

FORESTRY

FORESTS OF VICTORIA

Introduction

Forests are complex and dynamic ecosystems of living organisms and their physical habitat. The living organisms include plants, animals, birds, fungi, and a vast collection of micro flora and fauna. The physical components of the ecosystem include those associated with the atmosphere, the soils, and the rock formations from which the soils have been derived.

The objectives of forest management vary according to the demand for the benefits that a forest ecosystem can provide and the capability of the ecosystem to supply the desired benefits without detriment to its long-term productive capacity. Forests owned by the community, such as the State forests of Victoria, provide a wide range of benefits both tangible and intangible. The efficient management of forest ecosystems to produce these benefits is a demanding task involving considerable resources of skilled manpower, finance, and equipment. The services of a wide range of expert personnel are required, including foresters, botanists, zoologists, pathologists, entomologists, hydrologists, engineers, surveyors, management specialists, economists, sociologists, landscape architects, and administrators.

Approximately 36 per cent or 8.1 million hectares of the total land area of Victoria is occupied by forests. Of this, 6.9 million hectares are State forest of which 2,890,000 hectares are reserved forest. The reserved forests are permanently reserved as forest land and can be excised or alienated only in exchange for other areas of Crown or private land. The remaining 4 million hectares are mainly protected forest which are not permanently reserved although the Forests Commission is responsible for their management.

The major belt of forest in Victoria is located in the eastern half of the State extending from a point to the north of Melbourne to the New South Wales border. This area forms the southern end of the vast and continuous belt of forest that straddles the Great Dividing Range along the length of the eastern coast of Australia. Other extensive areas of forest in Victoria are situated to the north-west of Melbourne, in the South Gippsland Ranges, the Otway Ranges, the south-western region, the Mallee, and the northern and central parts of Victoria where forests of red gum, ironbark, and box are present.

Types

The forests of Victoria embrace many types ranging from the tallest of hardwood forests in the world, which occupy the cool mountain regions in the east, to the stunted mallee heathlands of the arid north-west. The main types recognised within State forests are mountain forests, stringybark forests, red gum forests, ironbark and box forests, arid woodlands, arid heathlands, and forest plantations. The majority of native forests are hardwoods, while most forest plantations are of softwood species.

Mountain forests

The mountain forests occupy about 840,000 hectares of the cool, high rainfall country in the Central and Eastern Highlands, the South Gippsland Ranges, and the Otway Ranges. The forests comprise two main types, namely, sub-alpine woodland, and ash forests of alpine ash, mountain ash, and shining gum.

The sub-alpine woodland occupies the highest elevations in the State ranging from approximately 1,400 metres to 1,800 metres. It covers about 210,000 hectares in Victoria and typically consists of snow gum forests interspersed with snow grass and herb plains. Because they occupy an area where the climate is severe, sub-alpine woodlands must be carefully managed to ensure the protection of vegetation and soils.

The sub-alpine woodland yields large quantities of water which is used for domestic, irrigation, and hydro-electric purposes. It also provides an environment suitable for specialised recreational use, including intensively developed ski resorts, scenic roads, and walking tracks. The alpine walking track, which is planned to extend along the total length of the Great Dividing Range, passes through sub-alpine woodland for a considerable portion of its length.

The ash forests of alpine ash, mountain ash, and shining gum extend from the lower limits of the sub-alpine woodland down to elevations of approximately 600 metres, or lower on some southern aspects. They occupy the cool, moist regions to the east of Melbourne and in the South Gippsland and Otway Ranges, and cover a total area of approximately 630,000 hectares.

The mountain forests play an important role in Victoria's economy because they are among the most productive forests in the State, yielding large quantities of wood and water, and providing an environment for recreational activities. They produce large volumes of timber of seasoning quality, and the majority of the hardwood pulpwood used by the paper making industry in Victoria. They occupy significant portions of the catchment areas used to supply water to major population centres. The very tall trees and dense understorey of shrubs and ferns found in ash forests provide magnificent scenery, and afford an excellent habitat for well known wildlife species, such as lyrebirds, possums, and wallabies.

