

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 35 per cent of the total land area of Victoria is occupied by forests. This represents an area of 7,930,000 hectares, of which 6,740,000 hectares are State forest being managed by the Forests Commission, Victoria. 2,290,000 hectares of the State forest are classified as reserved forests, while the remaining 4,450,000 hectares are protected forests. 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 protected forests 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 east 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 760,500 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 110,500 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 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 4,570,000 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 past 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.

Fire protection of forests

The Forests Commission, Victoria, is responsible for the prevention and suppression of fires in all State forests, protected public lands, national parks, and, with some exceptions, all alienated land within 1.5 kilometres of such Crown land. This area of responsibility is legally defined as the "fire protected area" and covers 37 per cent of Victoria as shown in the following table:

VICTORIA—FIRE PROTECTED AREA

Type	Area
	hectares
Reserved forest	2,300,000
Protected forest	4,500,000
National parks	300,000
Protected public land (a)	..
Private property within 1.5 kilometres of above reserves	1,400,000
Total	8,500,000

(a) Newly created responsibility.

Victoria's forests are among the most fire hazardous areas in the world. They are subject to long hot summers with peak fire weather periods in which high temperatures and low humidities are associated with very hot dry winds which sometimes blow from the centre of the continent with gale force. Fuels, in the form of bark, twigs, and leaves, accumulate under eucalypt forest at rates of up to 2.5 tonnes per hectare per annum, and total accumulations in excess of 75 tonnes per hectare are common. These fuels burn fiercely and under severe conditions crown fires develop and burning material may be thrown for 20 to 30 kilometres ahead of a fire.

Evidence from charcoal deposits, early explorers, and physiological characteristics of our flora indicate that the present eucalypt forests have evolved in an environment in which fire is a major factor. The regeneration of some species would fail without fire, so strong is this inbuilt dependence.

The Colony of Victoria was in its infancy when it experienced the calamitous fires of February 1851, and the records show a progression of serious fires. Many early fires were caused by a combination of severe weather conditions and uncontrolled burning associated with clearing and grazing activities. Then came the disastrous fires of January 1939 when 71 lives were lost, townships obliterated, and millions of hectares of forest of almost incalculable value were destroyed or badly damaged. A Royal Commission was subsequently set up to investigate the disaster, and as a result of its recommendations, policy on forest fire protection underwent complete reorganisation. Major developments included the provision of access roads, development of radio communications, establishment of detection points, and improvement of fire equipment.

Uncontrolled fire is not compatible with society's demands on the forests either as a source of raw material or for recreation and other values. Apart

from forest considerations, uncontrolled wildfires are unacceptable because of the inevitable losses of private property, and even human life. Thus, the Forests Commission pursues a policy of immediate attack on all fires occurring during the period of fire danger, on the basis that with a sudden change in weather conditions there is no guarantee that today's quiet fire will not be tomorrow's blazing inferno.

The suppression techniques of a modern forest fire fighting force begin long before any outbreak of fire is reported. The fire problem consists of weather conditions, ignition sources, and the amounts and condition of fuels. People have little or no control over the weather and although they have some control over ignition sources, the one factor which they can modify is fuel quantity. Mechanical removal of fuel over vast areas is obviously impossible, but a simple and effective way of reducing the build-up of forest fuels is by burning under carefully controlled conditions, so that the low intensity fires produced cause minimum damage to forest values. This operation removes only surface layers of fuel, in a mosaic pattern, so that the intensity and potential for serious damage of subsequent fires is reduced.

Early detection of fires is achieved by a network of lookout towers, supplemented by aerial patrols where necessary. Crews of trained forest workers and staff are continuously in radio contact with their headquarters, even when engaged on normal work, and can be quickly dispatched to any outbreak of fire. An extensive network of roads and tracks is maintained for rapid access with the result that the Forests Commission has been able to restrict most outbreaks to less than 4 hectares. Crews are trained in the use of hand tools and employ this method of dry fire fighting in remote areas which are too rugged for bulldozers, four-wheel drive tankers, and pumps. Mobile camp equipment is provided for crews required to spend long periods fighting remote fires, and aircraft are used to "bomb" fires by dropping chemical retardants on forest fuels in their paths, thereby holding their spread until ground crews arrive. Helicopters are used to transport crews and equipment into remote areas, and to determine fire boundaries accurately. However, improved techniques and more equipment are not the complete answer to forest fire protection; statistics indicate that about 75 per cent of fires are caused by human beings, and the Forests Commission aims at reducing this figure by an active programme of public education involving articles, advertisements, publications, talks, and public forums.

