



# FOREST FOCUS

NUMBER 15

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▲ Although one of the smaller mallees, *mottlecah* (*E. macrocarpa*) produces the largest fruits and flowers of the whole genus.  
▼ (Both by Brian Stevenson)



E. "Pterocarpa" near Norseman. (Govt. Photographer) ▶

▼ E. "pterocarpa" flowers, *Dryandra arboretum*.



▲ *Dundas mahogany* (*E. brockwayi*) resembles salmon gum in appearance and is very suitable for planting as a shade tree in agricultural areas.  
(Govt. Photographer)





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Number 15, August 1975



# FOCUS on Inland Eucalypts — a valuable biological resource

Published for Mr. B. J. Beggs, Conservator of Forests, Forests Department of Western Australia, 54 Barrack Street, Perth.

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### Front cover:

Flowers of the *Eucalyptus youngiana* tree which grows to a height of five or six metres and occurs naturally in the arid region fringing the eucalypt zone. It also occurs in small belts of eucalypts which extend as outliers far into the mulga zone and into South Australia. Blossoms can vary from light butter yellow to deep red.

### Back cover:

*Top:* Bushwalking through state forest and the Murray Valley near Dwellingup.

*Bottom:* Rock outcrops like Boulder Rock (Brookton Highway) and Sullivan Rock (Albany Highway) provide variety for picnickers and walkers.

An area in the south-west of Western Australia between the 200 mm and 500 mm rainfall isohyets which is less than five per cent of the Australian continent's total area, is the natural habitat of about 25 per cent of all the eucalypt species.

(There are about 500 species within the genus *Eucalyptus*. However, if numerous varieties and hybrids are included, together with newly recorded species, the total goes up to over 650. The genus includes not only trees of high commercial value for their timber, tanning materials and oil-producing foliage, but also many trees and shrubs of considerable aesthetic value.)

The woodlands of this arid and semi-arid region constitute a biological resource which is of scientific value to the world as well as to Western Australia. These species have the capacity to form relatively tall woodlands under low rainfall conditions, to produce substantial volumes of wood and to regenerate adequately after cutting.

Clearing for agriculture has greatly reduced the woodlands in the 380 mm to 500 mm rainfall zone.

Similarly in the drier 280 mm to 380 mm range most of the original woodland has been cleared and burnt for wheatfields. Firewood for the goldfields water supply pumping stations, domestic firewood and fenceposts have also taken their toll.

### Important development role

Inland from Southern Cross there has been a continual demand for the

local timbers since the pioneering days when gold was first discovered and deep underground mining commenced.

Selected local timbers are admirably suited for the construction of underground shafts, passageways and ore passes because of their toughness and ability to withstand pressure.

Prior to the comparatively recent electrification and diesel powering of such items as the large winding engines at mines, town electricity generation plants, the eight water pumping stations on the goldfields water supply scheme, and other industrial and domestic firewood requirements, vast quantities of firewood and mining timber were extracted from surrounding woodlands. It is claimed that in Coolgardie alone, 100,000 gallons of distilled water was produced each day with wood-fuelled stills.

During the 70 years of full-scale mining, the eucalyptus timber used for industrial and domestic purposes in the goldfields region consumed 350,000 tonnes annually, or a total of 25 to 30 million tonnes. The yield per hectare in these areas ranges from seven to nine tonnes, so that during this period some 3.4 million hectares of inland forest had been cut over. Wood fuelled steam locomotives operated along "woodlines"

ranging up to 200 km from Kalgoorlie to obtain some of this timber.

This eucalypt woodland is most impressive for such an arid environment—growing up to 22 m in height in a 200 mm (8") rainfall. That it is capable of utilisation and management in the traditional forestry sense is demonstrated by the 80-year old regrowth stands surrounding Kalgoorlie. These now comprise the "green belt" jealously preserved by the local people. There seems little doubt that its controlled utilisation for mining purposes can proceed indefinitely without fear of ecological deterioration.

About 70 to 80 km north of Kalgoorlie, eucalypt woodland gradually gives way to mulga (*Acacia aneura*) which was used in the distant north mines. In one large mine 240 km north of Kalgoorlie a quantity of 750,000 tonnes was felled during the 50 years life of the mine. During the 1930's the introduction of oil fuel began and by 1960 wood fuel was entirely replaced by oil at all mines.

### Other values

As the demand for mining timber declined, other items of forest produce, such as fence posts and honey production, came into prominence.

Seed of many of the inland species has been in constant demand, both for local use and for supply to overseas countries, particularly those near the Mediterranean.

Renewed activity within the eastern goldfields following the discovery of nickel and increases in gold prices, now place the value of the woodlands into a new perspective. The protective and aesthetic qualities of the vegetation are appreciated by the new inhabitants and shelter, outdoor recreation and resource conservation have a new emphasis.

Current interest by the Forests Department in this woodland resource focuses primarily on biological, aesthetic and recreational values. Particularly, it is considered

essential that valuable gene pools and seed sources for the major eucalypts be preserved. Representative samples of important ecosystems have been surveyed and selected with the object of reservation.

Areas formerly reserved as State Forest generally contain the only uncut segments of the vegetation and include sites of maximum biological value.

The eucalypt species of this arid and semi-arid region offer nurserymen, landscapers, parks administrators and home gardeners about 115 separate species.

Any healthy tree may be considered to possess aesthetic value, and this may be either, or a combination of, beautiful blossoms or fruits, attractive foliage, or unique bark.

