvage harvesting are large areas of relatively young uniform-aged ash-eucalypt forest. Most of the harvesting since the mid-1980s has been concentrated in 1939 regrowth stands.

Harvesting of the 1939 regrowth ash-eucalypt forests earlier and then later than the nominal rotation age of 80 years will have the effect of creating a more balanced age class distribution in the net productive area, particularly for the ash-eucalypt forests.

2. Increasing the volume of timber harvested from mixed-species forests to about 20% in the future as significant areas of regrowth approach rotation age. Generally less than 10% of the sawlog allocation is currently produced from the less productive mixed-species forests. Appendix S provides a definition of the mixed-species forest types.
3. Unstocked ash sites will be regenerated through the reforestation program (see Section 6.2).

Achieving a non-declining yield of sawlogs will also rely on:

- Strict adherence to the FMA timber harvesting prescriptions and the zoning scheme outlined in this plan. Any reduction of available harvestable area will have implications for wood supply levels in the medium term.
- Undertaking Timber Stand Improvement operations in degraded mixed-species stands to improve their productivity (see Section 6.2);
- Limiting harvesting to the sustainable yield;
- Maintenance and construction of an adequate network of timber extraction roads;
- Availability of markets for a range of timber products;
- Economically viable and environmentally sensitive timber harvesting and regeneration systems.

Salvage

Events such as wildfire, wind storms, disease or a plague of pest species can lead to substantial areas containing stands of dead or damaged trees. To make some economic use of these trees, timber salvage operations may be implemented. These may require modified timber harvesting prescriptions. Salvage harvesting may occur within State forest subject to the following Management Guideline.

MANAGEMENT GUIDELINE

Salvage

All areas of SMZ and GMZ are available for salvage harvesting following the preparation of a salvage harvesting plan which will be subject to the Code and which will consider:

- flora, wildlife, cultural and water production values
- access to the area
- the volume of timber to be recovered
- the environmental, economic and social consequences of a salvage operation
- rehabilitation of the area following the salvage harvest

Areas of SPZ not available for salvage harvesting are those which contain:

- Code exclusions;
- Leadbeater's Possum Zone 1A habitat;
- Buffers for threatened species which dwell in stream or riparian areas;
- Aboriginal or Historic places.

Areas of SPZ may be available for salvage harvesting and subsequent re-zoning when:

- the impact of the destructive event has led to the SPZ no longer containing the value for which it was identified;
- the value for which the area of SPZ was identified may be better represented by reserving another area of forest in SPZ;
- the value that an SPZ buffer was protecting no longer exists and will not be replaced or when the vegetation contained in the buffer may pose a safety problem.

Proposed amendments to the zoning scheme should ensure that there is no net deterioration in the level of protection of values in the SPZ, nor any long-term net deterioration in timber production capacity. Refer also to the Management Guideline for reviewing management guidelines, management prescriptions and the zoning scheme in Chapter 9.

Sustainable yield forecasts may require review following a major salvage operation.

Residual Logs

The production of D+ sawlogs results in quantities of residual logs also being available for harvesting. These logs are too small or too defective to meet current sawlog specifications and would be left in the forest as waste if not harvested in conjunction with sawlogs. The ash-eucalypt sawlog to residual log ratio over the period 1991/92 to 1995/96 averaged about 1:1.75. The proportion of sawlog is expected to increase in future years, as the average age of the forest increases.

Residual logs have been harvested in conjunction with sawlogs throughout the State forests of the Central Highlands since the opening of Australian Paper's Maryvale mill in 1940. Australian Paper continues to utilise the majority of residual logs to produce high quality printing and writing papers. There is scope to increase the supply of mixed-species residual logs in conjunction with sawlog operations and Timber Stand Improvement programs (see Section 6.2).

Under the *Forests (Wood Pulp Agreement) Act* 1996, Australian Paper Pty Ltd has a legislated supply of residual logs from State forest. The supply levels are:

- 500 000 m³ gross from 1996/97 to 2003/04
- 450 000 m³ gross from 2004/05 to 2006/07
- 400 000 m³ gross from 2007/08 to 2009/10
- 350 000 m³ gross from 2010/11 to 2029/30

The bulk of this wood will come from the State forests of the Central Highlands. The volume supplied from each individual FMA will vary each year.

Specialty Timbers

Species such as Silver Wattle, Blackwood, Myrtle Beech and Sassafras produce timber with attractive colour and grain, making them sought after for furniture and wood turning purposes. Saleable quantities of Silver Wattle and Blackwood may be produced during reforestation operations. Other specialty timbers occasionally become available in small quantities. Whenever a saleable quantity of specialty timbers becomes available, they may be sold under licence or as parcels by public tender.

ACTIONS

Supply sawlogs in accordance with sawlog licence commitments.

Complete the Statewide Forest Resource Inventory of the forest resource, including the development of forest growth and yield models, to provide data for the next review of sustainable yield rates prior to 2001.

Prepare salvage harvesting plans when required.

Supply residual logs in conjunction with sawlog harvesting operations and Timber Stand Improvement programs.

Supply residual logs in accordance with the Forests (Wood Pulp Agreement) Act 1996.

Tender or issue licences for specialty timbers when saleable volumes become available.

6.2 SILVICULTURE

Silviculture involves treating forest stands to achieve management aims which include timber and water production and flora and fauna conservation. Silvicultural treatments include harvesting, regeneration and tending operations, such as thinning. The combination of these treatments form a silvicultural system through which the structure, composition and growth of a stand can be manipulated.

The success of a silvicultural system must be measured by ecological, economic and social criteria. Harvesting and regeneration systems used in the Central Highlands will:

- ensure adequate regeneration of the original species mix;
- obtain the desired growth;
- maximise sawlog yield;
- minimise impact on flora, fauna, cultural or water catchment values;
- incorporate social and economic considerations;
- protect regeneration from excessive damage by factors such as browsing, disease and fire.

Guiding principles for silvicultural treatments in State forest are contained within the Code, while NRE's 'Native Forest Silviculture Guidelines' provide operational procedures and standards, and FMA timber harvesting prescriptions set local standards.

Failure to apply sound harvesting and regeneration practices leads to a decline in forest productivity. This has occurred in some areas of State forest across the Central Highlands. These areas have been degraded by wildfire or former inefficient harvesting and regeneration methods and require specific management actions to realise their potential for timber production.

Intensive silvicultural systems which involve mechanical disturbance may affect the retention of some resprouting understorey species. Measures to aid their retention are discussed in Section 3.2.

Some animal species can cause severe damage to regeneration by browsing the young trees. Control of these species should be in accordance with the 'Control of Pest Animals' Management Guideline in Section 8.1.

Silvicultural Systems

NRE established a major native forest research program, the Silvicultural Systems Project (SSP), in the Central Highlands at Tanjil Bren to test the hypothesis that a better balance between environmental, economic and social concerns can be achieved with silvicultural systems other than clear-felling. From this research and other development work elsewhere in mixed-species forests, the silvicultural systems listed below have been identified as currently and potentially suitable for application in the State forests of the Central Highlands.

Wildlife habitat will be maintained on timber harvesting coupes according to the 'Tree retention on timber harvesting coupes' Management Guideline (see Section 3.1).

Table 6.1 Current and potentially available silvicultural treatments for the State forests of the Central Highlands

<i>Forest type</i>	<i>Silvicultural treatments currently used</i>	<i>Other silvicultural treatments potentially available¹</i>
Ash-eucalypt	Clear-felling Seed tree Thinning Early spacing Reforestation	Retained overwood ² Shelterwood ³
Mixed Species	Clear-felling Seed tree Group selection Thinning Timber Stand Improvement	Early spacing Shelterwood Reforestation

Notes:

- 1 Potentially available treatments are aimed at catering for fauna / landscape values when these are significant.
- 2 Availability is subject to operational development to address costs, productivity and retained tree survival.
- 3 Availability is subject to continued research and development to address safety, costs and productivity.

Table 6.2 Nominal rotation ages of the silvicultural systems currently used in the State forests of the Central Highlands

<i>Forest type</i>	<i>Silvicultural system</i>	<i>Nominal rotation¹</i>
Ash-eucalypt	Clear-felling	80 years
High quality mixed species	Clear-felling / Seed tree	80 years
Low quality mixed species	Clear-felling / Seed tree / Group selection	120 years

Note: Rotation lengths vary depending on the growth rate of the trees, forest type and treatments such as thinning which might be planned during the rotation period and may vary in designated water catchments.