There is still much to learn before it is possible to use large scale fire for the management of native flora and fauna; subjects such as the effects of fires of varying intensities on individual plant and animal species and associations, the effects of weather parameters on forest fuels, and identification of forest fuel types, require further detailed investigation. An extensive research programme is being undertaken in these, as well as in other fields, and the Forests Commission is constantly developing new equipment and techniques in the continuing battle against forest fires.

There have been significant developments already in firebombing, the use of chemical retardants, monitoring of fuels, aerial ignition techniques, infra red mapping of fires, burning guides, and mass fire ignition techniques.

Wildfires regularly cause damage to Victorian forests and their control is a critical element in effective forest management. It must be recognised, however, that fire is an integral part of forest ecosystems and total exclusion is impractical despite the policy of rapid initial attack, a vigorous research programme, and advances in applied technology.

Benefits derived from forests

The benefits provided by the State forests of Victoria include wood, water, recreation, minor vegetative products, honey, and scientific and aesthetic values. Of these, wood products are the only benefit for which accurate records are

maintained. Information is also available on some aspects of water production and recreation, but no quantitative information is available on the wide range of intangible benefits that are derived from the forests, such as those associated with scientific and aesthetic values, atmospheric purification, and the subjective experiences obtained from recreation.

Wood

The output of wood products from Victorian forests amounted to 2,970,000 cubic metres in 1974-75. Of this total, 2,789,000 cubic metres were logs for sawing, peeling, slicing, or pulping, while the wood used as firewood or hewn timber totalled 181,000 cubic metres. During 1974-75 there was a continuation of the trend towards amalgamation of sawmills into larger, more efficient, units. In addition, the use of waste wood from sawmills for pulp and paper production continued to increase. The following table shows the production of wood, for all species, from Victorian forests (including privately owned lands) for the years 1970-71 to 1974-75 :

VICTORIA—PRODUCTION OF WOOD FROM FORESTS
(‘000 cubic metres)

Item	1970-71	1971-72	1972-73	1973-74	1974-75
Logs for sawing, peeling, slicing, or pulping—					
Hardwoods	1,940	1,854	1,701	1,814	1,961
Softwoods (plantation grown pines)	473	586	689	595	828
Total logs	2,413	2,440	2,390	2,409	2,789
Hewn and other timber (not included above), estimated volume—					
Firewood (a)	263	254	187	165	80
Other (b)	112	116	118	103	101

(a) Excludes mill waste used as firewood.

(b) Includes telephone and electric supply transmission poles, bridge and wharf piles and beams, fencing timbers, railway sleepers, and mining timbers from Crown lands. Similar information for private lands is not available.

Recreation

The demand for recreational benefits from Victoria's State forests is of major proportions and growing rapidly. This large and increasing demand is attributed to the increasing urbanisation and mobility of the population, as well as to a growth in the resources of time and money available for recreational activities. In addition, the conservation movement has led to an increasing awareness of the importance of forests for recreation and educational purposes. As a result, schools, scientific societies, clubs, and naturalists are now making extensive use of forests for studies in geography and the ecology of plant and animal communities.

Recent surveys have shown that people make more than 4,000,000 visits per annum to the more popular areas of State forest, and this recreational use is estimated to be increasing at a rate of 10 to 20 per cent per annum. The following table shows the number and main activities of visitors to some selected State forests in Victoria during 1972 :

VICTORIA—NUMBER AND MAIN ACTIVITIES OF VISITORS
TO SELECTED STATE FORESTS, 1972

Forest	Main activities	Number of visitors
You Yangs	Drives, picnics	82,000
Mt Macedon	Drives, picnics	82,000
Mt Disappointment	Drives, picnics	24,000
Grampians	Drives, picnics, camping, and hiking	150,000
Mt Buller	Skiing and other snow sports	140,000
Mt Baw Baw	Skiing	30,000

The Forests Commission has established an Environment and Recreation Branch to plan and co-ordinate the development of State forests to meet the increase in demand for recreation. Important projects recently undertaken include the extension of the alpine walking track and the construction of interpretative nature trails in several forest parks. A total of 113 forest parks and reserves have been designated as areas where recreation is the prime objective of management. At 30 June 1975 these parks and reserves covered an area of 56,395 hectares.