Also worthy of note are examples of amenity and ornamental plantings of indigenous trees in townships and around homesteads in the region: The gimlet (*E. salubris*) street trees at Menzies, the wide variety of species in parks and streets of Kalgoorlie, the drought defiant green of the kurrajongs (*Brachychiton gregorii*) transported mature and fully grown from woodland to street at Kambalda, the astounding tuart (*E. gomphocephala*) growing at Kookynie, and others.

### Arboreta

Seed from these arid and semi-arid species was used in a Forests Department nursery established at Kalgoorlie in 1946 to produce trees for the drier inland areas. This nursery was transferred to Dryandra in 1955, and finally to Narrogin in 1967. Another nursery had previously been established at Hamel, near Waroona, in 1896, and is still in operation supplying seedlings to farmers and other people in country areas.

To demonstrate the advantages of tree planting and to test species for suitability in the agricultural areas of the state, more than sixty arboreta have been established since 1949.

Over 9000 trees of many different species have been planted in locations ranging from Yuna in the north to Esperance and Boxwood Hills in the south. Recently, more attention has been given to tree planting and arboreta in the Kimberley and Pilbara regions.

The arboreta enable the department to assess which are the most suitable trees for planting in different localities and to investigate spacing and planting methods. They have been invaluable to the department's advisory service. A number of leaflets have been prepared setting out lists of suitable species with descriptions and advice on planting and care of trees.

### Annual drought

The annual domestic crops receive favoured treatment to free them from competition and encourage development. They are drought-escapers in that they complete their life cycle during the wetter portion of the year and unlike trees, do not have to withstand the rigorous testing period of the annual drought.

The wheatbelt climate, which includes an annual summer drought of at least six months, necessitates the use of hardy trees and gives ample reason for research into drought resistant species and tree spacing trials.

The trials have shown that a number of exotics (eucalypts and non-eucalypts) perform quite well in these situations. A wide range of seedlings is therefore raised annually by the Forests Department and sold at cost throughout the farming areas. Native cypress (or pine) (*Callitris*) and sheoak (*Casuarina*) species have even better adaptations for drought resistance.

The severe drought to which arboreta were subjected during 1969-70 provided a real test. Results of a recent assessment have been very encouraging and almost without exception, well established trees have survived.

