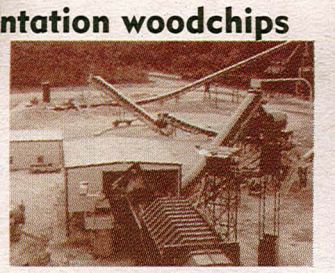
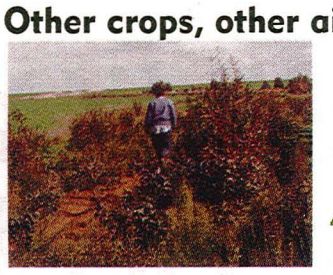




JUNE 2000

Eco Action
Our environment, our future.

WA plantations

State Government of Western Australia
Department of Conservation and Land Management

Plantations lead the way

Plantations in Western Australia meet two very strong demands—for timber, where increasingly they will replace timber from native forests, and for landcare.

▲ *A crop of maritime pines planted on already cleared farmland.*

Spurred on by these demands, new plantations are being established faster in Western Australia than anywhere else in Australia.

In fact, tree crops on farms are being planted three times faster than the average rate of other States and Territories, according to the interim update of the National Plantation Inventory released last year.

Between 1994 and 1998, the area of tree crops in Western Australia grew from 130 845 hectares to 212 304 hectares, an increase of more than 60 per cent.

This represents a dramatic change in plantation development.

Plantations in Western Australia used to be grown in large blocks on State-owned land, when land was either for trees or for agriculture, not for both. About 90 000 hectares of government and private pine plantations were established over more than half a century to help supply local demand.

By contrast, it took just over a decade for bluegums to grow from experimental plantings to a 130 000-hectare industry.

Today's rapid plantation development is based on growing trees on private land, where the environmental benefits of tree planting are desperately needed.

Western Australia has more than 70 per cent of Australia's reported dryland salinity. An estimated 1.8 million hectares of farmland are already salt-affected to some extent. If unchecked, this area could increase to six million hectares, or 30 per cent of the south-west agricultural region.

Salinity is caused by replacing the deep-rooted, perennial native vegetation with shallow-rooted, annual crops and pastures which can't use as much of the rainfall as the native vegetation. The unused rainwater accumulates and water tables rise, bringing with them salt stored in the soil. This causes waterlogging and salinity on low areas.

Fertiliser run-off from agricultural land has also caused algal blooms throughout the south-west, with adverse effects on the biodiversity. Wind erosion is also a significant problem in the south coast agricultural zone.

Extensive field studies show that certain trees can lower water tables rapidly. Stands of vigorously growing trees in the Wellington catchment, for example, lowered the water table by eight metres in 10 years and groundwater levels can be reduced significantly by planting trees strategically on a portion of a farm. These plantings can be integrated with traditional farm practices and can even improve productivity by providing shade and shelter for crops and stock.

The cost of planting trees on the scale required is still more than the community can afford. The Salinity Strategy released recently by Premier Richard Court set a planting target of more than three million hectares of woody tree crops in the south-west agricultural region.

More than a decade ago, the Department of Conservation and Land Management (CALM) recognised the potential of using the increasing demand for wood fibre to pay for the establishment of trees on farmlands.

The objective of CALM's tree crops on farms program was to develop a major commercial industry, on privately-owned land in partnership with farmers, on a scale that would make a significant contribution to the rehabilitation of degraded agricultural land and river systems.

The tree crops on farms program has shown the potential for such an industry and stimulated extensive private investment in tree planting schemes, particularly for bluegums. This investment means there has been no need for the State Government to provide capital for new bluegum plantings since 1994.

CALM's tree crop program was expanded in 1996, under the State Government's Salinity Action Plan, and 7000 hectares of maritime pine have since been planted.

CALM is also developing several species of native mallee eucalypts as short rotation tree crops for the low rainfall zone. More than 7000 hectares of mallees have been planted on farmland since 1994—most of this work has been privately funded by farmers.

