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# FOREST FOCUS

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## LOSS OF PRODUCTIVE FOREST










23 x 34 1/2

# WESTERN AUSTRALIA

## FOREST AREAS OF THE SOUTH WEST

SCALE: 10 MILES TO AN INCH

### LEGEND

- STATE FOREST & TIMBER RESERVES 
- NATIONAL PARKS 
- PINE PLANTATIONS 
- KARRI 
- WATER CATCHMENT - BOUNDARY 
- DIVISIONAL OFFICES 
- MAJOR TOWNS 
- DISTRICT OFFICES 
- OTHER TOWNS 



*This map indicates how bauxite mining leases cover present major water catchments. It can be seen that virtually all water catchments are within State forests.*

*The proposed North Dandalup and Murray catchments are marked.*

*The Forests Department has always supported the multiple use concept with relation to forest land and apart from normal forest produce aspects, has given attention to the needs of the water supply authorities, naturalists, tourists and public recreation requirements.*

*Western Australia, and Australia as a whole, is underforested on world standards. This is shown by the table below:*

### Brief Comparison of Commercial Forest Areas

Country	Total Area	Area of Commercial Forests	Forests as Percentage of Total
	millions of acres	millions of acres	%
United States	1,904	485	24.3
Canada	2,218	529	23.3
Japan	91	62	68
Australia	1,900	87	4.6
West. Australia (State Forests)	625	4.5	0.72



## FOREST FOCUS

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Compiled by Dale Watkins

### Front Cover

*On this spot, a jarrah forest once stood. Milling of "Swan River mahogany" commenced in this area over one hundred years ago. All that remains now is a patchwork of mined areas; abandoned tablelands which were cleared for mining; and the remnants of regenerated jarrah forest. The foreground trees are five years old. Note the lack of ground cover over the whole area.*

*"... the State will require all its present forests, parks, reserves, beaches and adjacent waters, at least in the south-western part of the State, and probably more, in order to provide sufficiently for the recreational and aesthetic needs of the people."*

*"... it appears to us that the forests have so many other advantages to the State and the people that commercial production is not the only reason why they should be preserved."*

*"... the forests should be safeguarded not only for these reasons but because they are a scenic and tourist attraction and provide a natural habitat for the indigenous plant and animal life which occur naturally in a forest of indigenous trees."*

*The above quotes are from the Report of the Committee of Inquiry into the Mining Act, January, 1971.*



# Focus on Loss of Productive Forest

An average area of 1,387 acres of forest cover, much of it prime forest, has been lost from State forests every year for the past 20 years.

This attrition of dedicated forest is due to the extension of necessary public utilities as well as some commercial activities such as mining in State forests.

The total loss of 27,741 acres in 20 years is significant when it is realised that of the 625 million acres of Western Australia, less than four and a half million acres (0.72 per cent) are dedicated forest (see comparative forest areas, page 2).

On world standards, Western Australia is not only under-forested, but is also the driest third of the driest continent. Of the southern part of the State, where population is concentrated, only 10 million acres enjoy over 30 in. rainfall a year.

Population concentrations are situated close to the forest area, which provides various products to the community. The most vital of these is the State's most precious "mineral"—water—supplied and delivered to the front door at a cost of 5.6 cents a ton!

For 25 cents a thousand gallons, it is supplied to an estimated population of 612,730 through the metropolitan water supply scheme. The

1969/70 consumption figure was 142,052,800 tons. (See water catchments map, page 2.) Additional to this is the water piped by the country water supply schemes to inland mining centres, towns and farms.

### No forests—no fresh water

While Western Australia is extremely rich in minerals, it can be fairly claimed that the most valuable—from the human angle—is good quality fresh water.

Having no extensive chains of mountains to provide water from melting snow, most West Australians rely solely on forest catchments for domestic and industrial fresh water needs.

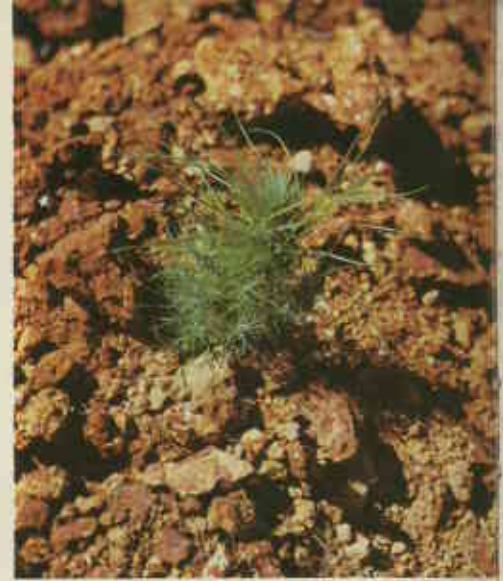
Local and world-wide experience with water catchments has proven that when forest cover is cleared, salinity, siltation and turbidity problems arise. A branch of the Collie River feeding Wellington Dam has

### INTRODUCING . . .

the new Minister for Forests, Mr. T. D. Evans, who also carries the portfolios of Treasurer and Minister for Tourism.