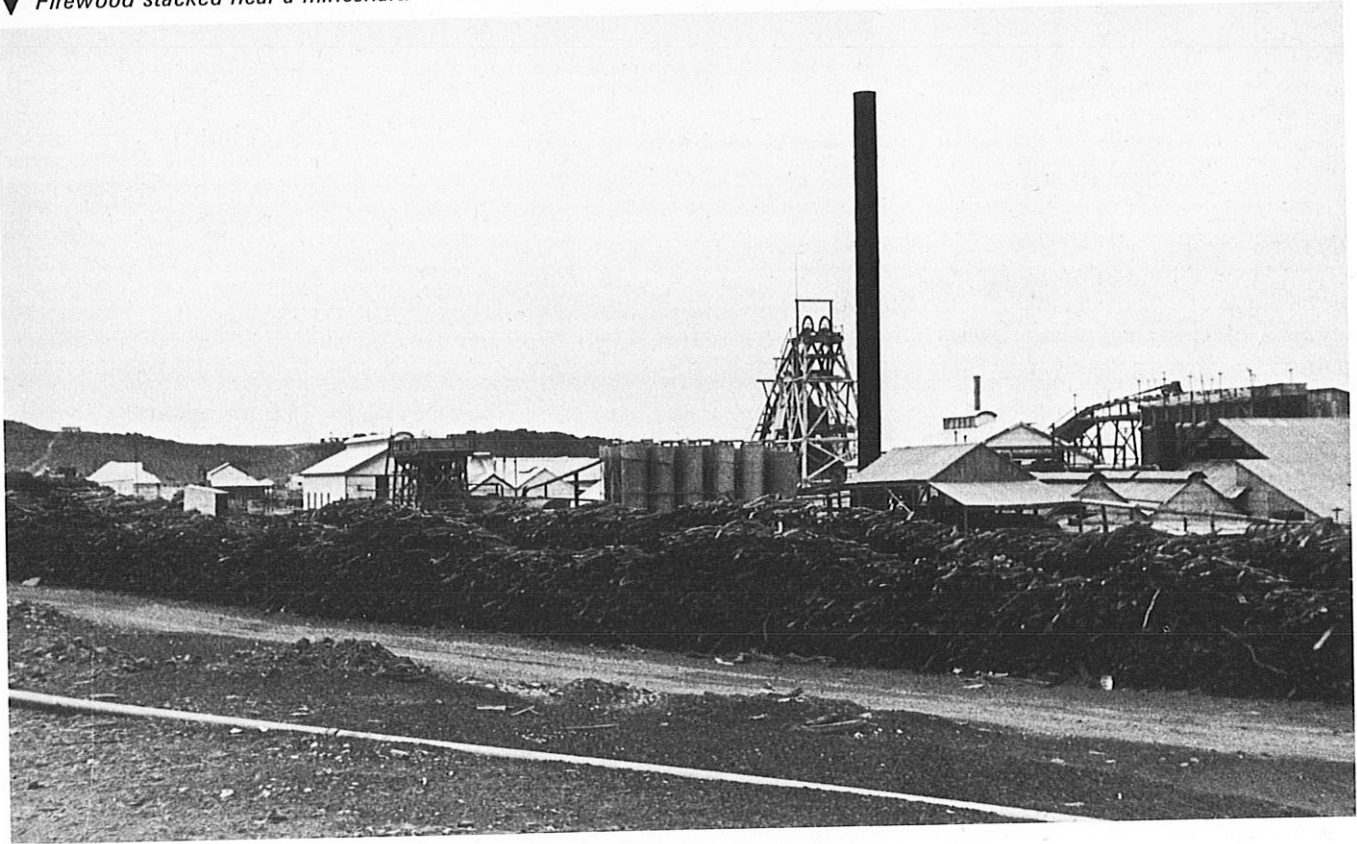


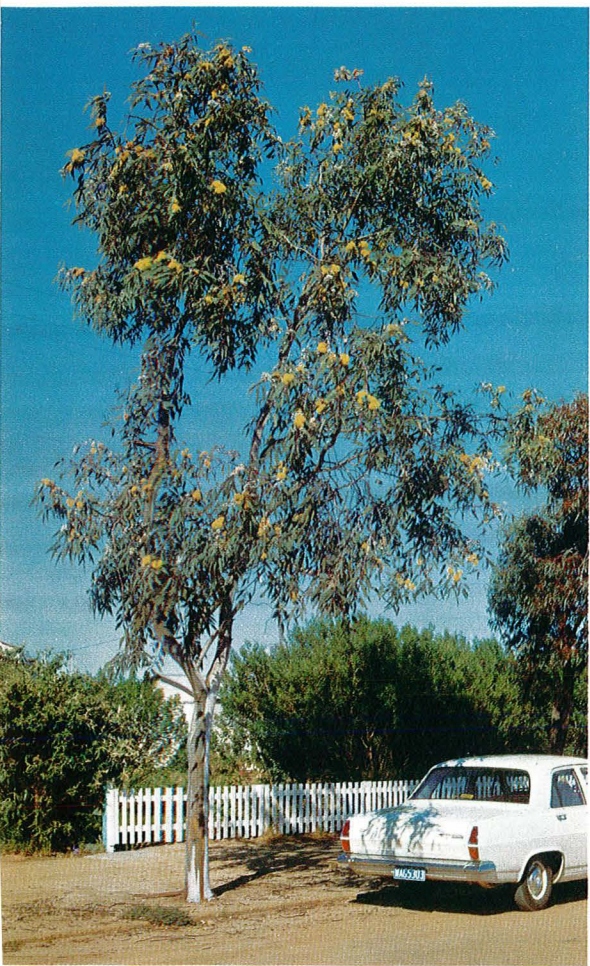
▲ Goldfields woodline train. The first wagon is carrying logs for mining timber.

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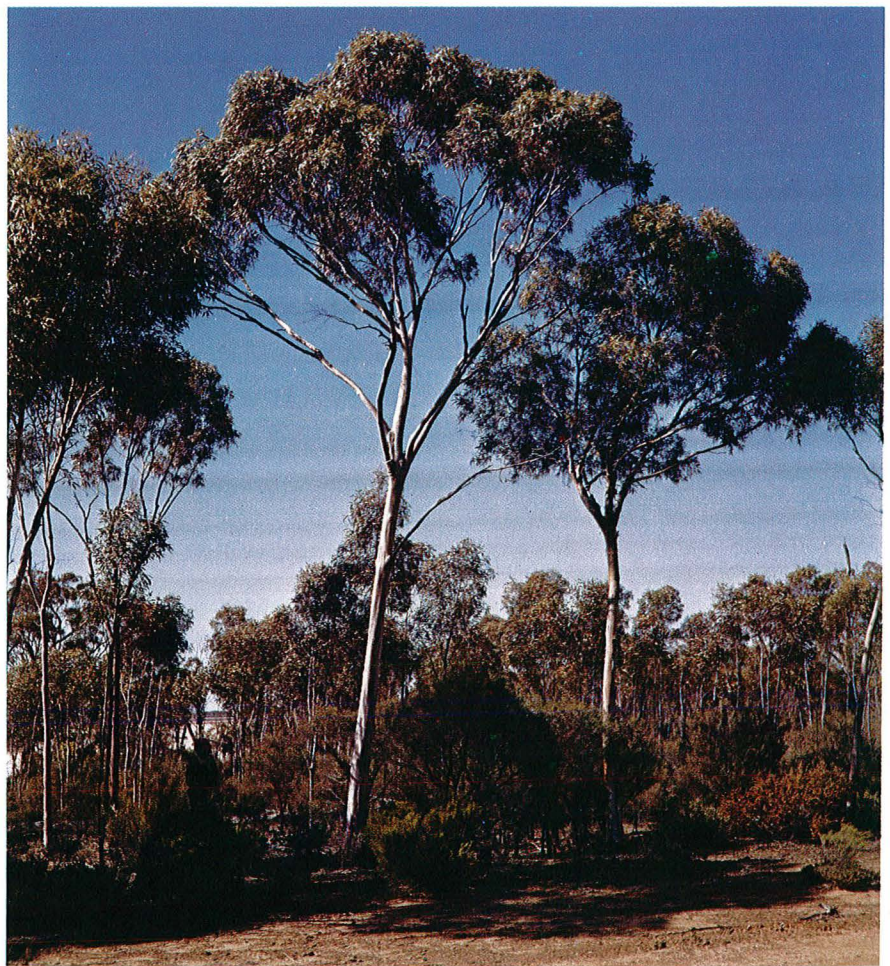
▼ Firewood stacked near a mineshaft.