Clear-felling

This widely used and efficient silvicultural system involves the removal of all trees within the coupe, except those retained for environmental purposes, in a single harvesting operation. Seedbeds are then prepared by either high intensity burns or mechanical disturbance. Clear-felling with burning generally satisfies the biological requirements for successful regeneration of eucalypt and understorey species in both ash-eucalypt and mixed-species forests. The trialing of 'understorey islands' which aim to increase the retention of some resprouting understorey species in sites which are mechanically disturbed, is provided in Section 3.1.

Regeneration is achieved either by the application of seed of suitable provenance by aerial or hand sowing, or by planting seedlings. The clear-felling system in ash-eucalypt forest and high-quality mixed-species forest will continue to be the predominant silvicultural system used in the Central Highlands.

Seed Tree

This system involves the retention of about 5 to 10 trees per hectare which carry capsule crops for the supply of seed. The regeneration burn prepares the seedbed and induces seed to fall from the retained trees. If practicable and the trees are merchantable, the seed trees of ash-eucalypt species, which are generally killed by the regeneration burn, are removed as soon as possible after successful establishment of the regeneration. Even-aged regeneration is achieved. In mixed-species forests where the seed trees are more resistant to fire, the seed trees are often retained to provide habitat for wildlife.

The Seed Tree system will be used in years of good seed crops and where suitable seed trees are distributed throughout the coupe.

Thinning

Thinning of stands (the removal of a proportion of the trees) can be undertaken in mixed species and ash-eucalypt forests to increase wood yield by concentrating growth on retained stems.

Substantial areas of regrowth forest exist in the State forests of the Central Highlands. These regrowth forests could be thinned to yield small logs and lead to increased productivity and stand quality.

MANAGEMENT GUIDELINE

Thinning

Commercial thinning of regrowth stands should be directed to stands that:

- maximise the growth of sawlogs. Sites should generally contain even-aged regeneration aged between 14 and 30 years in ash-eucalypt forest and up to 40 years in mixed-species forest.
- allow a properly conducted operation which will minimise damage to retained trees. Sites should generally be:
 - on slopes of less than 18°
 - free of surface rock and old logging debris
- are economically viable. The pre-thinning basal area should average not less than 25m²/ha in ash-eucalypt forest and 30m² in mixed-species forest. The height to the first green branch should average not less than 12 m on co-dominant trees in ash-eucalypt forest and 8 m in mixed-species forest.
- are easily accessible.

Other operational conditions can be found in the 'Guidelines and Prescriptions for Ash Thinning Operations' and 'Thinning of Mixed Species Regrowth' (NRE 1997b).

Subject to favourable financial analysis, suitable stands of ash-eucalypt and mixed species forest will be commercially thinned.

Early Spacing

Otherwise known as pre-commercial thinning, early spacing is the manual or mechanical thinning of a young, dense stand in which the thinnings are not merchantable. The trees may be felled and left, or injected with herbicide. The aim is to concentrate growth on retained stems so as to improve the yield of a commercial thinning of the same stand at a later age. Subject to favourable financial analysis, early spacing will take place in suitable stands of young ash-eucalypt and mixed-species forest.

Reforestation

Due to their fire history, some sites which could sustain ash-eucalypt forest are covered by *Acacia*, bracken and other vegetation. These sites have been progressively reforested across the State forests of the Central Highlands since the 1960s and approximately 5000 ha remain untreated. Reforestation areas are managed as native forest.

MANAGEMENT GUIDELINE

Reforestation

Reforestation activities will focus on:

- sites suitable for growing eucalypts
- old pasture sites or understocked sites (particularly the Toorong Plateau)
- sites adjacent to timber harvesting coupes
- areas of at least 5 ha (unless adjacent to a timber harvesting coupe)
- sites with slopes less than 30°
- sites which are easily accessible

Sowing will be the predominant means of establishment.

Some areas of State forest have been planted with non-indigenous species for the purposes of improved wood production. After the timber on these areas is harvested they will be regenerated with indigenous species.

Group Selection

This technique is applied generally to stands of multi-age mixed-species forest and involves the removal of groups of trees to create an opening in the canopy. Because the size of the gap is small, it can be seeded adequately by natural seedfall from surrounding trees. The cutting cycle (the interval between removal of adjacent groups in a stand) is about 20 years. The system provides an opportunity for maintaining landscape values during harvesting and regeneration.

Group selection has been trialed in ash-eucalypt forests. However, due to safety concerns, generally high costs, frequent site disturbance and the requirement to maintain an extensive road network for an extended period, this system will not be used in the ash-eucalypt forests.

Timber Stand Improvement

Many areas of mixed-species forest in the GMZ were selectively harvested during the 1950s and 1960s and are now dominated by large, unmerchantable trees which are suppressing regrowth. Timber Stand Improvement (TSI) operations involve selective removal of mature and senescent trees from established stands of regrowth, with the aim of releasing the regrowth from competition. TSI operations will be concentrated in high-quality mixed-species forests in conjunction with the production of sawlogs, residual logs and firewood. Wildlife habitat will be maintained in these areas according to the 'Tree retention on timber harvesting coupes' Management Guideline (see Section 3.1).

Retained Overwood

This silvicultural system for ash-eucalypt forests was proposed as a result of wildlife research and requires further operational development and evaluation. The aim of this system is to enhance and increase the area of high quality habitat for arboreal wildlife and to promote a multi-aged forest. It involves the retention of a proportion of existing and potential hollow-bearing trees during harvesting and regeneration operations. Large old trees with good wildlife habitat characteristics are preferred for retention. Where these are not present in suitable densities, regrowth trees can be retained. The exposure of these trees may accelerate the development of hollows.

Smith and Lindenmayer (1988) consider that the availability of potential nest trees ceases to be a limiting factor for hollow dependent possums and gliders in ash-eucalypt forests once about 12 potential nest trees per three hectares are present. Burgess *et al* (1994) considers the long-term retention of about 10% of the basal area (with a minimum of 10 trees per hectare) throughout the rotation to be sufficient to enhance the development of a multi-aged forest. Burgess maintains that in most cases tree retention should be restricted to about 10% of the basal area because of safety considerations and because of the potential for these trees to inhibit the subsequent development of the regrowth.

Where the retained trees are fire-sensitive species, seedbed preparation is currently achieved by mechanical means. Nevertheless research is being undertaken to identify a suitable method that includes

burning, as this will induce better regeneration of acacias, which are an important food source for many arboreal wildlife species in ash-eucalypt forests. Operational trials of the Retained Overwood system will be held in ash-eucalypt forest in areas adjacent to stands of veteran trees.

Shelterwood

This system involves removing the original stand in two fellings, an initial 'regeneration' cut and a 'removal' cut, with the interval between the fellings being normally between 10 and 15 years. The retained trees, which are the seed source, are usually the best quality trees, and comprise 20% to 30% of the basal area of the original stand. Even-aged regeneration is obtained by natural seedfall onto seedbeds prepared mechanically or by burning after the regeneration cut. This system offers advantages through the maintenance of landscape values during harvesting and regeneration.

The system is still in the research/development phase in ash-eucalypt forests. Major concerns of the system include the safety of tree-fallers, the damage caused to young trees when the remaining older trees are removed, windthrow through exposure of the retained trees and the disturbance to the regenerated site during the removal cut. This system will not be used in ash-eucalypt forests but may be considered in mixed-species forest in years when the retained trees have a moderate to high yield of seed or on sites with a high incidence of heavy frosts.

ACTIONS

Identify areas suitable for thinning and subject to favourable financial analysis, prepare a 5-year operations plan.

Identify areas suitable for early spacing and subject to favourable financial analysis, prepare a 5-year operations plan.

Subject to favourable financial analysis reforest unstocked areas where the site quality and accessibility are favourable, particularly on the Toorongo Plateau and sites adjacent to timber harvesting coupes.

Identify mixed-species stands suitable for Timber Stand Improvement treatment and prepare a 5-year operations plan.

Implement and evaluate operational trials of the Retained Overwood silvicultural system in 1939 ash-eucalypt regrowth forest adjacent to stands of veteran trees.

As required, undertake new research projects and review existing projects which examine operational aspects of relevant silvicultural systems.