Stringybark forests

The stringybark forests of Victoria include a wide variety of forest types in which various stringybark eucalypts and associated species occur. They are the most extensive of the Victorian forest types and occupy practically all of the forest land on the coastal plains, and in the foothills to the north and south of the Great Dividing Range up to elevations of 900 metres. The total area of stringybark forests is 4,300,000 hectares.

The presence of the root-rot fungus *Phytophthora cinnamomi* (Rands) in the stringybark forests is currently causing concern. Sections of the coastal silvertop forest in eastern Gippsland and other stringybark forests in south-west Victoria have been damaged, and in some cases killed, by the fungus. A detailed research programme is currently in progress, and in the meantime controls have been imposed to restrict the spread of the fungus through transfer of soil by trucks and tractors.

The stringybark forests provide wood, water, and recreation. They yield some 65 per cent of the total volume of timber produced from State forests. The principal uses of the timber are for house framing, general construction, and wood pulp for hardboards, paper, and packaging material. A large portion of the total yield is now coming from the extensive forests of eastern Gippsland. Some areas of intensively managed stringybark forest in the central part of Victoria have been producing regular timber yields for over a century and some have entered their third rotation of timber production. In western Victoria, where they are practically the only reserves of original native vegetation, they are an important source of timber for farm buildings, fencing, and fuel.

Stringybark forests occupy the water catchments of many cities and towns in Victoria. They are rich in birds, animals, and wildflowers, and their distinctive character makes them an attractive location for recreational activities. They attract large numbers of day visitors throughout the year, and are frequently used for fishing, camping, and hiking, especially during the early summer and autumn months.

Red gum forests

The red gum forests are the most widely distributed of the Victorian forest types although their total area is relatively small. Extensive areas of river red gum can be found along the flood plains of the Murray River downstream from Cobram, and along the northern reaches of its tributaries. Savannah woodlands of red gum occur on the western plains and the species is common along watercourses throughout most of Victoria.

The red gum forests produce substantial quantities of wood and are extensively used for recreational pursuits. In addition, they play an important role in the control of water flows along the Murray River system and its tributaries. The forests have supported a viable timber industry since the earliest days of settlement. Red gum timber is used for sawmilling, sleepers, posts, and piles, and because of its strength, durability, and attractive appearance it is keenly sought.

The open woodland and gentle slopes of the red gum forests are well suited for outdoor recreation. Roads and tracks are inexpensive to construct and there are many suitable sites for camps and picnics. Streams and billabongs are focal points for recreation and the numerous species of birds and animals associated with the water are major attractions. The red gum forests also provide an excellent grazing area for domestic stock and native animals.

Ironbark and box forests

The major areas of ironbark and box forests occur on poor soils in the north-central regions of Victoria where low rainfall and hot, dry summers are characteristic of the climate. The main forests are mixtures of red ironbark and box eucalypts with the species mixture generally being determined by the fertility and water holding capacity of the soil. The ironbark and box forests are used for railway sleepers, fencing timbers, and fuel, and they are highly valued for honey production and recreation.

Arid woodlands and heathlands

The arid woodlands and heathlands occupy large areas of the Murray Basin plain in the north-west of Victoria. They are forests of tremendous diversity with a wealth of plant species and many distinct associations. The diversity of these ecosystems is mainly a result of variations in soil type and the history of the areas they occupy. The arid woodlands and shrublands offer environments suitable for recreation and they are of considerable scientific and aesthetic interest. Because they occupy low rainfall areas, and are of a stunted form, they are of relatively minor value for water and wood production.

Forest plantations

The lack of native species suitable for the commercial production of softwood and the presence of derelict and marginal farmland have led to the development of extensive forest plantations in Victoria. The total area of these plantations (including privately owned plantations) is approximately 195,000 hectares.

Early planting trials covering a wide range of softwood species indicated that radiata pine was eminently suited to the medium rainfall environments of Victoria, and it has been used in the majority of plantations. Small areas of Corsican pine, maritime pine, ponderosa pine, and Douglas fir have also been established. Mountain ash is the only native species that has been used on any significant scale for plantation purposes.