The State forests of Victoria offer a diverse range of recreational environments. An illustration of their potential is shown in the following table which lists the resources and facilities which are available for recreational purposes in State forests and adjoining roads and streams.

VICTORIA—STATE FOREST RECREATION RESOURCES, 1972

Resource	Quantity
Picnic grounds	791
Walking tracks	670 km
Camping grounds	346
Roads suitable for pleasure driving	5,600 km
Roads suitable for trail bikes and four-wheel drive vehicles	18,400 km
Beaches suitable for swimming	92 km
Water suitable for boating	18,200 ha
Streams suitable for canoeing	1,300 km
Streams and shore suitable for fishing	6,900 km
Land and water suitable for hunting and shooting	1,510,000 ha
Land suitable for bush hiking, orienteering, etc.	3,397,000 ha
Ski resorts and snow locations	4

Water

It is estimated that water catchments in State forests yield more than 50 per cent of the total surface water run-off in Victoria. These catchments provide water for irrigation and hydro-electric purposes and for domestic use by towns and cities throughout rural areas. Although no records are available on the volume or value of the water produced, an indication of their importance is shown by the fact that during 1974–75 the State Rivers and Water Supply Commission supplied 2,700,000 megalitres of water for irrigation purposes, a major portion of which came from catchments within State forests.

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

The Forests Commission is a large and diverse organisation. During 1974-75 it employed a total of 2,352 persons in a wide variety of occupations, including 767 persons under Commonwealth Government employment schemes. Total expenditure for 1974-75 was \$19.4m. Management activities undertaken in 1974-75 were extensive and a brief description of some areas of activity follows.

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 1974-75. A total of 1,000 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 3,550 hectares of new softwood plantations was established, almost 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.

The establishment of softwood plantations on a major scale in Victoria has many beneficial effects including provision of much needed timber supplies, an environment suitable for picnics, pleasure drives, scenery, etc., and reforestation of derelict farmland. However, the establishment of new plantations may involve major environmental changes, and before a plantation is established a considerable amount of research and planning is carried out to minimise undesirable effects. Where a new plantation is to be established within an area of native forest an ecological survey is conducted, and the plantings are located so as to minimise their influence on the environment. Types of native forest that are limited in extent, or are of special ecological significance, are excluded from the planting area. In addition, substantial blocks and corridors of the original vegetation are retained to provide undisturbed habitats for native flora and fauna.

VICTORIA—STATE FOREST SOFTWOOD PLANTATIONS :
ESTABLISHMENT AND TENDING ACTIVITIES

Activity	Area		
	1972-73	1973-74	1974-75
	hectares	hectares	hectares
New planting	4,690	5,200	(a)3,550
Re-planting felled areas	350	300	410
Thinning—commercial	1,050	1,050	1,030
—non-commercial	70	10	10
Pruning	430	220	470
Fertilisation	2,170	870	1,820
Firming	390	330	360
Cleaning—ground	7,350	3,950	7,090
—aerial	2,800	3,820	2,490

(a) Subject to survey.

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 1974-75 a total of 18,881 hectares of native forest was subjected to regeneration or other silvicultural treatment. Labour made available through Commonwealth Government employment schemes assisted considerably in this work.

**VICTORIA—TREATMENT OF NATIVE FOREST TYPES IN
STATE FORESTS, 1974-75**

Treatment	Area treated (hectares)					Total
	Ash forest	Stringy-bark gum	Box iron-bark	Red gum	Native pine	
Aerial seeding	1,268	248	..	..	..	1,516
Hand seeding	608	418	..	..	..	1,026
Induced seed fall (a)	10	3,191	..	17	..	3,218
Regeneration felling/natural seed fall	114	4,296	175	80	..	4,665
Liberation felling	12	2,079	10	260	..	2,361
Thinning	116	1,710	2,574	602	52	5,054
Coppicing	..	21	524	130	..	675
Other	..	78	280	8	..	366
Total	2,128	12,041	3,563	1,097	52	18,881

(a) Artificially induced seed fall from standing trees.