6.3 OTHER FOREST PRODUCE

Firewood

Firewood from the Central Highlands' forests is in demand by domestic and commercial users from local communities and suburban Melbourne. Steady growth in demand is expected with the increasing number of domestic wood-burning stoves and heaters in use.

Several firewood-collection areas in State forest are open to the public each year. Firewood is supplied from:

- site clearing prior to reforestation operations;
- residual material remaining after normal timber-harvesting operations;
- salvage operations;
- thinning operations;
- Timber Stand Improvement works;
- roadside clearing works.

Providing firewood-collection areas near highly populated areas requires careful planning. The development of a firewood collection strategy for each FMA should include:

- the identification of areas available for firewood collection;
- the incorporation of firewood collection areas with proposed timber harvesting coupes and silvicultural operations and forward roading plans;
- measures to encourage the collection of firewood in the drier months of the year;
- information for collectors;
- road access to collection areas.

Other wood products

The State forests of the Central Highlands produce a variety of other wood products such as fencing timbers, poles and wood-chop blocks. Low volumes of these materials are produced and no significant increase in demand is expected.

Seed and Miscellaneous Products

Seed

NRE's annual regeneration and reforestation operations require considerable quantities of eucalypt seed. Seed is collected from both standing trees and from the crowns of trees felled during harvesting operations. The two major species, Mountain Ash and Messmate do not regularly produce large seed crops, and crown damage by psyllids and leaf fungi have recently contributed to poor seed yields.

MANAGEMENT GUIDELINE
Seed Collection, Storage and Use

To ensure the efficient collection, storage and use of seed, the following actions should be taken:

- collect seed from species and provenances native to the area or general locality where it will be used;
- undertake seed crop assessment by:
 - ground-based assessment of felled trees
 - ground-based assessment of standing trees
 - aerial assessment (this form of assessment should be undertaken during the coupe assessment stage of the Wood Utilisation Planning process);
- re-allocate resources to ensure seed collection is maximised in years of good seed crops;
- implement the seed tree silvicultural system in years of good seed crops;
- protect collected seed from exposure to high temperatures, high humidity and insects;
- perform seed viability tests on all seed lots soon after collection and then every two years;
- undertake further research and development into optimal seed storage and use;
- make seed available to commercial seed contractors, research institutes and conservation and native tree planting groups only when NRE's requirements have been met.

Apiculture

Bee-keepers have made limited use of the State forests of the Central Highlands mainly because of the limited access and difficulty of finding suitable bee sites with water. Preferred sites are those within drier mixed-species eucalypt forests. Access to State forests for bee-keeping is controlled through the issue of annual licences and temporary permits (3 or 6 month), usually under the Forests Act. Apiarists estimate the best flowering times for the desired species and obtain licences to occupy sites accordingly. Bee-keeping is consistent with the broad management objectives of State forest, provided that care is taken with the location and management of apiaries.

MANAGEMENT GUIDELINE
Bee-keeping

Licences or permits for bee farms may be issued in State forest except:

- within 2 km of Reference Areas (scheduled under the *Reference Areas Act 1978*) and the 150 m buffer surrounding the Reference Area;
- within 500-m of developed recreation sites (refer to Appendix Q);
- within 1.6 km of an annual bee site or 0.8 km from an occupied temporary site;
- within the Special Protection Zone where bee-keeping conflicts with the conservation of the values identified in the zone.

New sites may be established after consideration of:

- the general suitability of the site and its proximity to other annually-licensed and temporary sites;
- fire protection requirements;
- the standard of access to the site and the cost of maintaining access;
- the need for a suitable cleared area for the location of hives.

Licensees should be consulted when their sites may be affected by forest management or utilisation activities, or when unsuitably located sites must be moved.

Grazing

The commercial grazing licences issued for State forest cover a total area of just over 100 ha. Licences are issued on an annual basis and are subject to regulations made under the *Forest Act* 1958, standard conditions set out by NRE and special conditions relating to particular licences.

Grazing may compromise forest values through removal of vegetation cover and trampling, leading to loss of habitat, soil compaction and erosion, and the introduction and spread of exotic plants.

MANAGEMENT GUIDELINE	
Grazing	
•	The impact of grazing by domestic stock on State forest should be regularly monitored.
•	Affected licensees should be consulted when the cancellation or modification of licence is under consideration.
•	Sites should be rehabilitated, where necessary, following the cancellation of grazing licences. Responsibility for rehabilitation would depend on licence conditions.
•	No new grazing licences should be issued for State forest.

Other forest products

Table 6.3 indicates the management of the collection of particular forest products.

Table 6.3 Conditions for the licensed collection of other forest products

Product	Management	Comments
Myrtle Beech branchlets	Generally Prohibited	Pruning of Myrtle Beech along roadside areas of the Toorongo Plateau may continue subject to conditions outlined in the Central Gippsland Forest Management Prescriptions. These include: - harvesting will not occur within 40m of Cool Temperate Rainforest - annual review following monitoring for disease within harvested areas - measures to minimise the risk of disease in harvested trees
Moss covered rocks or logs	Prohibited	
Sphagnum moss	Prohibited	
Sawdust from historic places	Generally prohibited	Proposals to be considered on a case-by-case basis by historic place management specialists
Live tree ferns	Permitted	From new road alignments and road widening operations.
Dead tree fern stumps	Permitted	From timber harvesting coupes and new road alignments
Ground ferns	Permitted	Only from new road alignments and widening operations
Specialised foliage	Permitted	Not from rainforest or Victorian Rare or Threatened flora
Seed	Permitted	See management guideline - Section 6.3
Craft timbers	Permitted	See speciality timbers - Section 6.1
Grass tree foliage	Permitted	Refer to FMA timber harvesting prescriptions
Tea tree stakes	Permitted	Not from swamp and riparian areas Refer to FMA timber harvesting prescriptions

ACTIONS

Continue to make firewood and other miscellaneous products available in conjunction with the production of sawlogs and silvicultural operations.

Prepare a firewood collection strategy for each FMA.

Undertake a media campaign before each summer to encourage collection of firewood in dry weather.

Collect and use seed in accordance with the Seed Collection and Use Management Guideline.

Continue to licence bee farms on State forest in accordance with the Management Guideline.

Review current commercial grazing licences to assess the impact of grazing on water quality, soil stability, flora and fauna values and fire management, and modify licence conditions where necessary so that they are consistent with sound land management practices.

Phase out all commercial grazing licences in areas of State forest, which retain their natural values, by the year 2002.

Continue to supply miscellaneous forest produce subject to Table 6.3 and the provisions of the Flora and Fauna Guarantee Act 1988.

6.4 MINING AND EXTRACTION ACTIVITIES

Mineral Exploration and Mining

Under the *Mineral Resources Development Act* 1990 access to State forest for exploration and mining requires a licence and approval of a Work Plan by Minerals and Petroleum Victoria (a division of NRE). Mining Work Plans include rehabilitation plans, and are approved only after consultation with the relevant land management agency. Exploration Work Plans do not require rehabilitation plans, but are subject to a set of conditions which include rehabilitation measures. State and local government planning schemes apply to mining activities except where an Environment Effects Statement has been prepared.

Extraction Activities

Extractive materials include rock, gravel, sand, clay and soil. Most extraction in State forest is from NRE-maintained quarries which supply rock and gravel for the construction and maintenance of forest roads. The resource is limited and not renewable and therefore should be used conservatively. Clay and sand for road base preparation and topsoil for rehabilitation purposes are generally obtained directly from roadside borrow pits and from road widening and realignment works.

Extractive sites are regulated under the *Extractive Industries Development Act* 1995 and are subject to the consent of, and any conditions specified by the Secretary of Natural Resources and Environment.

Quarries and borrow pits can affect other values (especially landscape and water quality) if poorly sited and managed. NRE's management of quarries should be in accordance with a work plan which details proposed access, drainage, fill disposal areas, excavation area and rehabilitation and public safety measures. Disused quarries and gravel pits should be progressively rehabilitated.

MANAGEMENT GUIDELINE
Placing Conditions on Mining or Extraction Activities

The opening of new NRE-managed pits or the consent for extractive activities and the conditions to be applied should be based on:

- the impact of the proposal on the zoning scheme
- the availability of alternative resources on freehold land or at other sites
- the environmental and other impacts of the proposal.