‡





▲ *Lemon flowered gum* (*E. woodwardii*) in a Kalgoorlie street, and, below, its flowers.  
▼ (Govt. Photographer)



▲ *Merrit* (*E. flocktoniae*) with regeneration in the background.

▼ *Mature coral-flowered gum*. (Both Govt. Photographer)





▲ *Normal coral flowered gum blossom.*

(Govt. Photographer)

▼ *Yellow flowered variety of the coral-flowered gum.*



## North-western areas

Following the success of this work in the southern half of the state, a forester was seconded, late in 1963, to investigate and promote the growing of trees for amenity purposes in the rapidly developing north-western areas. This project has developed considerably and has received excellent support from the expanding communities of the townships and from the mining companies.

The Pilbara is one of the most highly mineralised regions on earth. The key mineral in the dramatic development of this region is iron ore, although bauxite and other deposits are quite extensive and will also influence the region.

One result of this massive development has been that towns or settlements which previously had populations of only a hundred or so are rapidly growing into towns of several thousands. In addition, new centres are being established. The new towns are of two types, the "company" towns and the "open" towns developed under normal government guidance and administered by a local authority.

The more important of these open towns are the developments at South Hedland and Karratha. It is estimated that the Port Hedland area population is likely to reach 20,000 by 1980, with most of the increase occurring in the satellite township of South Hedland.

Karratha, situated near Roebourne, is likely to have a similar population and construction of new homes in this township commenced in 1969. However, the precise dates and locations of the proposed steel works and offshore gas pipeline will be the determining factors in development of these two centres. Both are being developed mainly by the State Housing Commission.

## Shelterbelts

In this semi-arid region, trees and shrubs play an important role in



▲ Three flower colour variations of the goldfields sand mallee (*E. eremophila*) ‡

providing shade and shelter, in improving the aesthetic appeal of residential and recreational areas and in assisting in the control of windblown dust.

During 1970, the chairman of the North-West Planning Authority requested advice from the Conservator of Forests on possible establishment of shelterbelts around the towns. Later in the year Forests Department officers, Eastman and Batini, visited the Pilbara region accompanied by the current tree adviser, Fred Lullfitz.

Inspections were carried out at six Pilbara centres, and a list of recommendations was included in a report.

The Pilbara region is unsuited to commercial production of timber or other forest products. Tree growing is concerned primarily with provision of shade, dust barriers and amenity values. The visual amelioration of this harsh landscape is considered to be an intangible asset of great importance.

Under domestic conditions growth rates are rapid—particularly with species such as river gum which can grow to 3-5 m by the age of two years, and corkbark (*Sesbania grandiflora*) which has grown to 3-4 m at the age of eighteen months. Some insect problems (galls and termites) do occur, but can usually be controlled.

Some species can withstand moderate cyclones by shedding their leaves, or through other survival mechanisms. The success of any long term planting schemes in this region will depend on the tree's ability to withstand the occasional severe cyclone which occurs.

Much of this area is naturally treeless and satisfactory growth—if any at all—could only be achieved by watering the planted seedlings during their early years. Results already obtained in this region by artificial watering are quite remarkable.

Shelterbelts of native shrub species (including wattles and hakeas) would require less water and fostering to boost their growth than introduced tree species—particularly after establishment. This native shrub shelterbelt would be a poor alternative to the higher tree shelterbelt, but could give a minor level of protection against dust for a relatively low cost.

### Irrigated silviculture at Ord

The Agriculture and Forests Departments are co-operating with the Commonwealth Forest Research Institute's experimental irrigated tree plots in the Kununurra area.

There is little available world-wide information on the performance of eucalypts under irrigation, other than that from the F.R.I.'s experiment near Darwin, which used sewage effluent. In this trial the growth of several species was very promising and has indicated that under irrigation, adequate growth rates can be maintained throughout the year. Unfortunately this experimental plot was damaged during the Darwin cyclone.

Thirty-two tree species are under test in the Darwin experiment. In one twelve-months-old plot the mean height of one species was 7.05 m. The fastest growing four or five species put on between 10 and 12 tonnes of wood a hectare. It is expected that this rate of wood production will increase dramatically in the second and third years.

Two problems to be faced at the Ord location are a higher pH (alkaline) reaction in the soil and a higher salt level in irrigation water.

Closer to Perth, the C.S.I.R.O. and Metropolitan Water Board are co-operating (with some initial assistance from the Forests Department) in an experiment using effluent from the Beenyup waste water plant near Wanneroo to irrigate softwoods. After initial nutrient



▲ Young white mallee (*E. erythronema*) in a Kalgoorlie street. ‡

imbalance problems had been rectified, the trees are showing excellent growth rates.

### Kimberly Trials

Two Kimberley seedling trial plots were commenced in December, 1972—a two-hectare plot seven miles north-east of Kalumburu mission on the extreme northern tip of Western Australia; and a one and a half hectare plot near Drysdale River homestead.

The main vegetation type on both plots was a fairly dense woodland dominated by messmate (*E. tetradonta*) and wollybutt (*E. miniata*). The Kalumburu site had previously carried a considerable number of northern cypress (*Callitris intratropica*) stems, the bulk of which have been felled for local use.