Plantations woodchips

The State Government's new direction in forest management has accelerated the transition to a plantation-based woodchip industry.

Sotico, formerly Bunnings Forest Products, will reduce native timber woodchip exports from 630 000 tonnes in 1999, to 270 000 tonnes by 2002.

At the same time, plantation woodchip exports will rise from 50 000 tonnes last year, to 750 000 tonnes in 2002. The chips will be produced from bluegum plantings in the south-west.

The Government will end logging in old growth karri forests from 2003 and then reduce the allowable karri sawlog cut to 50 000 cubic metres a year—less than a third of current levels. This means there will be less harvesting of marri, the major source of native timber woodchips, because the sawlog harvest determines the area cut, not the demand for woodchips.

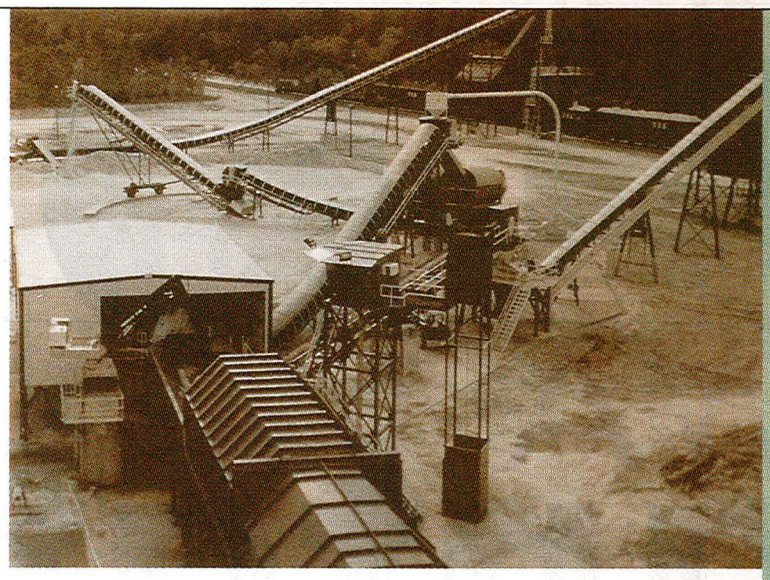
In other developments, Japanese investors have announced plans for a custom-built plantation woodchip mill in Albany. Together with associated plant and infrastructure, expenditure on the project will be close to $50 million by 2003.

The mill will be built by Oji Paper and Itochu Corporation, two of the joint venturers working with CALM to plant about 26 000 hectares of bluegums in the Albany region.

Subject to an environmental assessment, construction of the mill is due to begin later this year and the mill should be operational in the second half of 2001.

The mill's initial production capacity will be 300 000 tonnes a year, which represents the timber harvested from 1500 hectares. The mill is expected to reach full capacity of one million tonnes by around 2005-2006.

The new woodchip project will create an extra 230 direct jobs.

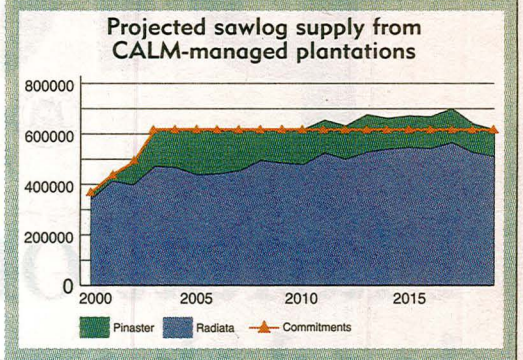


▲ *Investors have announced plans to build a plantation chip mill in Albany, similar to this one operating in the United States.*

Industry's rapid growth

The volume of pine sawlogs and industrial wood logs processed in Western Australia has more than doubled from 334 000 cubic metres in 1988 to 753 000 cubic metres in 1999.

This rapid growth is expected to continue with CALM planning to increase its sawlog supply by a further 340 000 cubic metres by 2005 (see graph). Private plantations are also maturing and expected to increase their log supply.



The State now boasts a broadly-based, integrated plantation processing industry that services the local and export markets.