No new extractive activity will be permitted within the SPZ, unless it will make a significant contribution to the regional economy, and unless the values within the SPZ can be maintained or provided elsewhere.

Operational and rehabilitation requirements and approved Work Plans for all mining, exploration and extraction activities should effectively protect forest values. As a minimum, licence conditions, Work Plans and proposed NRE managed extraction activities should address:

- biodiversity conservation
- protection of catchments and streams
- impacts on forest recreation and tourism
- impact on sawlog resources
- impacts on cultural and landscape values
- management and maintenance of forest roads
- rehabilitation and revegetation of the land.

ACTIONS

Prepare a work plan for prescribed quarries managed by NRE.

Progressively rehabilitate disused NRE quarries or gravel pits.

Chapter 7

FOREST ROADS

Background

NRE is responsible for a network of roads within the forested areas of the Central Highlands. This network feeds into the system managed by municipalities and Roads Corporation (VicRoads). A well-planned and maintained road network is essential for forest management and public access. Much of the road infrastructure required for the efficient transport of wood from the forests and for fire protection already exists, although many roads need upgrading. These roads are generally available to the public to access recreational and tourism opportunities in the forest.

Table 7.1 Responsibility for road construction and maintenance in Victoria

<i>Authority</i>	<i>Responsibility</i>
Roads Corporation	Proclaimed main roads and highways
Local government	Roads and legal easements providing access to private property
NRE	Roads and tracks on public land
Victorian Plantations Corporation	Roads and tracks in public land plantations
Commonwealth Government	Financial contribution to the maintenance of access to Commonwealth installations on public land

The main thrust of present NRE roading programs is to rationalise and consolidate access within the forest. Major issues to be addressed include:

- cost and benefits of upgrading existing or building new roads;
- NRE's capacity to maintain the present network;
- closure of redundant roads and rehabilitation to protect environmental values;
- provision of access for timber extraction, fire protection and recreational purposes;
- instances of duplication of access to particular forest areas;
- the design, construction and maintenance of existing and new roads to maximise economic benefits and minimise environmental impacts;
- maintenance and funding of roads within State forest which provide access to private property or access to land managed by other organisations.

The majority of roads in State forest in the Central Highlands were built prior to the introduction of the Code of Forest Practices for Timber Production (Code). The Code specifies minimum standards for road design to ensure public safety and limit environmental impacts. Implementation of the Code has resulted in a progressive improvement in the standard of road construction and maintenance.

In addition to the standards specified by the Code, road management operation should also seek to:

- provide efficient, practical and direct transport routes;
- minimise damage to vehicles and other costs to users;
- minimise damage to the roads;
- minimise the impact on surrounding vegetation, particularly in areas of high conservation significance.

Funding for roads in State forest comes from one of two sources:

- NRE funding. This money is targeted to roads used for fire protection, recreation, and other community purposes.
- A roading charge on all forest produce. This money is spent on the construction and maintenance of roads required for the extraction of timber and minor forest produce. Roothing Advisory Committees, which include representatives from sawlog and residual log licensees, timber harvesting contractors and Australian Paper Plantations Pty Ltd, advise Senior Foresters on planning for and expenditure on these roads.

Minor timber extraction roads are constructed to provide access to timber harvesting coupes from the major logging road network. These roads are closed and rehabilitated once their purpose has been served.

Aims

To identify and maintain a road network in State forest that meets public and NRE needs.

To construct and maintain forest roads to standards adequate for intended uses, safety and minimal environmental impact.

State Forest Road Network

There is a need to identify the network of roads and tracks essential for the use and management of State forest, as well as define their purpose, required standard and maintenance responsibility. Much of the existing road and track network was constructed following the Second World War to access timber, but is now used by NRE for fire protection purposes, by the public for recreation and by the timber industry to extract logs.

Changing demand for access to the timber resource and for fire protection purposes has caused changing levels of resources available for road and track construction and maintenance. As a consequence, some parts of the network need to be extended and many existing roads and tracks need to be upgraded to meet the future needs of the timber industry. Other parts of the network have too many tracks and may need to be rationalised.

The road network required for timber extraction has been identified and is documented in 'A permanent road network for the ash-eucalypt and associated mixed-species forests of the Central Highlands and the Eastern Strzeleckis' (CFL 1988).

MANAGEMENT GUIDELINE

Determination of the Road Network to be Maintained in State Forest

The following process should be followed to determine the road network to be maintained or constructed in State forest:

1. Make an inventory of the current road network
2. Identify the road network to be maintained or constructed. This should include consideration of the following parameters:
 - access to timber resources
 - anticipated usage levels for utilisation purposes over the next rotation
 - proposed seasonality of use for timber harvesting traffic
 - erodibility of soil type
 - difficulty of topography
 - burning strategy, priority zones and strategic fire control lines
 - required location and density of tracks for fire suppression activities
 - proximity of assets / values / communities
 - travel times
 - level of current and expected public use
 - access to existing and proposed facilities and attractions
 - whether or not the road or track is required for a through-route
 - protection of conservation values
3. Consultation with public user groups, including horse riding, 4-wheel driving, deer hunting and bushwalking clubs
4. Implementation. This should include:
 - development of road and track construction and maintenance operations plans
 - seasonal closure of some roads and tracks
 - permanent closure of some roads and tracks
 - restricted access to some roads and tracks

The priority areas for determining the State forest road network should be:

1. Catchments containing threatened flora or fauna that are susceptible to increases in stream sedimentation. These include the Tapinga, Rubicon and Upper Goulburn catchments.
2. Catchments used for domestic water supply purposes.
3. Areas of high timber value.
4. Other areas of State forest.

Road and track closures

Many roads and tracks in the State forest of the Central Highlands were built to carry traffic for a short period or to cater for infrequent use in the drier periods of the year but are now widely used for four-wheel-driving and other vehicle-based recreation. The use of these roads and tracks during wet conditions can be unsafe and can cause serious damage to the tracks, vehicles and environmental values. Following the identification of the road network to be maintained, some roads and tracks may be seasonally, temporarily, or permanently closed, or closed except for management purposes.

NRE is responsible for road closures in State forest, and this is undertaken after consultation with local municipalities and the Victorian Association of Four-Wheel Drive Clubs.

MANAGEMENT GUIDELINE

Road and Track Closures

Roads and tracks should be permanently closed where they:

- no longer serve any useful purpose;
- are potentially hazardous to users;
- cause unacceptable levels of stream sedimentation;
- provide access to environmentally sensitive areas.

Seasonal road closures should be implemented where required to:

- prevent vehicle traffic on roads and tracks which are unsafe during winter;
- limit damage to the road and track network;
- prevent an increase in stream sedimentation;
- protect the road and track surfaces during the winter following road and track construction and improvement works.

Seasonal closures are determined annually and are published in major regional and metropolitan newspapers.

Temporary road closures should generally be implemented for short periods of time, primarily in the interests of public safety while forest management activities are in progress. Temporary road closures should be implemented on those roads:

- considered to be unsafe for vehicular use;
- undergoing management activities, so that recent work may consolidate and settle;
- where continued use could result in damage to the road surface or cause unacceptable reductions in water quality.

Access may be restricted on some roads except for management purposes. These roads may be closed to the public in order to minimise soil disturbance, protect water quality or protect the road surface. In water supply catchments, management of these roads and tracks will be by arrangement between NRE and the catchment authority.

ACTIONS

Prepare in conjunction with local government, the Roads Corporation and the Victorian Plantations Corporation plans that address the funding and maintenance of roads of mutual interest, including those roads that access private property within or adjacent to State forest.

Determine the road network to be maintained in State forest using the process outlined in the above guideline.

Annually review road and track closures according to the above guideline.

Prepare, in consultation with water catchment authorities, an annual road works plan that specifies the maintenance requirements of roads and tracks in restricted access catchments.

Chapter 8

OTHER PUBLIC LAND ISSUES

8.1 WEEDS, PEST ANIMALS AND DISEASES

Background

One of the greatest impacts of European settlement on the biological, productive and aesthetic values of Australian ecosystems has been the introduction of weeds and pest animals. Eradication of well-established pest species is not usually feasible, so control programs should aim to reduce the impact caused by such pests on specific values or areas.

NRE manages substantial areas of land within many catchments. Under Section 20 of the *Catchment and Land Protection Act* 1994 land owners must take all reasonable steps to:

- eradicate regionally prohibited weeds;
- prevent the growth and spread of regionally controlled weeds; and
- prevent the spread of, and as far as possible eradicate, established pest animals.