The prime use of forest plantations is for wood production, but they also provide valuable cover for water catchments, and recreational benefits, such as those obtained from driving, picnics, and general scenic enjoyment. Another benefit from plantation development has been the reforestation of abandoned farmlands and rehabilitation of lands degraded by mining and bad farming practices.

Management

The State forests of Victoria are managed by the Forests Commission under the *Forests Act 1958*. This Act provides for State forests to be managed to produce a sustained yield of wood, and to provide protection for water catchments, recreational and educational opportunities for people, a habitat suitable for native flora and fauna, and a range of minor forest products such as forage for grazing, honey, essential oils, gravel, and stone. The Forests Commission also has explicit responsibilities under the Act to protect State forests from misuse and damage by fire, insects, and fungi.

In order to fulfil its obligations under the Act, the Commission is organised into functional and territorial divisions. The functional divisions cover administration, forest management, forest operations, economics and marketing, forest protection, and forestry education and research. Territorial organisation is based on seven field divisions each of which is subdivided into a number of forest districts. The forest district is the basic territorial unit through which the management of State forests is implemented. There is a

total of 44 districts in Victoria, each of which is under the control of a professional forester.

Establishment and tending of State forest plantations

The establishment of plantations to meet future requirements for wood and to reafforest derelict areas of farmland continued on a major scale in 1981-82. A total of 361 hectares of native hardwood plantations was established during the year, the main planting being mountain species in the eastern Strzelecki Ranges of South Gippsland. During 1981-82, a total of 3,128 hectares of new softwood plantations was established, the whole area of which was radiata pine. Softwood plantings were concentrated in six of the eight development zones where it is planned to establish an area of plantation sufficient to support large and integrated wood using industries.

VICTORIA—STATE FOREST SOFTWOOD PLANTATIONS:
ESTABLISHMENT AND TENDING ACTIVITIES
(hectares)

Activity	Area				
	1977-78	1978-79	1979-80	1980-81	1981-82
New planting	4,136	3,667	2,940	2,608	3,128
Re-planting felled areas	545	520	719	620	568
Thinning—					
commercial	396	940	1,094	1,775	2,120
non-commercial	112	149	5	—	167
Pruning	387	342	127	196	101
Fertilisation	3,006	3,631	3,488	2,218	743
Firming	—	—	—	—	—
Cleaning—					
ground	5,263	4,772	6,040	4,558	4,435
aerial	1,751	9	—	398	760

Source: Forests Commission, Victoria.

VICTORIA—NATIVE STATE FORESTS ESTABLISHMENT AND
SILVICULTURAL TREATMENT
(hectares)

Activity	Mountain forests			Stringybark and other forests		
	1979-80	1980-81	1981-82	1979-80	1980-81	1981-82
New planting	299	204	246	30	114	125
Aerial seeding	1,406	1,646	1,445	1,104	994	1,018
Hand seeding	709	838	1,071	1,041	1,051	1,368
Induced seed fall (a)	94	135	57	3,771	2,750	3,398
Regeneration felling/natural seed fall	212	143	109	7,326	7,148	7,727
Liberation felling	62	229	75	2,464	1,760	1,005
Thinning	29	17	17	2,741	3,548	3,114
Coppicing	—	—	—	623	283	508
Other	68	67	29	809	1,011	2,334

(a) Artificially induced seed fall from standing trees.

Regeneration and tending of native forests

The regeneration and tending of native forests is aimed at maintaining them in a healthy, productive condition so that they can continue to supply benefits to the community in perpetuity.

During 1981-82, a total of 23,275 hectares of native forest was subjected to regeneration or other silviculture treatment.