One of the Minister's first activities with the Forests Department was to visit his home town of Kalgoorlie to attend a function held for a senior officer, Mr. R. Donovan, who was retiring after 40 years of service (30 of which were spent at Kalgoorlie).





*Above, left: The lack of normal taproot development does not augur well for the future.*

*Above, right: Pines, too, suffer windthrow. Here a pinaster pine (*Pinus pinaster*) has struggled to gain a firm footing—and lost.*

*Right: The harsh conditions with which some seedlings have to contend.*



*Above: A sample of erosion in an area planted with pines in 1969. The good patch of tallwood (*E. microcorys*) in the background is on a cleared and abandoned area.*

*Below: Five-year-old plantings ranging from completely disappeared (foreground), to poor, and good in the far background where soil is deeper and fertilising brought a good response.*

*Right, centre: Windthrow in the oldest (five years) planting. Where the surface soil is shallow, the tree roots have failed to penetrate the underlying "hard pan" to gain the required anchorage.*

*Right, bottom: This is what it used to look like (see back cover and page 15). This photograph was taken in the Jarrahdale area.*



*A patch-work of cleared but abandoned, and mined areas. Foreground is also cleared and abandoned. All have been planted with various exotic species with varying results. The superior response in the valley is on an abandoned area where top-soil was not removed.*

10 per cent of its catchment cleared, but the salinity is about three times as great as that in two other feeder rivers which drain from forested land.

The only streams which are reasonably free of salt and suitable for domestic and industrial water rise in the forested areas.

The importance to the community of retaining a normal, healthy forested water catchment can readily be seen. However, there are occasions where it is necessary, in the community's interests, to clear part of forest areas and catchments to provide public services such as roads, railways, power transmission lines, water storage reservoirs and pipe-lines.

Areas of State forest lost to these services in the last 20-year period are: water supply reservoirs 14,845 acres; power transmission lines 8,296 acres; new and re-aligned public roads 1,589 acres.

To this should be added the rapidly increasing problem of open cut or strip mining in State forests, 1,541 acres.

### **Mining spells destruction**

When the Forests Act of 1918 came into force it was recognised as advanced legislation in that it gave the Conservator of Forests wide powers to conserve and manage a small but increasing forest estate which had already been put under stress by early uncontrolled logging operations.

*The malformed taproot of this wind-thrown pine (held erect for the photograph) illustrates the problems involved when the too shallow overburden is on top of a hardpan which is impenetrable for most species.*



It was then recognised that our forest resources were limited. The Attorney-General and Minister for Woods and Forests, the Hon. R. T. Robinson, in introducing the second reading debate of the Forests Bill on 17 September, 1918, said:

*"Forests are not mines and any attempt to treat them as such spells their destruction. The course of a gold-mine is clear. There is so much gold in a mine we say, 'Let us get it out as*

*fast as we can and make as much profit as we can upon it.'*

*"When gold is exhausted the mine is finished. With forests the position is different. Here we have a mine of wealth, but unlike a gold mine it is inexhaustible so long as it is worked properly. It is not so much a question of how much timber there is in a forest and how quickly we can get it out and turn it into money. This, unhappily, has been the point of view of early govern-*





*Above: Power transmission lines have caused the loss of about 8,296 acres of forest in the last 20 years.*

*Below: Serpentine Dam. In the last 20 years water storages have inundated about 14,845 acres of the forests which feed them. The higher the population, the more forest catchment area required to supply water requirements.*



*ments; but it is a question of how much we can take out without impairing the continuity of the supply."*

Two forms of mining were already established in the main forest areas in 1918—coal mining at Collie and tin mining at Greenbushes. The area covered by these activities has been of minor concern in relation to the whole.

Some 20 years ago mineral sands mining was commenced and claims were lodged for small areas of forest. In view of the limited areas involved, agreements were entered into with the companies concerned, making provision for compensation and restoration of the areas to be mined. The areas sought were generally not high quality forest.