Each plot is fenced to exclude cattle, and in the case of the Kalumburu plot, additional fencing was needed to keep out the rock

wallabies. Species planted included northern cypress, river gum, Caribbean pine (*Pinus caribaea*), and African mahogany (*Khaya senegalensis*).

### Trees for the North-West

As a result of Mr. Lullfitz's experience, his recommendations on some of the most suitable species for the region are listed below, and could be of interest to people living in the North-West. However, before undertaking a serious or extensive tree-planting scheme, it is strongly recommended that advice be sought regarding suitable species for the soil types, climatic factors, availability of artificial watering and water quality in the areas to be planted.

- River gum (*E. camaldulensis*)
- Coolibah (*E. microtheca*)
- Gum topped bloodwood (*E. dicromophloia*)
- White gum (*E. bigalerita*)
- Cabbage gum (*E. grandifolia*)
- Kopi gum (*E. striatocalyx*)
- Corkbark (*Sesbania grandiflora*)
- Chintabel (*Erythrina vespertilio*)
- Cadjeput (*Melaleuca leucadendron*) and related species
- Rottneet tea tree (*M. lanceolata*)
- Indian tulip or portia tree (*Thespesia populnea*)
- Kurrajong (*Brachychiton* species)
- White cypress (*Callitris glauca*)
- Sheoak (*Casuarina glauca*)
- Wattle (*Acacia* species)
- Leichardt pine (*Nauclea orientalis*)
- Cluster fig (*Ficus glomerata*)
- Poinciana or flamboyant tree (*Delonix regia*)
- Golden shower (*Cassia fistula*)
- Cape lilac (*Melia azederach*)
- Moon tree (*Kigelia pinnata*)
- Tamarind (*Tamarindus indica*)
- Coconut palm (*Cocos nucifera*)
- Port Jackson fig (*Ficus rubiginosa*)
- Carob bean (*Ceratonia siliqua*)
- Jacaranda (*Jacaranda mimosifolia*)

Mr. Lullfitz has established a nursery at Broome, where plants



▲ Variations in the blossoms of white mallee. This is one of the species with an extensive range, and observations suggest that the proportion of red and pink flowered specimens is higher east of Merredin. In the northern extensions (Wongan Hills and Morawa) a more upright, slender variety is found. ‡



are raised and sent to other holding nurseries in the North-West, such as the shire nursery at Port Hedland.

### Reference books

The following publications will be of value to those interested in further information:

Suitable trees for planting in the wheatbelt\*

Suitable trees for planting in the South-West and Esperance plains\* (free Forests Department leaflets)  
Selected Flowering Eucalypts of



of W.A.\* † (Forests Department booklet \$1)

Eucalypts of the W.A. goldfields and adjacent wheatbelt † (Forestry & Timber Bureau \$3.75)

Growing trees on Australian farms † (Forestry & Timber Bureau \$4.40)

The use of trees and shrubs in the dry country of Australia † (Forestry & Timber Bureau \$6.85)

Forest trees of Australia † (Forestry & Timber Bureau \$8.50)

Forestry in Western Australia\* (Forest Department \$1.50)

\*Available from Forests Department, W.A.

†Available from Australian Government Publishing Service.



◀ *Boongul* (*E. transcontinentalis*) reaches its best development in the goldfields (up to 20m), but in some areas grows as mallee. (Govt. Photographer)



◀ *Boongul* flowers. (Govt. Photographer)

*Seedlings (normally first year stock) are available for sale to people and local authorities in country areas from department nurseries at Hamel and Narrogin.*

*People interested in obtaining seedlings should first obtain the leaflet "Trees for shade, shelter and conservation" which contains conditions of sale, ordering advice, prices and a list of species available.*



◀ *Salmon gum* (*E. salmonophloia*) and *gimlet* (*E. salubris*) regeneration, 40 years old, north of Kalgoorlie. (George Nunn)

# Torwood

No article on dry land eucalypts—particularly those from the Kalgoorlie region—can be complete without some mention of the torwood.

The torwood is a hybridisation of the two species *E. torquata* (coral-flowered gum) and *E. woodwardii* (lemon-flowered gum). When these two species from widely separated areas of natural distribution are brought together under cultivation, hybridisation occurs freely.

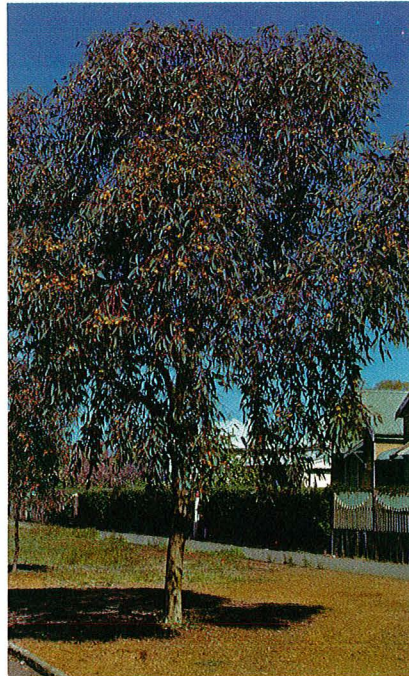
The progeny of two such colourful parents has naturally caused considerable interest in horticultural circles. When first raised in the Kalgoorlie nursery, they were dubbed “torwoods”.