As a result of the past investments in plantations and industry, Western Australia has the largest particleboard factory in Australasia. Wesfi's factory at Dardanup, and its medium density fibreboard (MDF) plant at Welshpool, use the plantation thinnings, tree crowns and sawmill waste to produce their panel products. Thinnings also produce pine posts and poles that are chemically-treated at several local plants.

Sawlogs are processed mainly at Wespine's Dardanup sawmill. This facility is planned to expand over the next three years to use about 400 000 cubic metres of logs annually. Smaller mills at Bassendean (Pinetec) and Pemberton (Pempine) also use local resources. New industries are being planned to expand further the processing capacity for Western Australian pine.

Nursery grows to meet demand

The first nursery to provide tree seedlings for government reforestation projects was established at Guildford in 1896.

Today, CALM's Manjimup nursery is the biggest of its kind in Australia. A record 26 million seedlings were produced last year and about 40 million will be produced this winter after a $9 million upgrade to meet demand for maritime pine seedlings.

CALM has a second nursery in Narrogin, where most of the seedlings raised go to wheatbelt landcare projects. Narrogin has capacity for approximately 800 000 seedlings but also acts as a holding nursery for local dispatch of seedlings raised at Manjimup, bringing total production to more than a million.

Originally an agricultural tobacco research station, the first tree seedlings were raised at Manjimup in 1972. This nursery initially concentrated on open-rooted seedlings and "potted" plants with nearly 100 different species being raised. The karri seedlings, which were the bulk of production, were mainly grown as open-rooted stock. However, in 1976, the production of the hardwoods changed to a mechanised containerised system.

The first crop was a modest total of 22 000 seedlings which increased to 120 000 the following year and to 2.5 million by 1978, which is about the level of production karri has maintained.

Several other eucalypt species were experimented with in the containerised system to meet expanding demand for fast growing, dieback resistant, or salt-tolerant trees for reforestation projects throughout the south-west of the State.

In 1979, the Forests Department accepted responsibility for raising and establishing some 600 000 container tree seedlings annually for a Public Works Department project in the Wellington catchment, which turned the nursery into a mass production unit.

▲ *Extensions to CALM's Manjimup nursery make it the biggest of its kind in Australia, with an annual capacity of about 45 million seedlings. The new facilities will produce seedlings for the Maritime Pine Project.*

However, to encourage more private tree seedling nurseries to develop, a policy was accepted that the Manjimup nursery could only accept orders of 10 000 seedlings or more.

In 1999, the nursery was expanded to accommodate a maritime pine cuttings program which has been developed to take advantage of the genetic gains that have been made by the breeding program. At present it has a capacity for 25 million pine seedlings and cuttings taking the nursary's total production to more than 45 million for all species.

What is plantation timber used for?

Western Australia's first plantations were established in the 1920s to provide a local source of pine for building materials. Between 1926 and 1962, mallet was planted initially to support the tannin industry and later to produce tool handles, and for fence posts and firewood.

More recently, bluegums have been planted to produce pulpwood for the manufacture of high quality paper, but can also be used for fuel wood, poles for round wood construction, and sawn timber. Maritime pine produces medium density fibreboard, particle board, cases, pallets, veneers, treated posts, poles and sawn timber. Oil mallees are being grown for their eucalyptus oil content and trials are underway to use the residue to produce activated carbon and electricity.

Today, plantation timber is being grown to meet the demand for timber on the world, not local market. Commercial trees are also being grown for their contribution to Western Australia's environment and not just to its economy.

Is there a pine stockpile that could be used instead of logging native forest timber?

An independent review of CALM's plantations operations has rejected previous public criticism that a stockpile of sawlogs existed in CALM's softwood plantations.

The review was carried out late last year by the Melbourne-based consultants Forestry Pacific Pty Ltd (Forpac) as part of the State Government's commitment to new directions for forest management and timber industry development.