Over the last 10 to 15 years there has been a revival of tin mining activity in the Greenbushes forest area.

### **Major threat**

The first major threat to the forest from open cut mining appeared a little over 10 years ago with the interest in bauxite alumina projects. Concern was expressed by foresters and others because of the likely loss of forest area and because the high grade bauxite was located under prime forest stands.

When objections were raised, the fears expressed were allayed by an assurance that the area which would be involved would be in the order of 20 to 25 acres a year—with a *maximum of 35 acres*. The fact that such an operation would embrace only 2,000, or at the most 3,500 acres in 100 years resulted in the objections not being pressed.

The first such agreement was ratified in 1961 with operations commencing at Jarrahdale in 1963. The company is required to pay compensation on an acreage basis for loss of forest and to undertake replacement of the sandy gravel overburden on the quarry pits. In practice, this replaced overburden provides a top-soil depth of only

4 to 12 in. and its shallowness is now the cause of serious concern. As young trees planted in the mined areas grow taller they become more subject to wind. Wind-throw of some young trees has already become evident and it is feared this will increase as the trees grow above the protection afforded by the steep quarry walls in the earlier planted areas. This, of course, is provided there is sufficient nutrients and summer moisture in the shallow overburden to allow tall tree growth.

A feature of the mining agreements has been that *no maximum* area of operation is specified and the only figure stipulated is the *minimum* tonnages which will be processed.

Already the annual clearing has increased tenfold to some 240 acres. At this rate in a hundred years something like 24,000 acres instead of the stated 2,000 or 3,500 acres would be mined. In addition, much larger annual areas are proposed for mining in prime forests east of Pinjarra.

Nearly 50 per cent of State forest area (2,100,000 acres) is currently taken up by mining lease agreements for bauxite.

In addition to the allocation of large areas of the northern forest, there has been a rush to peg the southern forest for mining tenements in the past 18 months. These claims cover a wide range of minerals with the glamour ore, nickel, being frequently mentioned around Manjimup. In February, 1971, over 800 claims, each comprising 300 acres, had been identified and objections lodged to them being granted. Pegging has been carried out by major companies, and many other parties who may be best described as "land agents". Reputable mining companies normally are most co-operative in the case of forest hygiene requirements, however, unknown operators of any size pose a direct threat to the control of the jarrah root rot fungus *Phytophthora cinnamomi* (see page 10).



*Above: The State will require all of its present forests, parks, reserves, beaches and adjacent waters, at least in the southern part of the State—and probably more—in order to sufficiently provide for the recreational and aesthetic needs of the people. Below: Bauxite mining in State forest, Jarrahdale. Between 1965 and early 1970, 1,200 acres of jarrah forest had been cleared, but only about 300 acres actually mined to date. This photograph shows some of the cleared and abandoned areas with forest in the background.*





*Above, left: Mined and planted area of four-year-old sugar gums (*E. cladocalyx*) showing the quality of natural jarrah forest in the background.*

*Above, right: This area borders the railway clearing to Jarrahdale No. 2 ore crusher plant, and is likely to be cleared for future mining. This is regrowth jarrah resulting from logging operations about 80 to 100 years ago. What is not mature enough for milling will be destroyed.*

*Below, left: Windthrown sugar gum, which subsequently died. Note the lack of root penetration. Planted areas*



*have been experimentally treated with fowl manure and chemical fertilisers. Trees in left background have shown a good response.*

*Below, centre: Erosion of planted areas.*

*Below, right: Erosion in an isolated pocket of deeper overburden. This patch of four-year-old sugar gums (*E. cladocalyx*) and tallowwood seedlings (*E. microcorys*) is showing good initial growth on the deeper pocket of soil and fertiliser treatments, with fewer deaths and windthrows.*





### Loss ratio 3 to 1

The problem which has been experienced at Jarrahdale is that in addition to the area mined, a similar area is cleared and not mined, and there is an additional area approaching the same size again used for roads, crusher sites and so on.

A second plant is under construction at Pinjarra and it has been suggested that this unit could ultimately have an intake of  $2\frac{1}{2}$  times the Kwinana plant. To this must be added the proposed operations at Bunbury and Upper Swan, and based on the growth which has occurred at Kwinana over 10 years, it is difficult to estimate the requirements for these or any other plants.

### Experimental plantings

While some people associated with mining have predicted that the forest destroyed will be replaced with a more vigorous tree crop, foresters claim that these plantings must be regarded as experimental at this stage. It will take a number of years to find out if a satisfactory *protection* forest can be established on these quarry floors. There are definite reservations about the ability of the rehabilitated area to support a high value *production* forest crop.