As one would expect, wide variations in vigour, tree form, leaf formation and the colour of the flowers became apparent as they developed.

By culling weak seedlings it is possible to obtain trees of greater vigour, denser crown and better appearance than either parent, but there appears to be no sure way of selecting blossom colour. Some trees will produce blossoms of similar colour to those of the individual parents, particularly the yellow of *E. woodwardii*, but most will be of intermediate shades. While shades

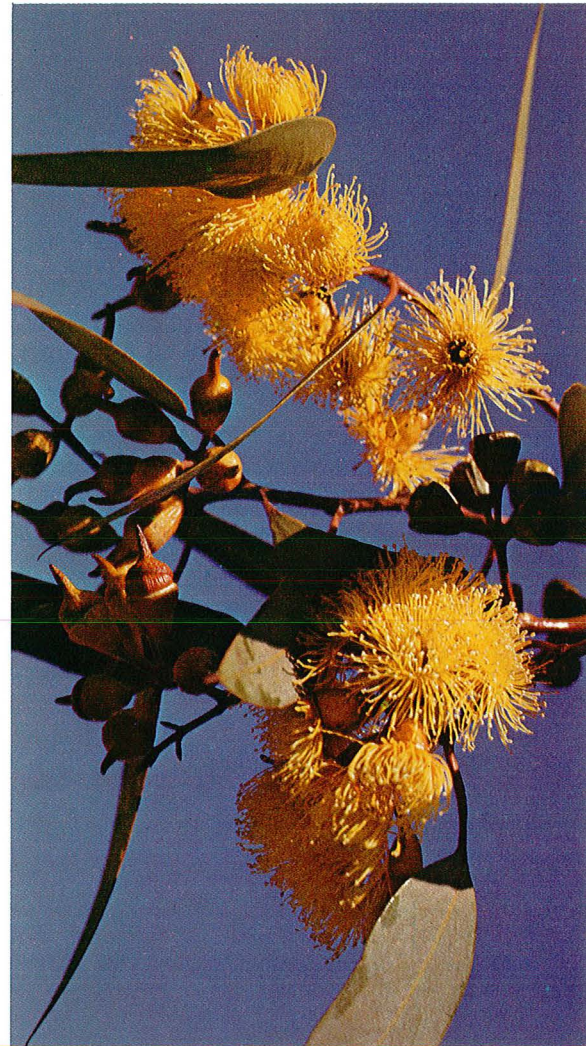
approximating to orange are general, some of the more spectacular blossoms show unusual dual tones, the outer part of the blossom showing a distinct colour difference from the centre. 🕒

Two different flower types of torwood. (Govt. Photographer) ▶



▲ Torwood street tree, Kalgoorlie. †

Parents of the *E. torquata* *E. woodwardii* hybrid in the grounds of the North Kalgoorlie school. ▼ †



# Recreation Characteristics of Western Australian Forests

by P. N. HEWETT

As working hours have decreased and apparent nett disposable incomes have increased, the population of Australia in general and Western Australia in particular has found much more opportunity for leisure.

Although Perth takes great pride in its swimming and surfing beaches, and the boating opportunities of the Swan River, there are many days, especially in winter and spring when people turn to the forests for their recreation experience.

The picnic ethic is well known even though inadequately researched, but the more active forms of recreation are little appreciated by other than the participants.

The natural forest areas of Western Australia are meagre by world standards and occupy only 1.8 million hectares or 0.72 percent of the state.

It is fortunate for the forest recreationist that the forests are almost entirely within the most densely populated portion of the state, that some attractive forests occur only 40 kilometres from the city of Perth, and that even the remotest portions of State Forest are within 500 kilometres.

From 1954 to 1971 there was a seven percent increase in the proportion of the state's population living in Perth and a three percent decrease in the South-West land division. To some extent at least, part of the rural population from the forest zone moved to the city, but retains a nostalgic regard for the forest environment.

## Past activities

Use of forest areas for public recreation dates back prior to 1939 when weekend excursions by rail

were provided to a public which was much less mobile and independent than it is today. Family groups, school parties and sporting teams used places like Mundaring Weir for holidays, education or team training, and the "bona-fide" traveller system for Sunday trading helped to maintain this interest when railways closed and the level of motor car ownership rose in the fifties.

Observations of increasing recreation activity were reported from several forest headquarters near Perth in the late 1960's and this led to the first forest visitor survey for near city forests in 1969.

Similar surveys were conducted at Dwellingup, Manjimup and Gnangara in 1970 and 1971.

The initial survey was directed almost solely at dispersed picnic groups and other low key forest uses, and revealed a level of some 250,000 forest visits per year within 60 kilometres of Perth city.

The Forests Department is committed to a policy of managing its forests for multiple use, but this should not be taken to infer multiple use of all areas of forests at all times. Some of the major constraints to the universal application of multiple use principles, include those of mining activity, forest disease quarantine areas and water catchment areas. In addition to these relatively fixed constraints there are also difficulties with respect to planted forests, contemporary logging,

regeneration and protective programmes, as well as the immediate on-site difficulties of compatibility between various recreational pursuits.

Recreation policy of the department is directed toward achieving control of established use and the limited provision of facilities to service them. The competition for use of specific areas is such that it is not considered wise at this time to actively encourage or promote additional forest use until finance is available to service it properly. Funds available to date have been directed to the provision of simple picnic and barbecue facilities, self-guiding nature trails and marked bushwalking tracks. Most of the current expenditure is directed solely to the maintenance of established facilities.