The Forpac report endorsed CALM's method of forecasting softwood sawlog resource, stating:

> "This review observed that CALM's inventory data is based on sound methodology which has previously been separately reviewed by two independent forestry consultants for CALM as a requirement of the Auditor General."

The report also found that all of CALM's mature plantations were committed to provide sawlogs to existing industry, and that no stockpile of excess wood existed.

▶ *Maritime pine logs.*

Maritime pine

Maritime pine has come a long way from Portugal's seaside to Western Australia's wheatbelt.

Tree breeders working for CALM and one of its predecessors have produced a much better tree than the stock first introduced to Western Australia in the 1920s.

The success of this work has made maritime pine the key commercial tree crop to fight salinity in the 400-600mm rainfall zone. CALM's Maritime Pine Project is also operating on the coastal plain north and south of Perth.

CALM's pine sharefarming program was increased dramatically under the State Government's 1996 Salinity Action Plan, and continues to be a key action in the updated Salinity Strategy.

Sandy, free draining soil which is quite unproductive for pasture species is ideal for maritime pines.

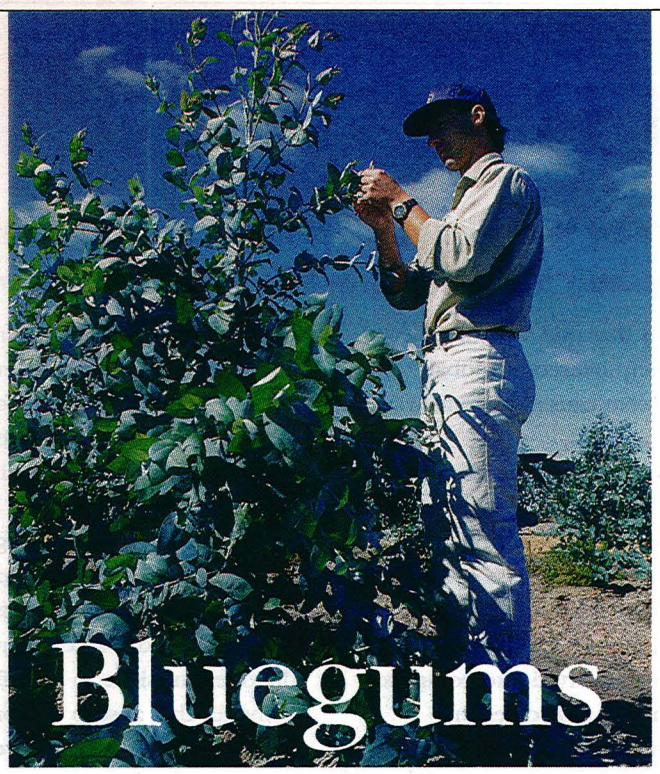
The species originates on the coast of several European countries, giving the pine its common name, and has been grown in State-owned plantations in Western Australia since the 1920s.

As well as the landcare benefits of strategically-planted trees, there is a growing market for pine in Western Australia which cannot be supplied from existing plantations.

CALM is also offering to plant a range of native species as part of the Maritime Pine Project, to help meet the demand for trees on land not suitable for pines. Radiata pine may also be planted in wetter areas.

SPECIFICATIONS

Rainfall:	> 400 mm/year
Rotation:	One
Rotation age:	30-35 years, with several thinnings between ages 12 and 24
Products:	Medium density fibre board, particle board, cases, pallets, veneers, treated posts, poles and sawn timber
Sharefarm scheme available:	Yes



Bluegums

Tasmanian bluegums have been planted outside their natural range ever since British and French explorers collected seeds from the trees in the 18th century. Today, the species is a major plantation-grown eucalypt in the temperate zone.

Trial plots of bluegums were established across Western Australia's south-west in the 1960s, and the trees proved to be well suited to local conditions. In the 1980s, CALM approached Western Australia's two biggest timber companies and then Japan's biggest pulp and paper companies, looking for investors to plant commercial bluegum crops on farmlands.

Investors weren't prepared to commit funds on the basis on trial plantings, so CALM began an 6500-hectare planting program funded by borrowings.