Any predictions as to the success

or otherwise of these experiments should not be made until the trees are at least 15 or 20 years old and are placing a strong demand on the site.

Soils of the jarrah forest have very low fertility and the sandy gravel under which the best bauxite is found provides a particularly harsh site for forest growth. The high quality jarrah forests which have developed on these areas amaze visiting foresters.

The bauxite before removal is a medium for plant growth to depths of 8 to 14 ft. and generally overlies a heavy impervious clay. The overburden resulting from mining only produces from 4 to 12 in. of sandy gravel to be replaced over the clay.

During the last winter, some windthrow of the more advanced plantings of exotic species at Jarrahdale has highlighted the problems of poor root penetration. Experiments are under way for deeper ripping into the clay before planting in an attempt to facilitate root penetration.

While every effort is being made to achieve success, with the fullest co-operation of the mining company ultimate satisfactory results are far from assured.

Some plantings undertaken to date have shown encouraging growth. These areas have received

(Continued on page 12)



Miss Lexie Nicholls with a penguin rescued during the recent oil spill emergency at Penguin Island.

Photo courtesy of W.A. Newspapers

## OIL POLLUTION

The problem of oil spills may be solved by spreading dry pine bark on the affected waters, according to California-based *Forest Industries*.

Dry shredded bark from southern yellow pines can absorb three times its own weight in crude oil in seconds but repels water for several hours.

Tests at the Texas Forest Products Laboratory proved the utility of the bark for this purpose. Floating oil-soaked bark could be mechanically collected and much oil recovered.

Southern yellow pine is a collective term for several species growing in south-eastern U.S.A. from Virginia to Texas. Some members of the group are included in Forests Department trial plots in W.A.



(Continued from page 9)

applications of both chemical fertiliser and fowl manure.

Fourteen different eucalypt species and seven conifers have been planted, with the hope of proving some as suitable for growing on these rather harsh sites. Factors considered in the choice of species are that they be resistant to *Phytophthora cinnamomi* and that they have a commercial value.

Jarrah is not being replanted at present on the mined areas. The reasons for this are that jarrah is very susceptible to attack by *Phytophthora*, and it has, by comparison with many other eucalypts, a slow growth rate. Jarrah seedlings commonly remain in a dormant condition for up to 15 years before making any significant height growth.

### Long term benefits

Two of the first thoughts which come to mind in comparing the advantages of forestry to those of mining on a particular area are those of short-term economic and social values. What is more important and considerably more difficult is evaluation of the long-term worth to future generations—which is possibly the greatest criterion where a regenerative natural resource is concerned.

Should the attempts to reforest mined areas not be successful, the long term effects of bauxite mining on State forest areas could outweigh any of the short term financial gains being made at present.

Apart from their timber production role, the jarrah forests in which mining is taking place include virtually all of the catchment areas for reservoirs supplying domestic water for the Perth metropolitan area. Being close to the main population centre, these forests also receive a large amount of recreational use, and are also a haven for indigenous fauna and flora.

The beneficial effects of forests in the fields of temperature, wind and salinity control; air purification and oxygenation; and soil and water conservation are of major importance to community welfare.

*The wisdom of mining prime forest in proximity to our heavy population areas is questionable when there are large proven reserves of bauxite in the north where these other values of forestry do not exist.*

### Recommendations

In 1970 the Forests Department made submissions to the Committee of Inquiry in the Mining Act. The following are extracts from the Committee's report:

Recommendation 9 commenced: "We recommend that no marking off, prospecting or mining should be allowed on a State forest, timber reserve, water reserve or catchment area unless a permit is first obtained from the Minister responsible for the administration of the department concerned. The Minister should have power to grant or refuse to grant a permit or to grant permit subject to such conditions as he thinks fit to impose and there should not be any appeal from his decision."

Recommendation 24 commenced: "In view of our recommendations we think that it would be most undesirable to allow the existing or any future applications for prospecting or mining tenements on reserves, etc., to proceed except on the new basis which we have recommended. We therefore recommend that all applications both existing and future for mineral claims, prospecting areas, mineral leases or other mining tenement over any reserve or national park . . . or over any State forest, timber reserve, water reserve or water catchment area or over any private land should not proceed after the date of this report except on the basis that they conform to the relevant recommendations contained in this report and where necessary are accompanied by the necessary consents or permits."