## Current activities

Active recreation demand is being investigated from an organisational viewpoint to assess the number of people involved, current growth trends and the environmental impact likely to occur. Particular attention is being given to motorised recreation for which there is a large and growing demand.

## Motor rallies

Motor car rallies have been using forestry roads and tracks for many years during their autumn to spring rally season. The larger clubs are affiliated with the Confederation of Australian Motor Sport—C.A.M.S., through which all official rallies, including some events of the Australian Rally Championship are run. A system of route survey by rally directors and approval by relevant Forests Department district staff was initiated in 1973 and has worked well. Planning will become more difficult as a consequence of Quarantine Zones established to reduce the rate of spread of the forest pathogen *Phytophthora cinnamomi*, the cause of jarrah dieback.

Liaison with informal sport's car groups is more difficult to effect but the position is improving as more people in this category learn of the C.A.M.S. approval system.

Of a rather different nature are the Western Australian Motor Cycling Association—W.A.M.C.A., the Western Australian Mini-Bike Association—W.A.M.B.A., and the Recreation Vehicle Association—R.V.A., which collectively represent 12 motorcycle clubs, 10 mini-bike clubs and 3 or 4 dune-buggy and four-wheel-drive clubs.

### Trial, trail, mini bikes

The invasion by foreign motor cycles since the late 1960's has been felt Australia-wide, and Western Australia has a significant share of mini bikes, trial bikes and trail bikes. Official statistics record only licensing of machines so that assessment of total numbers for off-road motorcycles is at best an estimate. W.A.M.C.A. and W.A.M.B.A. cater for some 1,000 motor cycles of all shapes and sizes, and are genuinely concerned with maintaining amicable relations with state and local governments. However, it is estimated that another 5,000 unlicensed machines exist in Western Australia, and since the primary attraction of trail and mini bikes is lone, pioneer riding, there seems little chance for organizing this majority group.

The organised clubs and to a lesser extent, spokesmen for some individual owners, have sought the use of state forest for regular motorcycle activities covering the whole range of events for which trial and trail bikes are designed. In addition some clubs have made application for leasing or alienation of parts of the forest for their exclusive use. However, there is limited availability of forest land which is free from jarrah dieback, readily accessible from the Perth area and not within a water catchment reserve. In some areas, even occasional use of large areas causes noticeable

deterioration of the site, and would need careful monitoring under regular use. Furthermore the establishment of a permanent headquarters for any recreation group always involves construction of buildings and removal of at least some tree cover. Purchase of private land adjoining state forest has been recommended as a preferred course of action.

### Beach buggies

The dune-buggy or beach-buggy organisations have also made approaches for use of forest lands as an alternative to the near-city beaches where their reputation has become tarnished and to the comparatively remote Lancelin dunes which are 150 kilometres north of the metropolitan area. The firebreak areas of some plantations on the sandy Swan coastal plain have a limited potential for this group, but these will not be made available if their irresponsible behaviour, such as that on the south coast's giant Yeagerup Dune in late 1974, continues.

### Four wheel drive

There are two or three clubs which represent four-wheel-drive vehicles in Western Australia although they represent only a minority of owners. These vehicles have the ability to use non-road conditions and appear to also inspire a degree of irresponsibility in their drivers.

There can be little doubt that much of the damage to frontal dunes of Western Australia's beaches, often attributed to dune buggies and to trail bikes, began when four-wheel-drive vehicles "blazed" a trail across the fragile heath ecotypes so common to this State's southern coastline. The desire of owners to repeatedly prove that vehicles of this kind can force a path anywhere is reflected in the rapid spread of jarrah root rot and increased turbidity of river systems.

For these reasons, recreational use of four-wheel-drive vehicles may be excluded from state forest.



▲ *Four-wheel drive vehicles are responsible for considerable damage to the environment, including erosion, increased stream turbidity and spread of jarrah dieback.*

### Fishing

Streams and pools within forests of the South-West, are popular fishing spots during the open seasons, the issue of licenses being controlled by the Department of Fisheries and Wildlife.

There have been several types of fish introduced including, redfin perch (*Perca fluviatilis*), brown trout (*Salmo trutta*) and rainbow trout (*Salmo gairdneri*), mainly since 1930, and these are now well established from the Canning and Serpentine Rivers in the north to the Warren River in the south.

In many streams the most popular fishing is for the fresh-water crustacean, marron (*Cherax tenuimanus*) which is also widely distributed. Marron fishermen believe that declining catches have resulted from the introduction of trout, but little scientific investigation of this claim has been published.

Assessment of the level of fishermen and of their catch is virtually impossible because of the diversity of fishing spots, some illegal fishing, and the secrecy which surrounds the best places. There are several established angling clubs in the state, but fishing of one kind or another is almost universal and the clubs would cater for a very small minority.

The only Forests Department study of marron fishing was carried out in summer 1972-73 in the Murray River. It was estimated that in excess of 10,000 people fish for marron each year in this river, their average catch per fishing night being 0.92 marron.

### Canoes

Western Australia has few permanent running streams and even fewer with "white water" suited to competitive canoeing. As with motor cycles, club membership reflects only a small fraction of canoe ownership, and the adoption of canoes as a high school sports activity has accelerated interest in ownership and hire of both kayaks and Canadian canoes.