As weed and disease dispersal mechanisms and pest animal territories cross land management boundaries, control efforts on one parcel of land may be futile if infestations on adjoining land are left untreated. To effectively control pests, NRE works through the 'Good Neighbour Program' with landholder groups and local government to identify pest control needs and to undertake coordinated work on both public and private land.

Aims

To minimise the impact of pest plants, animals, insects and diseases on the biological, productive and aesthetic values of State forest.

To coordinate pest control operations across the public and private land boundary.

To prevent the introduction of new pests into the Central Highlands, and the spread of pests into priority areas.

Planning for Pest Species Control

Effective pest species control requires well planned and designed programs. This requires that the priorities for control of pest species in State forest have regard not only to the management aims of State forest but also the overall catchment priorities expressed in the Regional Catchment Strategies. It also requires consultation and coordination with regional Catchment Management Authorities and, where necessary, with Landcare groups and individual landholders to develop agreed priorities and implement joint action.

To achieve effective pest control, a rolling three-year work plan will be introduced. This approach will:

- ensure pest species control programs will be implemented within the framework established by this plan;
- provide a vehicle for consultation with Catchment Management Authorities and community groups;
- ensure funding is allocated to areas of greatest need;
- ensure any necessary follow-up works are identified in advance and included in annual programs.

MANAGEMENT GUIDELINE
Pest Species Control Programs

Programs should be conducted:

- with due regard to cost and efficiency;
- using methods which are defined in relevant NRE policies and guidelines;
- in consultation with relevant Catchment Management Authorities and Landcare groups;
- with an evaluation program.

Preparation and implementation of programs for State forest in the Central Highlands should be based on the framework established by this plan and relevant legislation and policy. These programs should be prepared on a rolling three-year basis and include:

- maps showing the location of areas proposed for treatment;
- any cooperative management arrangements with adjoining land managers;
- the nature of infestations;
- the threat posed by infestations;
- control methods to be used;
- necessary follow-up works.

Priority Areas for Pest Control on State forest

Pest control programs will focus on limiting the damage caused by pests to the priority areas listed in Table 8.1. In addition, small, isolated infestations of potentially harmful pests on State forest, that could feasibly be eradicated, will be given a high priority.

Table 8.1 Priority areas for pest species control

<i>Site</i>	<i>Priority</i>
• Reference area buffers and areas adjoining conservation reserves	High
• Known sites of species or communities listed under the <i>Flora and Fauna Guarantee Act</i> 1988 or other areas of high conservation significance	High
• Sites containing Victorian Rare or Threatened flora species, nesting sites of threatened fauna	High
• Areas where NRE and landowners have cooperative projects to control pest species on their respective land	High
• Areas containing recently disturbed soil - particularly along new road alignments or recently harvested logging coupes	High
• River frontages	Medium
• Popular recreation and historic sites	Medium

Weeds

The disturbance resulting from timber harvesting and other management activities can provide opportunities for some weed species to establish, which can adversely affect the survival or regeneration of indigenous species. To prevent this, field staff need to be made aware of noxious and environmental weeds, hygiene measures to reduce the risk of weed spread need to be developed and implemented, weed infestations should be routinely recorded, and new infestations eradicated.

Weeds may be declared to be 'noxious weeds' under the provisions of the *Catchment and Land Protection Act* 1994. The Act also provides for their categorisation as State prohibited, regionally prohibited, regionally controlled or restricted (see Table 8.2).

Table 8.2. Classification of weeds under the *Catchment and Land Protection Act 1994*

<i>Category of weed</i>	<i>Definition</i>
State prohibited	a) it does not occur in Victoria; or b) it occurs in Victoria but it is reasonable to expect that it can be eradicated from the State.
regionally prohibited	c) it is not widely distributed throughout the region; and d) it is capable of spreading further in the region; and e) it is reasonable to expect that it can be eradicated from the region.
regionally controlled	f) it occurs in the region; and g) it is capable of spreading further in the region and should be stopped from doing so; and
restricted	h) to prevent its spread, continuing control measures are required. i) it is a serious threat to primary production, Crown land, the environment or community health in another State or Territory; and j) it has the potential to spread into and within Victoria; and k) if sold or traded in Victoria there would be an unacceptable risk of it spreading within Victoria and to other States or Territories.

At present, no State prohibited weeds are known to occur in the State forests of the Central Highlands. Regionally prohibited and regionally controlled weeds occurring in, or on the margins of, State forest are listed in Appendix T.

Blackberry in particular poses a very serious threat to many areas of State forest throughout the Central Highlands. This regionally controlled weed is invasive and, once established, can spread readily through undisturbed forest. It is particularly prevalent in riparian areas and areas which have been subject to soil disturbance, such as along roads and tracks. The species forms impenetrable thickets which inhibit the regeneration and growth of indigenous species and its thickets cause access problems, particularly for recreationists. Blackberry thickets also harbour rabbits and other pest animals.

Due to the extent of the infestations across the Central Highlands, eradication of the species is not considered feasible. NRE funds research into blackberry control measures. Current control measures include biological and chemical treatment. Spraying programs are usually directed to roadsides, near popular recreation areas, land adjoining private property and river frontages. In the future, control programs will be directed to areas listed in Table 8.1 and in accordance with the Pest Species Control Program Management Guideline.

Some naturalised non-indigenous plants pose a threat to forest values by altering the native plant community composition and structure and by affecting forest production through competition with regrowth trees. These plants, regarded as 'environmental weeds', are often escaped pasture or garden species and may not have been proclaimed as noxious weeds. Appendix T also lists some of the more significant environmental weeds found in the State forests of the Central Highlands.

Spraying with herbicide, or cutting and poisoning are the main methods of control of pest plants used in forests. In areas of State forest close to population centres, mechanical removal and spraying of weed infestations are also used as fire prevention measures. NRE is continuing to investigate improved control methods for pest plants.

MANAGEMENT GUIDELINE
Control of Weeds

Resources should be allocated for weed control on State forest so NRE can take all reasonable steps to:

- eradicate State prohibited weeds
- eradicate regionally prohibited weeds
- prevent the growth and spread of regionally controlled weeds, especially where these have an impact on State forest values
- where feasible, eradicate new weed infestations of any classification
- prevent the growth and spread of environmental weeds which have a significant effect on ecosystem diversity.

Direction of resources to particular infestations should account for:

- the classification of the weed under the *Catchment and Land Protection Act 1994*
- their impact on State forest environmental or economic values
- their impact on neighbouring parks, reserves, reference areas or nearby agricultural land (in keeping with the Good Neighbour Program)
- the potential for successful eradication or control.

The effectiveness of weed control programs should be monitored to:

- ascertain the rate of control or further spread
- determine if follow-up work is required
- determine if control practices require modification.

Plant Diseases

Many plant diseases are endemic in the forest and their impact on forest ecosystems depends on how the pathogen reacts with climate, soil type, aspect, altitude and disturbance. The two main diseases within the Central Highlands that have management implications are Myrtle Wilt and Cinnamon Fungus. Other fungi can periodically cause severe local infestations which may lead to defoliation and dieback and, in severe cases, the death of plants. The areas affected are generally small in area, however, and outbreaks are infrequent.

Cinnamon Fungus (*Phytophthora cinnamomi*)

A water-borne fungus that moves through the soil when it is in a saturated condition, Cinnamon Fungus attacks plants through their roots. It is lethal to plants in many different taxa (Marks and Smith 1991). As roots are killed by the fungus, the absorption of water and nutrients from the soil is restricted, resulting in dieback of the branches. Disease is favoured by the following conditions:

- fluctuating soil saturation;
- poor internal soil drainage;
- soils of low fertility containing little organic matter;
- soil temperatures of at least 15°C.

Cinnamon Fungus is present at lower elevations where it causes sporadic patches of dieback. It is uncommon in higher elevation areas.

The disease is primarily spread through infected gravel used in road construction, infected soil adhering to off-road vehicles and other machinery, and through infected nursery plants. The principal control measures used by NRE are land quarantine to slow fungal spread and stand manipulation by providing for large numbers of seedlings to facilitate natural selection for disease resistance.