Forest protection

The fire danger during 1974-75 was relatively low in the east of Victoria, but very high in the north and north-west regions of the State. During the season, Forests Commission personnel attended 443 wildfires, 73 per cent of which were brought under control before they reached an area of 4 hectares. These fires burnt a total of 94,990 hectares of State forest and national parks. The area of State forest and national parks burnt in the five fire seasons up to and including 1974-75 is shown in the following table:

**VICTORIA—AREAS OF STATE FOREST AND
NATIONAL PARK BURNT BY WILDFIRES
(hectares)**

Year	Commercial area	Non-commercial area	Total
1970-71	610	4,200	4,810
1971-72	4,040	13,180	17,220
1972-73	31,010	60,500	91,510
1973-74	6,310	11,900	18,210
1974-75	5,680	89,310	94,990

The wildfires occurring in the State forests originated from a variety of sources. Of the total number of outbreaks, 18 per cent were attributed to landholders and householders, lightning caused 23 per cent, and deliberate lighting accounted for 13 per cent. The causes of fires attended by Forests Commission personnel during the years 1970-71 to 1974-75 are shown in the following table:

VICTORIA—CAUSES OF FOREST WILDFIRES

Cause	Number of fires				
	1970-71	1971-72	1972-73	1973-74	1974-75
Grazing interests	2	1	5	..	..
Landowners, householders, etc.	87	56	148	37	78
Deliberate lighting	48	56	75	54	56
Sportsmen, campers, and tourists	45	34	68	23	56
Licenseses and forest workers	20	15	13	11	8
Smokers	11	12	23	6	10
Lightning	59	95	100	24	101
Tractors, cars, trucks, locomotives, and stationary engines	20	11	21	12	46
Children	12	8	18	8	15
Sawmills	4	3	12	6	6
Miscellaneous known causes	22	21	40	15	33
Unknown origin	28	13	47	15	34
Total	358	325	570	211	443

Fire lookout towers at 94 locations were operated during the summer period and aircraft were used to patrol some forest areas after periods of lightning activity. In accordance with established practice a helicopter was retained on contract and used for fire detection and suppression activities.

During 1974-75 a helicopter was used for aerial spraying of 450 hectares of high grade mountain ash forests to control defoliation by phasmatids. Biological control of the sirex wasp was continued with the release of parasites in areas of known infestation. The root-rot fungus *Phytophthora cinnamomi* continued to cause concern, although only scattered die back was detected in East Gippsland despite very wet conditions in early summer. In an attempt to limit the spread of the fungus, regulations have been introduced requiring all tracked vehicles to be washed free of soil before entering disease free zones.

Research and development

The Forests Commission maintains an extensive research and development programme covering a range of its functions, including fire protection and suppression, forest ecology, forest management, and the provision of opportunities for recreation in forest environments. This research and development programme plays an important role in Forests Commission activities by providing information on which to base management decisions aimed at meeting the changing needs of the community.

Studies of the behaviour of forest fires under various weather conditions are contributing to improvements in the strategies and methods of fire fighting. They also enable the more efficient use of controlled fires for fuel reduction, habitat management, and silvicultural purposes. During 1974-75 studies continued into the development of new techniques for classifying forest fuels into composition and flammability types, and the role of long-term fire retardants. A study of habitat changes following the extensive wildfires in the Little Desert and the Sunset Country was initiated.

Research into the silviculture of both native hardwood and exotic softwood forests is continuing. The major areas currently being investigated cover nursery practice, crop establishment, and tending practices such as fertilisation and thinning. A study of the productivity of first and subsequent rotations of *Pinus radiata* on representative sites at Rennick and Myrtleford was continued, as were investigations into the productivity of intensively managed eucalypt forest controlled on short rotations.

An extensive research programme into the genetics of both hardwoods and softwoods is being maintained. The benefits of earlier research in this field are now apparent with increasing yields of superior radiata pine seed from the Korweinguboora seed orchard.

Research in entomology is concentrated on the leaf-eating phasmatid insects and the sirex wood wasp. In both cases research has led to the development of techniques that are assisting in field control of these insect pests. Studies in phytopathology are concerned mainly with evaluation of the threat to native eucalypt forests posed by the root-rot fungus *Phytophthora cinnamomi*.

