

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.

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 773,100 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 124,900 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 650,000 hectares, of which 280,000 hectares are reserved forests and 320,000 hectares are protected forests.

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 eucalyptus 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 4,752,000 hectares of which 1,500,000 hectares are reserved forests and 2,510,000 hectares are protected forests.

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 up to eighty years. 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 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 heathlands 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 farmland have led to the development of extensive forest plantations in Victoria. The total area of these plantations (including privately owned plantations) now exceeds 100,000 hectares, with more than half of the area having been established since 1960. 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.

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

Establishment and tending of forest plantations

The establishment of plantations to meet future requirements for wood and to reforest derelict areas of farmland continued on a major scale in 1976-77. A total of 1,265 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 the year, a total of 5,000 hectares of new softwood plantations was established, the whole area of which was radiata pine. Softwood plantings were again concentrated in each of 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			
	1973-74	1974-75	1975-76	1976-77
New planting	5,204	3,546	3,889	5,000
Re-planting felled areas	296	413	486	388
Thinning—commercial	1,054	1,026	760	934
non-commercial	14	9	32	65
Pruning	215	470	391	131
Fertilisation	870	1,817	2,110	2,764
Firming	329	358	430	—
Cleaning—ground	3,946	7,094	5,090	6,738
aerial	3,816	2,486	1,915	1,107

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 1976-77, a total of 21,530 hectares of native forest was subjected to regeneration or other silviculture treatment. Labour made available through Commonwealth Government employment schemes assisted considerably in this work.

VICTORIA—TREATMENT OF NATIVE FOREST TYPES IN STATE FORESTS,
1976-77
(hectares)

Treatment	Area treated					Total
	Ash forest	Stringy-bark gum	Box iron-bark	Red gum	Native pine	
Aerial seeding	1,181	443	—	—	—	1,624
Hand seeding	609	679	—	—	—	1,288
Induced seed fall (a)	—	4,858	18	212	—	5,088
Regeneration felling/natural seed fall	11	2,857	80	380	—	3,328
Liberation felling	390	3,287	—	548	5	4,230
Thinning	36	1,266	2,047	595	36	3,980
Coppicing	—	1	268	12	—	281
Other	201	1,311	49	150	—	1,711
Total	2,428	14,702	2,462	1,897	41	21,530

(a) Artificially induced seed fall from standing trees.

R. J. Hamer Forest Arboretum

On 22 April 1977, the Premier of Victoria, the Hon. R. J. Hamer, officially opened the new Forest Arboretum that is named in his honour and located in the Dandenong Ranges near Olinda.

The Arboretum reserve of 192 hectares is a small part of the original Dandenong and Woori Yallock State Forests. It is reserved under the *Forests Act* 1958 and is being developed and managed by the Forests Commission. When planting of it is completed, it will include patches of about 200 different species of native and exotic trees, including a wide variety of deciduous trees. Seeds of the exotic species have been specially imported from the appropriate overseas countries. These plantings will occupy about 110 hectares, the balance of the reserve, namely, about 80 hectares, being the surviving remnants of endemic natural forest that were retained to add diversity to the Arboretum.

The aim was to create an attractive forest of native species and introduced species chosen for the colour of their flowers or foliage. Such a mixture of trees is characteristic of the Dandenongs. The design of the Arboretum is based on forest formation rather than the usual scattered single-tree formation, so that each species is represented by an irregularly shaped patch of trees about a half hectare in area. The taller-growing species

are planted in locations where their growth will not obstruct the magnificent views over the Ranges and the Silvan Reservoir. When the primary overstoreys of trees are established, smaller trees and shrubs will be planted under them to complement them and to add plant diversity and a forest understorey. Tree ferns will also be re-established in the gullies to further help in recapturing the total forest environment.