Myrtle Wilt

Myrtle Wilt is a fungal disease of Myrtle Beech (*Nothofagus cunninghamii*). It is caused by the pathogenic fungus *Chalara australis*. Infection of root and outer stem wood first causes conspicuous wilt symptoms in tree crowns, and ultimately death of the whole tree. Most infections are believed to spread through air-borne inoculum entering stem and branch wounds (Burgman and Ferguson 1995) although some may also spread by root fusion in dense stands.

The disease is known to occur in Cool Temperate Rainforest throughout the Central Highlands, generally at low levels of infection, but occurs at higher levels in some areas, notably in the Watts and O'Shannassy River catchments and on the southern face of Mount Donna Buang (Cameron and Turner 1996). Physical damage to trees is implicated in the spread of the disease. Damage occurs naturally through events such as branch fall. Road construction and timber harvesting operations are a potential source of damage.

Presently there is no comprehensive understanding (either at the local or landscape level) of the range of key factors operating in Victoria which affect disease spread and the level of infection. The risk of the disease spreading as a result of current management activities in State forest is considered low because:

- rainforest patches greater than 0.4 ha in area, including their minimum buffers of 40 m, are included in the Special Protection Zone;
- Annual Code of Forest Practices for Timber Production audits indicate that disturbance to retained areas (including rainforest and associated buffer) as a result of logging operations is negligible;
- windthrow of trees retained around timber harvesting coupes is an infrequent and low-level occurrence across the Central Highlands. A study is being undertaken to assess the extent of windthrow in buffers containing Mountain Ash.

The width of buffers surrounding rainforest will be reviewed if research demonstrates that damage to rainforest and associated buffers as a result of timber harvesting operations is not negligible.

MANAGEMENT GUIDELINE

Myrtle Wilt

Forest management and utilisation operations in State forest aim to prevent or minimise the spread of Myrtle Wilt and to rehabilitate infected stands where appropriate. This includes:

- Preventing the wounding of Myrtle Beech which is essential to minimise fungal infection. Options for disease prevention or minimisation in State forest will include:
 - avoiding damage to Myrtle Beech trees within coupes or at the edge of buffers when harvesting in eucalypt forests with a Myrtle Beech understorey
 - avoiding damage to Myrtle Beech trees during road construction or maintenance operations
 - removing or destroying stems and branches damaged during timber harvesting or road construction or maintenance operations
 - treating wounds with chemicals
 - providing Myrtle Wilt awareness programs for land managers and the public.
- Rehabilitating infected stands. NRE will investigate the effectiveness of rehabilitating infected stands through active promotion of seedling regeneration and growth of Myrtle Beech.
- Research. Burgman and Ferguson (1995) included a number of research proposals regarding Myrtle Wilt. These proposals will be considered when determining NRE's research program.

NRE is undertaking a study of the association between management history and disease status which includes determining the effectiveness of current management prescriptions.

Insect Pests

Insect pests affect forest ecosystems through the loss of foliage and death of trees. The main insect pest in State forest in the Central Highlands at present is the psyllid, *Cardiaspina bilobata*. This insect has affected significant areas of Mountain Ash forest, killing some stands. Research is being undertaken to

determine the reasons for the present outbreak and the most appropriate methods of control. A psyllid management plan (CNR 1995d) has been developed.

MANAGEMENT GUIDELINE
Control of Pest Insects

Psyllid (*Cardiaspina bilobata*)

Outbreaks of Psyllids occur frequently and can be widespread. Defoliation can be severe, leading to the death of the tree, but usually only causes a serious loss of canopy. Psyllid attacks have a potentially significant impact on overall forest growth and volume production. Attacks have increased on stands of Mountain Ash in recent years.

Action Implement the Psyllid Management Plan.
 Continue current research program into Psyllid biology.

European Wasp and English Wasp

These introduced, predatory, social insects become scavengers in urban or forest recreation areas

Action Destroy nests of European and English wasps in State forest as they are discovered.

Feral bee (introduced Honey Bee)

Feral bees become established in the wild after escaping from domestic hives. They are thought to compete with native pollinators and their hives may harbour disease which can infect domestic hives.

Action Report locations of feral bee hives when found near licensed apiarists' hives
 to the affected apiarist.

Pest Animals

Pest animals such as foxes, cats and feral dogs threaten indigenous fauna through direct predation and competition for habitat and feed. In addition, pests such as feral pigs and rabbits have the potential to cause erosion and aid the invasion of weeds into native forests.

As well as affecting forest values, these pests can have a major impact on adjoining agricultural land. Effective control of pests involves cooperation between neighbouring land managers. Group pest control schemes result in better success and yield greater community and NRE benefits.

MANAGEMENT GUIDELINE
Control of Pest Animals

Priority should be given to control of Prohibited, Controlled, Regulated or Established pest animals as required by the *Catchment and Land Protection Act 1994* and to the management of threatening processes listed in Schedule 3 of the *Flora and Fauna Guarantee Act 1988*.

Direction of resources to particular pest species should account for the potential for successful eradication and control as well as for their impact on:

- State forest environmental or economic values
- the conservation of rare or endangered native flora and fauna
- neighbouring parks, reserves and reference areas
- neighbouring agricultural land.

Pest animals of particular importance for control across the Central Highlands include:

- rabbits, because of browsing regenerating trees and their impact on agricultural land
- foxes, because of the ecological impacts and the threat they pose to livestock
- feral goats, pigs and domestic animals, because of their potential to cause serious damage to forest environments and their potential role as disease vectors
- feral cats, because of their impact on native wildlife
- feral dogs, because of their threats to native wildlife and livestock

Pest control programs should be monitored to:

- ascertain effectiveness of control
- determine if follow-up work is required
- ascertain effects on non-target species
- determine if control practices require modification.

ACTIONS

Prepare and implement three-year pest species control programs for State forest based on the Management Guideline for Pest Species Control Programs, the priority areas listed in Table 8.1, the Pest Plant, Animal and Insect Control Guidelines and relevant legislation and policies.

Develop competencies in field staff in the identification of and control methods for pest species.

Develop weed hygiene measures to be implemented during and after forest operations.

Continue to develop improved methods of pest species control.

Implement the Myrtle Wilt Management Guideline in order to minimise the spread of Myrtle Wilt.

Develop Myrtle Wilt awareness programs for land managers and the public.

8.2 FIRE MANAGEMENT

Background

The forests of the Central Highlands are amongst the most fire-prone in the world because of the mountainous terrain, flammable vegetation and hot summer winds. Most fires within the forests of the Central Highlands are started either by deliberate lighting or lightning.

Fire management on public land within the Central Highlands is governed by the Code of Practice for Fire Management on Public Land (CNR 1995c) and the Dandenong Region, Gippsland Area (Central Gippsland Region) and draft Alexandra Region Fire Protection Plans (FPPs). This Forest Management Plan, therefore, does not address fire management in detail. The Statements of Resources, Uses and Values provide more detailed information.

Aim

To ensure that management strategies established in this plan and those in the Regional Fire Protection Plans are complementary.

A key element of the FPPs is a fuel-management strategy based on five zones. This strategy is designed to help protect life, property and public assets while taking into account environmental, economic and social factors. Fuel-reduction burns are undertaken in three of the strategically located zones to maintain fuel to defined hazard levels. This should ensure that fires that start within, or spread into fuel reduced areas should burn at a lower intensity and be easier to suppress than those in areas carrying higher fuel levels.

Frequent fuel-reduction burning may adversely affect certain biological values or kill young regrowth resulting from previous fires or timber harvesting. To some extent, these issues have already been considered in the fire plans. Areas containing significant biological, cultural or economic values which can be damaged by fire are generally located in Zone 5, in which prescribed burning is excluded.

In addition to fire-prevention operations, NRE generally suppresses wildfires before they burn to their natural extent. Melbourne Water pursues a similar fire exclusion policy in the water catchments. Due to the absence of reliable data, the response of flora and fauna communities to the long-term effect of artificial regulation of fire intensity, frequency and seasonality is unknown. Nevertheless, the creation of a mosaic of burnt and unburnt areas is probably the most effective mechanism to ensure the maintenance of populations of all species over a broad area.

ACTIONS

Review fuel reduction burning operations in areas containing fire sensitive biological values when the Regional Fire Protection Plans are revised.