**VICTORIA—SILVICULTURAL TREATMENT OF NATIVE FOREST TYPES IN
STATE FORESTS, 1980-81
(hectares)**

Treatment	Area treated					Total
	Ash forest	Stringy-bark gum	Box, iron-bark	Red gum	Native pine	
Aerial seeding	1,646	994	—	—	—	2,640
Hand seeding	838	1,051	—	—	—	1,889
Induced seed fall	135	2,450	—	300	—	2,885
Regeneration felling/natural seed fall	143	5,237	316	1,595	—	7,291
Liberation felling	229	1,425	285	50	—	1,989
Thinning	17	374	1,722	520	932	3,565
Coppicing	—	15	260	8	—	283
Other	67	871	140	—	—	1,078
Total	3,075	12,417	2,723	2,473	932	21,620

Source: Forests Commission, Victoria.

**VICTORIA—SILVICULTURAL TREATMENT OF NATIVE FOREST TYPES IN
STATE FORESTS, 1981-82
(hectares)**

Treatment	Area treated					Total
	Ash forest	Stringy-bark gum	Box, iron-bark	Red gum	Native pine	
Aerial seeding	1,445	960	58	—	—	2,463
Hand seeding	1,071	1,337	1	30	—	2,439
Induced seed fall	57	3,250	27	121	—	3,455
Regeneration felling/natural seed fall	109	5,393	474	1,860	—	7,836
Liberation felling	75	949	—	56	—	1,080
Thinning	17	149	1,221	1,147	597	3,131
Coppicing	—	28	373	107	—	508
Other	29	2,154	155	—	25	2,363
Total	2,803	14,220	2,309	3,321	622	23,275

Source: Forests Commission, Victoria.

Forest recreation

Victoria's State forests provide diverse opportunities for recreation. The diversity arises from the range of forest types and topography present within the State, and from the differing standards of access and levels of facilities provided in the various forests.

Pleasure driving and picnicking are the most popular activities, but the forests are also used for camping, fishing, hunting, walking, orienteering, rock climbing, fossicking, nature study, skiing, canoeing, four-wheel driving, and horse riding.

Use of the forests for recreation greatly increased during the 1970s, as the community became more mobile, with more leisure time and interest in the outdoors. The Forests Commission estimated that in 1981 about 7 million visitor days were spent on recreation in State forests. The following table shows the number and main activities of visitors to some selected State forests in Victoria during 1981-82:

**VICTORIA—NUMBER AND MAIN ACTIVITIES OF VISITORS
TO SELECTED STATE FORESTS, 1981-82**

Forest	Main activities	Number of visitor days
You Yangs	Drives, picnics	250,000
Mt Macedon	Drives, picnics	236,000
Mt Disappointment	Drives, picnics	44,000
Grampians	Drives, picnics, camping, and hiking	1,140,000

VICTORIA—NUMBER AND MAIN ACTIVITIES OF VISITORS
TO SELECTED STATE FORESTS, 1981-82—*continued*

Forest	Main activities	Number of visitor days
Mt Buller	Skiing and other snow sports	360,000
Mt Baw Baw	Skiing	53,000
Lorne/Angahook	Drives, picnics, walks	100,000
Barmah	Drives, camping, boating, and fishing	40,000
Lake Mountain	Cross country skiing and other snow sports	125,000

Source: Forests Commission, Victoria.

Forest management has responded to the increase in demand by devoting more resources for encouraging the wider use of forests. This involves provision of facilities at appropriate locations, construction of walking tracks, better signposting of forest roads, and the provision of maps and information to assist visitors to the forests.

Increased recreational use has also brought problems; basically these consist of the conflict between different forms of recreation use, and the conflict between recreation use and conservation of the forest. Management, however, aims to separate incompatible uses, such as trail-bike riding and picnicking, to divert visitors away from sensitive areas, and to control erosion, littering, and pollution of water resources. In intensively used areas, including the forests around Melbourne and in the Grampians, rangers have been appointed to assist visitors to enjoy the forest, while protecting the forest environment.

Areas with particular significance for recreation or conservation may be set aside as special reserves. In October 1982, there were 123 of these Reserves totalling 60,352 hectares. Committees of Management and Advisory Committees have been appointed in relation to 45 of these Reserves. The Forests Commission estimates that the area reserved will increase in the next few years as the recommendations of the Land Conservation Council for parks and reserves to be managed by the Forests Commission are implemented.