This policy proved successful. CALM is now contracted to manage three multi-million dollar projects with a combined potential planting target of at least 60 000 hectares of bluegums. These trees will be established at a cost of more than $150 million over 10 years by the investors:

- Albany Plantation Forest Company of Australia Pty Ltd, a joint venture between Oji Paper Company, Itochu Corporation, Senshukai Company and Tohoku Electric Power Co Inc;
- Hansol Australia Pty Ltd, a subsidiary of Hansol Forem Co Ltd, and Pulpwood International Pty Ltd; and
- Bunbury Tree Farms, a joint venture between Mitsui Plantation Development (Australia) Pty Ltd, Nippon Paper Company and MCA Afforestation Pty Ltd.

The dramatic increase in bluegum plantings over the past five years is the result of local companies launching their own bluegum plantation projects. These projects are attracting significant private investment.

SPECIFICATIONS

Rainfall:	> 600mm/year (in the south-west)
Rotation:	Two
Harvest age:	Approx. 10 years
Products:	Paper and fuel wood (poles and sawn timber can be produced on a longer rotation)
Sharefarm scheme available:	Yes

Oil mallees

CALM initiated work on oil mallees in the 1990s to diversify the range of tree crop options available to farmers and, in particular, to develop a tree crop option for the Wheatbelt where rainfall is too low for bluegums and maritime pine.

The Oil Mallee Association was set up in 1995 to represent the interests of growers and, following the preparation of a business plan, the Oil Mallee Company was formed in 1997. Today, the Association controls the resource establishment side of the industry and the Company is developing the harvest, transport, processing and marketing aspects.

More than 12 million seedlings have been planted by more than 500 growers. Projected planting for 2000 is five million mallees. The industry development plan aims to achieve mallee planting on a scale that will help achieve salinity control.

Present world markets for eucalyptus oil are not large enough to consume oil on this scale, so new large-scale but lower-priced markets for the oil are being developed.

Growing mallee has proved to be quite simple. However, investment in harvest and processing depends on the development of large-scale, low-cost systems to harvest and handle the products.

Recent development has focused on economic uses for the residue leaf and wood. Since the oil is only 1.5 per cent of the freshweight of whole harvested mallee, residue uses will be important, even if only in terms of avoided disposal costs. The industry is conducting its first commercial feasibility investigation into using whole harvested biomass.

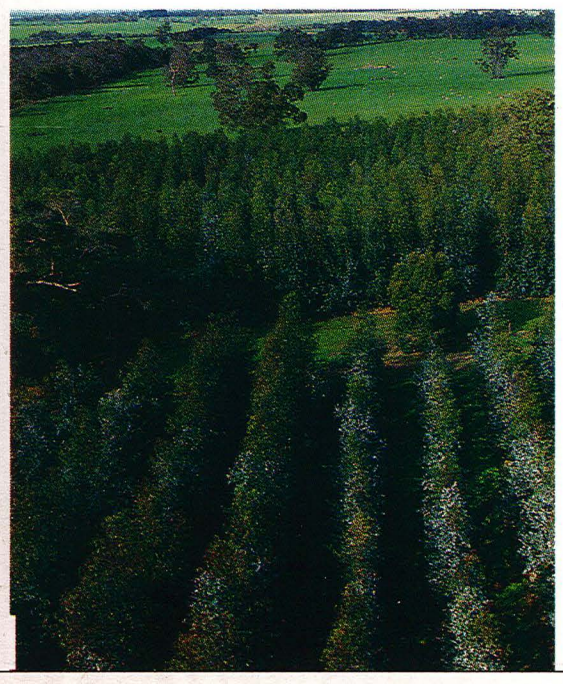
Funds are being raised for a $5 million pilot factory, which is expected to be built in Narrogin.

SPECIFICATIONS

Rainfall:	< 400mm/year
Rotation:	Multiple
Harvest age:	2 years
Products:	Eucalyptus oil, wood fibre and possibly activated carbon and electricity (from the residue)
Sharefarm scheme available:	No

Can plantation timber substitute for native timber?