Mensuration and management studies include projects covering the development and use of models to simulate the growth and harvesting of forests, and to assist in planning the harvesting activities within a forest. The use of State forests for recreation is currently the subject of a major survey designed to assess the nature and intensity of such use, its seasonal variations, and the socio-economic backgrounds and origins of visitors.

A major study of the ecology of *Pinus radiata* plantations in north-east Victoria continued during 1974-75. The aim of this long-term project is to examine plantations as habitats for macroscopic flora and fauna, including mammals, birds, and insects. Changes in species and population density that

occur following the establishment of a plantation are being recorded, and the influence of native vegetation in and around a plantation is being investigated.

Studies were continued into various aspects of forest hydrology. A multiple catchment study aimed at investigating the effect of plantation clearing on storm run-off was continued in north-east Victoria. Water quality measurements were maintained for a number of areas throughout Victoria.

Victorian School of Forestry

Introduction

The Victorian School of Forestry, Creswick, established in 1910, was the first forestry school to be set up in Australia. It is a college of advanced education, administered by the Forests Commission, Victoria.

The School is set in an arboretum of 5 hectares containing more than 80 families and 200 genera of native and exotic trees and shrubs. Buildings house well-equipped laboratories and lecture rooms, a library, herbarium, museum and other reference collections, a theatre, and staff and administrative offices.

Adjacent to the School is a demonstration forest of 615 hectares, comprising 495 hectares of native forest which includes three special purpose reserves, and 120 hectares of pine plantations. The forest is used for practical work by students and staff, as well as by visitors.

Creswick, a township of about 2,000 persons, is situated approximately 18 kilometres north of Ballarat and 130 kilometres west of Melbourne.

Diploma of the School of Forestry, Creswick

This course requires three years full-time study at the School, and three weeks approved field work during the vacations at the completion of the first and second years. The curriculum, staffing, and academic standards are reviewed continually by the eleven member Board of Forestry Education established under the Forests (Part II. Staff) Regulations 1969.

Entry to the course is open to men and women under 23 years of age who hold the Victorian Higher School Certificate with clear passes in chemistry, physics, and mathematics, or an equivalent qualification. The subjects of the diploma course are presented by resident lecturers, part-time lecturers from the Ballarat College of Advanced Education and the Victorian Forests Department, and guest lecturers. Practical assignments and field and industrial excursions are special features of the curriculum.

Accommodation for first year and most second and third year students is provided at the School at a reasonable charge. Several residential scholarships are offered by the Forests Commission to applicants under 21 years of age.

Certificate of Applied Science

The School has offered short residential courses for up to 30 students enrolled for the Certificate of Applied Science (Conservation and Resource Development), awarded by the Education Department since April 1975. The programme provides sub-professional training for persons in government authorities and industry who are engaged in the management of natural resources. Applicants should have passed Form V level or its equivalent, although satisfactory experience gained on the job may be accepted as an alternative pre-requisite for enrolment.

The course comprises 24 core and elective units of study. The electives allow for detailed study in specialist fields selected by the employer.

Most students are combining external studies with part-time and full-time college attendances, and will complete the course in four to five years. Two units are taken during three weeks' full-time study. A student may complete a course in two years.

Other activities

A silvicultural research station of the Forests Department is located at the School. Its members contribute in several ways to the activities of the School.

Short-term study facilities are offered to candidates for the Diploma of Forestry (Victoria), awarded by the Board of Forestry Education after acceptance of a thesis on an approved subject directly related to forestry.

The resources of the School have been used for continuing education courses in field botany and plant propagation, and the gradual expansion of these activities is planned.

Conclusion

The forests of Victoria are an important natural resource which makes a major contribution to the environment and welfare of the community. Forested catchments provide large quantities of water without which cities, towns, industry, and agriculture could not exist. The trees produce a supply of wood, which is a primary raw material for the development and maintenance of society, and the forests themselves constitute a habitat in which native flora and fauna can be conserved for the purposes of study and enjoyment by future generations. They supply a wide variety of excellent recreational opportunities that are both popular and necessary with the increasing urbanisation of the population. In addition, they provide a variety of other products and intangible benefits for various sections of the community.

Perhaps the most important and distinctive feature of Victoria's State forests is that they constitute a renewable natural resource, which with efficient management will continue to provide major benefits for future generations.

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- 12.14 Production statistics
- 12.16.49 Building materials