Participation in skiing—downhill and cross-country—continues to grow rapidly. The Commission manages two residential resorts, Mt Buller and Mt Baw Baw, and two day resorts, Lake Mountain and Mt Donna Buang. In addition to these resorts, many other areas in the high country are used by cross-country skiers. In the management of the resorts the Commission is assisted by Committees of Management.

Research and development

The Forests Commission maintains a research programme to ensure that factual information is available for planning and monitoring forest management practices to meet changing community needs. Both short and long-term studies are in progress into many aspects of silviculture of both native hardwood and exotic softwood forests, and also into genetics and tree breeding, entomology and pathology, protection, hydrology, other environmental effects, and planning techniques.

In nurseries, studies are being made of the nutritional and soil physical requirements of both eucalypts and conifers, the treatment of seeds and seedlings, methods of site preparation, planting and seeding, fertiliser and nursery techniques, and the identification and control of pests, weeds, and diseases, for the efficient production of seedlings.

Investigations are being conducted to develop cultural practices for optimal establishment and growth of first and second rotation radiata pine plantations and maintenance of long-term site productivity. A tree breeding programme with *Pinus radiata* is now yielding improved seeds for general planting purposes, and crossbreeding is proceeding to further develop the desired characteristics. The natural variation in several eucalypt species is being examined in extensive field studies, and the offspring of outstanding individuals are being grown in progeny trials and seed orchards.

The use of tree planting for salinity control in dryland and irrigated farming areas is under investigation with regard to the short-term and long-term salt tolerance of tree and shrub species, their annual water use and effect on the water table.

Other silvicultural studies concern the use of native trees as an effluent disposal system; the regeneration of burnt sites and high-elevation forests; the reforestation of former pine

plantation sites; and the effects of thinning on growth and wood quality of eucalypts and conifers.

Continuing surveys of the mechanisms of, and factors controlling, the biology of major pests and diseases of forests, are concerned with specifying the timing and type of control procedures to be adopted; monitoring and evaluating the effectiveness of these measures; assessing the likely environmental impact of control measures; and providing service information within and outside the Department.

The major emphasis in entomological research is directed at the sirex wood wasp (*Sirex noctilio*) and its impact on the management of *Pinus radiata* plantations; and at populations of the stick insect (*Didymuria violescens*), which cause defoliation of ash-type eucalypt forests. Pathological research continues on the cinnamon fungus (*Phytophthora cinnamomi*) and honey fungus (*Armillaria spp*), including assessment of site and stand characteristics associated with eucalyptus-crown dieback, and the rate of spread and effect of the fungus on different species in mixed eucalypt forests while in softwood plantations the needle cast fungus (*Phaeocryptopus gaeumannii*) is being monitored.

Research into the ecology of birds and animals in the forests is being conducted to assess the influence of management practices on forest flora and fauna. Studies look at the distribution and abundance of species and their habitats in the various layers of forest vegetation, especially in streamside reserves and corridors of native vegetation in plantations, and in plantations and adjacent native forests after utilisation. Emphasis is also being given to evaluating the effect of harvesting, flooding, pesticide application, fire, and controlled burning; on water quality and yield, nutrient status, site productivity, and flora, fauna, and wildlife habitats. This information is used to develop forest management procedures which allow for the efficient production of wood consistent with the conservation of other forest values such as water quality, recreation, and wildlife habitat.

Information for planning forest management is generated by computer analysis of growth habits of major commercial species under various cultural regimes. This data enables prediction of the quantities and sizes of future timber supplies as stands develop under different patterns of use.

Further references: Fire protection, *Victorian Year Book* 1965, pp. 553-4; Economic aspects of forests, 1967, pp. 361-2; Commonwealth-State Reforestation Agreement, 1969, pp. 372-4; Forests of Victoria, 1972, pp. 1-26; Victorian School of Forestry, 1977, pp. 399-400; Victoria's forests and man, 1978, pp. 1-35; R. J. Hamer Forest Aboretum, 1979, pp. 313-14; Forests along the Great Dividing Range, 1980, pp. 325-6; Tree planting on farms, 1981, p. 324; Forest protection, 1982, pp. 303-5

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