8.3 OCCUPANCIES AND UTILITIES

Background

Public land administration includes managing leases and licences for occupancies, pipelines, grazing and bee farm sites that occur on public land. Many individuals, organisations, municipalities and other government bodies hold leases and licences on State forest. Some public utility installations and the associated clearing works can have a significant impact upon landscape values as well as provide openings in the forest for colonisation by pest plants and animals. New installations will be directed to existing easements where possible.

The State forests of the Central Highlands are also used by organisations for research and training purposes and for the location for some commercial films. Permit conditions for some of these activities are found in NRE policy documents.

Forest management practices, particularly fire management and pest plant and animal control can have an impact on adjoining landowners and the wider community. Due consideration should be given to the requirements and wishes of individuals who own or manage private land adjacent to State forest. The Statements of Resources, Uses and Values provide more detailed information.

Aims

To minimise the impact of existing and proposed public utilities and uses on flora, fauna, cultural and timber values and forest roads.

To foster good relations with landholders adjacent to public land.

Activities in State forest

Land in State forest is used by organisations such as universities and other tertiary institutions, NRE and other public and private organisations for research purposes. The location of some research plots are known, but NRE field staff have not been informed of the location of others. NRE has an obligation to license occupancies on public land, including research sites. Accordingly, a register of research sites will be developed and the sites licensed, where appropriate. This will also help ensure that forest management activities will not inadvertently affect the research.

The State forests of the Central Highlands also provide a venue for the training of military, police and emergency service personnel. Generally these training exercises have little impact on the forest but, unless properly managed, may cause alarm to other forest users. Training exercises will be encouraged in the appropriate recreation management zone (see Table 4.1). A permit system is required for training exercises.

Licences and Leases

NRE issues a range of licences and leases for a wide variety of activities and uses in State forest. All public land in the planning area has been divided into 'parcels', each with a unique identification number. To administer land parcels, the NRE uses a computer-based Land Information Management System which records all leased or licensed activities currently permitted on a given parcel, as well as the details relating to those activities.

MANAGEMENT GUIDELINE
Licences and Leases

The granting or review of licences and leases on State forest should take the following into account:

- the zoning scheme established by this plan;
- the Recreation Management Zones (refer to Section 4.4);
- the impact of the licensed activity on biodiversity, cultural or catchment values;
- the impact of the licensed activity on other forest users (exclusive use by recreation groups or users will not be encouraged).

Affected licensees should be consulted when the cancellation or modification of a licence is under consideration.

The licensed area should be rehabilitated, where necessary, progressively or following the cancellation, expiration or surrender of the licence.

The licensed area should be monitored to assess its impact on State forest values.

ACTIONS

Develop a register of research sites in State forest in the Central Highlands and provide occupancy licences where appropriate.

Where required, introduce a permit system for military, State Emergency Service and police training exercises and a map showing appropriate sites for these activities.

Review existing or proposed licences and leases on State forest in accordance with the Management Guideline and renew or grant as appropriate.

Chapter 9

PLAN IMPLEMENTATION

The Forests Service comprises four business units:

Forest Management	Responsible for policy formulation and planning for the conservation of forest values and sustainable use of forest resources on State forest
Commercial Forestry	Responsible for commercial State forest utilisation and regeneration activities and ensuring that they operate within the policy and planning parameters
Fire Management	Responsible for co-ordinating the management of fire prevention and suppression on public land in Victoria
Centre for Forest Tree Technology	Responsible for providing information through research for the management of private and publicly-owned native forest and plantations.

Each of these business units will play a role in the implementation of the Forest Management Plan over the next ten years. The Regional Forest Managers in the North East and Gippsland Regions of NRE will be responsible for ensuring overall implementation of this plan which will entail:

- adoption of the zoning scheme and management guidelines and prescriptions for forest management and utilisation activities;
- implementation of specific actions;
- ensuring that plans to harvest within the SMZ conform with the aims of that SMZ;
- ensuring that salvage plans are produced in accordance with the Management Guideline for salvage operations;
- ensuring that modifications to the zoning scheme or other management strategies conform to the aims and targets established in this plan;
- reporting on the effectiveness of the plan and its implementation.

The Forest Management Branch will be responsible for:

- ensuring that management strategies are up-to-date and based on the best available information;
- monitoring the implementation of this plan;
- reviewing sustainable yield when the SFRI data becomes available.

The Senior Foresters from the Central Gippsland, Dandenong and Central Forest Management Areas will be responsible for:

- all actions relating to commercial forest utilisation, including harvesting and regeneration, regrowth management, sawlog and residual log production and other commercial uses of forest produce.

Wood Utilisation Planning

While the zoning scheme establishes the area of State forest available for timber harvesting, the volume of forest products to be supplied is specified in sawlog licences issued on the basis of sustainable yield forecasts. Sawlog licence conditions require NRE to provide licensees with Wood Utilisation Plans (WUPs) by 31 March each year. WUPs specify the individual areas (coupes) of State forest that are approved for harvesting to meet licence commitments. They are supplied to sawlog licensees who then organise the harvesting and transport of the logs. Harvesting is supervised by NRE and must be conducted by licensed operators in accordance with the Code. The Senior Forester of each Forest Management Area is responsible for the preparation of the WUP and the day-to-day management of the forest for timber production.

In the past, preparation of WUPs involved individual consideration of each proposed timber harvesting coupe to ensure compliance with policy commitments to conserve forest values (flora, fauna, landscape,

soil and recreation opportunities). Much of the information formerly used to check individual coupes has been used to develop the management strategies and zoning scheme in this plan. This will streamline preparation of WUPs and remove some of the delays and difficulties inherent in the old system. New information will be considered with a view to the possible amendment of the zoning scheme or management strategies rather than considering coupes in isolation.

Reviewing the Plan

The management of Victoria's State forests is based on the best available information and provides an innovative and progressive approach to natural resource management. This plan allows for the refinement of management guidelines, prescriptions and the zoning scheme in response to new information or changes in government policy, community expectations, technology and timber market conditions. Refinements will be made in an objective, systematic manner to avoid disruption to the forward planning and conduct of timber harvesting operations. A multi-disciplinary approach is essential to this process.

Where a change to zoning is proved to be warranted, any significant proposed changes will be made available for public viewing and comment in conjunction with the WUPs. Following consideration of comments received and relevant specialist advice, approval will be sought from the Secretary of NRE for adoption of the revised zones.

This Forest Management Plan applies until 2008 or until other circumstances warrant a major review.

MANAGEMENT GUIDELINE

Reviewing Management Guidelines, Management Prescriptions and the Zoning Scheme

Management guidelines and prescriptions in this plan may be reviewed under the following circumstances:

- when new information on the impact of forest management or utilisation activities on biological or cultural values becomes available;
- if the status of a threatened species changes;
- if new species are identified that are considered to be threatened;
- when monitoring of the practical implementation of the plan indicates that improvements can be made;
- as required by new legislation, policies or action statements.

Management zone boundaries may require review if:

- changes to management strategies for certain species or values mean that the zoning system is more or less than adequate for those values;
- field inspections or better mapping indicate that minor amendments are required to create practical management boundaries or to more accurately define the location of a particular species or value. At the scale of mapping used in this plan, the boundaries of some values, particularly rainforest, Leadbeater's Possum Zone 1A habitat, rare EVCs and old growth forest, cannot be accurately defined. The zones on Map 2 indicate only the general location of these values.
- the zone does not contain the values for which it was identified - amendments may be required to ensure that conservation targets are met;
- new records are listed for species whose conservation targets have not been met;
- new records of some species warrant changes to zones to include areas of good-quality habitat in exchange for areas of poorer-quality habitat;
- existing boundaries are found to place unnecessary restrictions on the practical access to areas for timber production or for infrastructure development (easements etc).

Proposed changes to the zoning scheme will be assessed according to whether they:

- ensure the CAR Reserve System continues to comply with the JANIS Reserve Criteria;

- adequately conserve the CAR values identified in the Comprehensive Regional Assessment datasets;
- ensure there is no net deterioration in the level of protection of identified CAR values in the Special Protection Zone;
- will maintain the protection of national estate values at the agreed regional scale, noting that as a result of any change to the CAR Reserve System in State forest, some minor changes to individual values may occur;
- consider the maintenance of National Estate protection;
- conserve the values highlighted in the zoning scheme register of this plan;
- maintain a well-distributed, inter-connected network of protected areas;
- at least maintain the timber production capacity of State forest in terms of volume, species and quality;
- minimise practical problems for timber harvesting or access in the General Management Zone;
- make the best use of areas that are unavailable for timber harvesting due to other considerations such as slope, access and site quality;
- avoid conflict with strategic burning zones.