Having deep fertile soils and a high rainfall, the area was originally clothed in tall mountain forest of eucalypts, with many ferns in Lyrebird Creek, the creek that virtually bisects the Reserve, and in its feeder gullies. However, a succession of fires destroyed the original trees leaving much of the area covered by bracken and scrub, the balance regenerating to endemic eucalypts. Most of the scrub and bracken covered sections were planted to softwoods for timber production in the period 1948-1955 with ornamental conifers and deciduous species being included to provide scenic diversity.

The disastrous forest fires of 1962 in the Dandenongs killed these post-war plantations. Soon after, a proposal to establish an arboretum on the area was canvassed and ultimately gained wide support. Government approval was granted for the scheme in 1970 and development began soon after. The area to be planted was prepared and groomed, a car and bus park was built, followed by a 6 kilometre main circuit road suitable for tourist buses. Thirteen kilometres of graded walking tracks have been constructed, and, for the most part, these traverse the boundaries between patches of different species of trees. A track for equestrians has been provided around the boundaries of the Arboretum. In the development of the area, the Forests Commission has provided opportunity for all categories of people to be able to enjoy the many wonders and features it will have to offer in the future.

There is considerable scope for development of special features in the Arboretum. Underplanting of the patches of the Arboretum with trees and shrubs will be, as far as possible, of species that occur in natural forests of the particular overstorey species. This will provide Victorians with a unique area for contemplation, recreation, and study. Ornamental reflective pools along Lyrebird Creek may be extended. Rockeries, landscaping, an information centre, and associated facilities are further elements that are planned. The final result is planned to create a most attractive garden of trees, shrubs, and ferns where people can walk, drive, rest, and contemplate as they escape the pressures of every-day living.

Research and development

An active programme of research is maintained by the Forests Commission to ensure that essential information is available for planning the management of the forests to meet changing community needs. Intensive studies of many aspects of silviculture of both the native hardwood and exotic softwood forests are in progress, and there are research projects also into protection, hydrology, other environmental effects, pathology, and planning techniques.

The methods of regenerating the forests after harvesting and establishing new crops are under continuing investigation. Studies are made of the soils, fertilisers and techniques in use in nurseries, methods of preparing the sites for planting and seeding, the control of weeds, the treatment of seeds and seedlings, techniques for assessment of the success of establishment in each case, and the fertiliser requirements of the growing crops in various types of soil.

In studies of the genetics of the main timber species, outstanding specimens are sought for use as sources of seed for future crops. Progenies of the selected trees are grown from seed and planted out for trial in several locations. The selected trees are propagated also by grafting for breeding and seed production purposes.

Changes in the productivity of sites used for successive crops of radiata pine are being studied in large experiments in two districts. Both native and exotic species are being tried under intensive cultivation and irrigation with drainage and sewerage effluent waters at several inland locations where economic disposal of wastes will be very beneficial.

Many experiments in the forests and laboratories are concerned with fungi and insects which are harmful to the forests, including the cinnamon fungus (*Phytophthora cinnamoni*), the honey fungus (*Armillaria*), the needle cast fungus (*Phoecocryptopus*).

goeumannii), the caterpillar of *Uruba lugens* which defoliates red gums, and the stick insect (*Didymuria violescens*).

Research into the ecology of birds and animals in the forests is conducted by surveys of the distribution and abundance of the numerous species in the habitats formed by different species of plants in the various layers of forest vegetation, especially in streamside reserves and corridors of native vegetation in plantations, in stands of seedlings and saplings, and the mature forests adjoining harvested areas. The hydrologic effects of native forests and softwood forests and the ecological effects of wildfires and controlled fires also are under investigation.

Fire research is concentrated on the behaviour of fires in various types of forests under particular conditions of temperature, wind, and humidity. The fuel which accumulates on the forest floor is studied to determine the progress of drying and the effects on fire intensity and rate of spread.

Information for planning the management of forests is assembled by analysis of growth measurements and preparation by computer of comprehensive predictions of the quantities and sizes of timber in forests of various species and ages as the stands develop under different patterns of use.

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