Some of the best streams for canoes are said to be the Murray, Collie and Blackwood Rivers, all of which have considerable lengths within state forest and have potential for development as canoe "trails", unless they are modified by reservoir construction. Other streams in the so-called "deep south" near Manjimup and Walpole have limited present use, but should funds become available for removal of snags and improving access they could provide alternative sports canoeing. The Forests Department has provided some assistance to canoe groups by way of advice and provision of maps,

but has not been able to assist financially or physically.

### Horses

Horse and pony clubs exist in several urban and country centres and in the past have concerned themselves primarily with gymkhana activities such as novelty events, dressage and hurdling. Since 1973 there has been a change in emphasis with interest in trail-riding.

The use of forest land for trail-riding has not been very extensive but can be expected to expand. The health and water pollution problems associated with equestrian activity have not been studied to any great extent in Western Australia but it is considered expedient to exclude horse activities from all water catchment, at least until such time as their presence can be shown to pose no serious health risks. In non-catchment areas horse riding can be permitted subject to the provision of feeding and stabling areas outside the forest.

### Orienteering

Orienteering as a competitive sport was established in Western Australia in 1972 and has shown relatively rapid growth. There have been small

events conducted in metropolitan pine plantations but most competitive meetings have been conducted in John Forrest National Park. The use of state forest for intensive orienteering can not be encouraged because of the limited areas of suitable forest close to Perth which are not on catchment.

### Bushwalking

There is a growing interest in bushwalking as a group or family activity in Western Australia, and the three existing clubs, have a membership of approximately 200 people. To this number must be added Guides, Scouts, para-scout organisations including Church of England Boys Society, Y.M.C.A. and the Duke of Edinburgh Award Scheme.

The department, in association with these groups has planned and established the state's first long distance walking track which extends from Kalamunda (near Perth) to Northcliffe in the southern karri forest. Named the Bibbulmun Bushwalking track after an aboriginal group which formerly inhabited much of the southern coastal zone, it is more than 40 kilometres in length and its use awaits the publica-

**ESTIMATES OF RECREATION LEVELS  
IN W.A. FORESTS (VISITOR DAYS)**

Activity	Area Demand per person	Organised Groups	Others	Total
Passive Recreation	Small	100 000	150 000	250 000
Motor Rallying	V. Large	500	200	700
Motor Cycling	Large	1 200	2 500	3 700
Beach Buggy Driving	Large	80	trace	80
Four Wheel Driving	V. Large	100	200	300
Canoeing	Confined	50	150	200
Horse Riding	Medium	30	160	190
Orienteering	Medium	150	trace	150
Bushwalking	Large	1 250	1 250	2 500
Camping	Small	300	300	600
Fishing	Confined	500	20 000	20 500
Totals		104 160	174 760	278 920

tion of a guide book and maps of the area. The Bibbulmun track will serve a wide range of forest users but is intended for the less experienced walker. The experienced walker will no doubt continue to map out his own journey as he has done in the past, but the marked track is expected to interest a much larger part of the population.

### Camping areas

Amendments to Camping Regulations of the Health Act permit "wild" camping subject to the following conditions

- the use of the land is permitted by the owner or occupier of that land;
- there is not in force any by-law made by the Council under the Local Government Act 1960, prohibiting camping or use of a caravan in that place;
- a nuisance is not and will not be caused by a lack of or defective sanitary arrangements;
- the caravan is parked or the camp is occupied in that place for three nights or less;
- there is no caravan park within a radius of 16 kilometres.

It is known that "wild" camping occurs within state forest from time to time but the department does not intend to either encourage this practise or to establish camp grounds under its own management. There is an existing network of caravan parks in or near the state forest at a number of centres including Mundaring, Armadale, Pinjarra, Collie, Donnybrook, Manjimup, Pemberton and Walpole, and by arrangement with local government, campgrounds have been established within state forest at Waroona and Logue Brook dams. There are also properties controlled by the Youth Hostels Association within forests at Mundaring Weir, Byford, Nogerup, Darradup and Pemberton.

These camping facilities are complemented by those used by special interest groups such as Guides and Scouts.

*In some areas even occasional use of trail bikes causes noticeable site deterioration.*

Even so, the department receives numerous requests for leases of forest areas as campsites and although each is treated on its merits, the general policy is opposed to creation of additional camps within the forest. A camping area usually requires an open space within a forest setting and this can be readily achieved by purchase of private land, often only partly cleared, but adjacent to state forest.

Exceptions to this general approach have occurred on three occasions in the last few years whereby abandoned forest headquarters at Dryandra (near Narrogin), Wellington (near Collie) and Pimelea (near Pemberton) have been leased to community organisations for use as youth and family holiday camps.

### The future

And what of the future? Current forecasts suggest that increases in demand of between seven to 10 times are likely within the next 25 years. This must accentuate the current problem areas such as the competition for land, overuse, sanitation, maintenance and supervision. Should we forecast possible changes in emphasis? Could these include a return to steam driven railway "nostalgia tours" of the forest areas, an increasing demand for museums and interpretive centres, a greater use of pine plantations (especially in areas close to Perth) and, possibly, spotlight "safaris" to observe some of the nocturnal native animals?

If these forecasts are all realistic, a greater input of resources (manpower, time and money) will be necessary if the character and appeal of the forest is to be conserved. 🗿

*Queensland silver wattle at Gleneagle, (Albany H'way)—an old Forests Department settlement converted for use as a picnic area.*