Monitoring

NRE's aim is to manage the forests of the Central Highlands so that the forests' natural and cultural values are maintained and the use of the forests' resources provide long-term community benefit. Integral to achieving this aim is the development of criteria and indicators against which the effects of forest management and utilisation activities on the forest's natural, cultural and economic values, can be determined (see also Section 3.3).

NRE has a number of processes established to monitor forest management and utilisation activities, including:

- Regular audits of timber harvesting operations in State forest are undertaken to provide information on implementation of the Code of Forest Practices for Timber Production;
- Water quality in a number of State forest streams is regularly monitored through the Victorian Water Quality Monitoring Network. Data from this can be used to detect trends in water quality and yield in forest catchments;
- All timber harvesting and other management operations are recorded each year;
- Forest sawlog growth and standing sawlog volume and residual log volume is monitored through measurement of the Permanent and Continuous Forest Inventory plots;
- Timber volumes harvested are recorded and compared with forest growth and yield estimates and forecasts of sawlog sustainable yield;
- Visitor numbers are recorded at a number of recreation sites;
- The Statewide Forest Resource Inventory (SFRI) project is establishing consistent descriptions for forests throughout Victoria and will provide a baseline for future monitoring of changes in the condition of the forests;
- The Pest Management Information System provides a means of recording pest infestations and reporting on the effectiveness of control programs;
- The Wildlife Atlas and Flora Information System provide means of collecting and reporting on flora and fauna data from a wide range of sources;
- Geographic Information Systems assist in data recording and storage, and enable the analysis of data sets to examine the effects of proposed forest operations on forest management zones and to determine the area subject to harvesting.

In addition, many of the current research programs aim to increase our understanding of the impact of natural and human-induced processes operating throughout the forest. The results of this research and the research needs identified in this plan will improve the effectiveness of NRE's monitoring programs. Research needs identified in this plan include determining:

- the habitat requirements and population dynamics of large forest owls;

- the extent of the critical habitat zone of the Spotted Tree Frog;
- the seasonal use of breeding and non-breeding habitat and the response to disturbance in Montane Wet Forest by the Baw Baw Frog;
- the impact of timber harvesting on water yields;
- effective methods for pest species control;
- the extent of windthrow in buffers containing Mountain Ash;
- the extent of damage to rainforest and associated buffers as a result of timber harvesting operations;
- the association between forest management history and Myrtle Wilt status which includes determining the effectiveness of current management prescriptions;
- the reasons for the outbreak of psyllids and appropriate methods of control;
- the response of flora and fauna communities to the long-term effect of artificial regulation of fire intensity, frequency and seasonality.

Reporting

Implementation of this plan is a key step to ensuring careful management of the Central Highlands' State forests. Accordingly, it is important to regularly review and report on its implementation. These reviews will provide the basis for systematically adapting the plan to changing information and circumstances and thus, ensuring it remains relevant.

ACTIONS

Each year the Regional Forest Managers in the Gippsland and North East Regions will:

- *Certify to the Regional Managers - Gippsland and North East Regions that the Wood Utilisation Plan prepared by the Senior Foresters - Central, Dandenong and Central Gippsland FMAs conforms to this plan*
- *Provide prescriptions for the preparation of coupe plans for harvesting in the Special Management and General Management Zones*
- *Consider new information and, if necessary, make recommendations on possible refinements or amendments to management strategies or the zoning scheme*
- *Make available for public inspection and comment an up-to-date zoning map, a list of any proposed zone amendments and proposals for harvesting in the SMZ*
- *Prepare an annual report on the implementation of this plan. This report may include information on significant outcomes such as:*
 - * *implementation of biodiversity management guidelines, new records of threatened species, and any observed responses to management initiatives*
 - * *key timber production data such as area and volume harvested by product type and areas subject to stand improvement operations critical to the maintenance of sustainable yield*
 - * *water quality and yield prescriptions*
 - * *implementation of pest plant and animal control guidelines*
 - * *major road maintenance or construction works*
 - * *compliance with the Code of Forest Practices for Timber Production and the Timber Harvesting Regulations*
 - * *significant research outcomes.*

Develop and progressively implement criteria, indicators and monitoring programs for forest biodiversity, water quality and other environmental values.

Links with the Central Highlands Regional Forest Agreement

In March 1998, the Prime Minister of Australia and the Premier of Victoria signed the Central Highlands Regional Forest Agreement (RFA). The RFA established the framework for the future management of forests in the Central Highlands. Importantly, it satisfied the environmental protection and industry development requirements of both Governments, ensuring a durable basis for future planning and investment.

The RFA formally accredits the Central Highlands Forest Management Plan as part of Victoria's Ecologically Sustainable Forest Management system. The RFA also makes reference to several other issues associated with the plan. These are summarised below.

CAR Reserve System

In the Central Highlands, the comprehensive, adequate and representative (CAR) reserve system on public land primarily comprises areas established for conservation purposes (e.g. National and State Parks) and areas set aside for conservation within the SPZ in State forest. In signing the RFA, the Commonwealth and Victorian Governments have agreed that the CAR reserve system satisfies the National Reserve Criteria.

Sawlog Production

The Commonwealth and Victorian Governments acknowledge that the RFA is expected to provide as a minimum the current legislated sustainable yield of D+ sawlogs (415 000 m³ per annum) from the Dandenong, Central and Central Gippsland FMAs for the next twenty years, but recognise that sustainable yield levels in Victoria are subject to periodic reviews. However, Victoria is committed to supply, as a minimum, the current licensed volume of D+ sawlogs (345 000 m³) for the next twenty years from these FMAs. NRE will manage the forest estate in the Central Highlands to at least maintain its timber production capacity in terms of volume, species and quality.

Residual Log Utilisation

The RFA satisfies the requirements of three Commonwealth Acts:

- the *Australian Heritage Commission Act 1975*;
- the *Environment Protection (Impact of Proposals) Act 1974*; and
- the *Endangered Species Protection Act 1992*.

The export of hardwood woodchips or unprocessed wood sourced from Central Highlands will not be subject to controls under the *Export Controls Act 1982* while the RFA is in place.

Integrated Forest Planning System

Victoria has developed a system of linked computer-based tools collectively called the Integrated Forest Planning System (IFPS). The IFPS provides a means of modelling the growth, development and harvesting of forest stands as well as a range of other forest values. Its major application to date has been in forecasting sustainable sawlog yields in the Otway and Midlands Forest Management Areas and in parts of the Central Highlands planning area.

Application of the IFPS for the whole Central Highlands was prevented by a lack of suitable spatially-referenced forest stand information. This information will be provided by the Statewide Forest Resource Inventory (SFRI) (see chapter 6). The RFA commits Victoria to implementing IFPS in time for the next review of sawlog sustainable yield in Central Highlands which is due in 2001.

Management of Cultural Values

The RFA commits the Victorian and Commonwealth Governments to joint development of a package of measures that will be implemented by Victoria to ensure the appropriate management of Aboriginal heritage values in the Central Highlands. These measures are the development of Statewide guidelines for the management of cultural heritage values, provision of participation and negotiation through the establishment of formal consultation mechanisms with local Aboriginal

communities; modelling to establish priority areas for future surveys of Aboriginal sites; and, training of staff.

National Estate

The RFA recognises that many of the national estate values are well reserved in the CAR reserve system and that this Plan and other mechanisms provide for the conservation of many other national estate values in the region. All national estate values in the Central Highlands will be conserved through the application of the principles for managing national estate values as detailed in this Plan.

Management zone boundaries may require review in implementing this plan. Best endeavours will be used by NRE to maintain the levels of protection of national estate values in a regional context, however, minor changes to the levels of protection of individual values may occur as a result of changes to the SPZ through time as new information becomes available.

Monitoring and Reporting

The RFA commits the Victorian and Commonwealth Governments to joint development of an appropriate set of indicators to monitor and review the sustainability of forest management practices. The Governments have agreed that any indicators established will be consistent with the criteria established under the Montreal Process, and will take into account the framework of regional indicators developed by the Montreal Process Implementation Group. These processes further advance the monitoring and reporting commitments in this plan.

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