Yes, in many cases plantation timber can be used instead of native timber, but there will be a transition period before enough sawlogs are available from young plantations to start replacing native timbers. The sawlogs from older plantations are already fully committed to local sawmilling companies. Even when plantation sawlog production increases, last year's report by consultants Forestry Pacific noted "...no substitution for mature appearance-grade native forest woods can be made by plantations."



▶ *Bluegums growing on a south coast farm.*

Are prices for plantation sawlogs higher than for native forest sawlogs?

No. The royalty for equivalent grades of jarrah and karri logs are equal to or higher than those for pine logs, but the recovery rate of sawn timber from pine logs is higher than for native forest logs (which have more natural faults). This means the buyers of native forest sawlogs pay more royalty per cubic metre of sawn timber produced.

What area of maritime pines has been planted?

More than 28 000 hectares of maritime pines have been planted in State-owned plantations. CALM has also planted 7000 hectares of maritime pines under sharefarm agreements with private landowners.

What area of bluegums has been planted?

CALM manages more than 37 000 hectares of bluegums, most of them planted on farmland on behalf of major investors. The total area of bluegums planted in Western Australia is estimated at 130 000 hectares.

What area of oil mallees has been planted?

More than 7000 hectares of oil mallees have been planted by farmers.

Carbon farming

Growing trees for their carbon is still so new that a market price is yet to be set, but carbon crops are attracting an increasing number of investors around the world.

The reason is that one of nature's processes can help overcome global warming, a problem caused by industrial processes.

Fueled by solar energy, plants take carbon dioxide from the atmosphere, combine the carbon with hydrogen atoms to make simple sugars and return oxygen to the atmosphere.

In perennial crops such as trees, these sugars are converted into complex long-chained carbon molecules that interlock to form wood. For every tonne of wood produced, 3.7 tonnes of carbon dioxide molecules are extracted, or sequestered, from the atmosphere.

Carbon dioxide is one of the so-called greenhouse gases that absorb heat rising from the Earth's surface and then radiate some of that heat back towards the ground. Carbon dioxide occurs naturally, of course, but has been increasing in concentration because of human activities, such as burning fossil fuel.

◀ *Removing whole trees and measuring their carbon content is the basis for developing equations to predict tree carbon content from easily measured parameters, such as tree height and trunk diameter.*

Increasing levels of greenhouse gases are affecting the world's climate through global warming. The Kyoto Protocol, signed at the Climate Change Conference in December 1997, sets legally binding greenhouse gas reduction targets.

This includes agreement for carbon dioxide emissions to be offset by activities that absorb carbon dioxide. Nations will be able to develop annual carbon accounting systems and trade carbon credits—the difference between the amount of carbon dioxide emitted and the amount absorbed.

Farming for carbon credits is yet another incentive for landowners and investors to plant trees and protect native vegetation.

BP has already invested in a study with CALM to test the feasibility and management of tree plantations for carbon sequestration as well as landcare and biodiversity. The study is believed to be the first tree planting project in Australia to offset greenhouse gas emissions.

Other crops, other aims

It's now understood that clearing native vegetation has led to environmental problems such as increased salinity levels and erosion.

Revegetation is a cornerstone of the State Government's Salinity Strategy, together with managing remnant native vegetation, and there are many other species that can be planted apart from commercial tree crops.

Other commercial perennial crops include olives, jojoba, lucerne, tagasaste, saltbush, sandalwood and brushwood. Information about these crops, especially for smaller landowners, can be obtained from:

- Agriculture Western Australia's **Revegetation on Farms Project**, Phone: 9881 0222

Revegetation with native species (*above right*) is also vital for salinity management and to conserve biodiversity. To maximise the benefits, locally-occurring native species that are appropriate for soil type are used, and the natural flora structure is recreated.

Native revegetation projects can also be designed to control wind and water erosion, to provide buffer zones, wildlife corridors and shelter for stock.

Information on how to manage existing bushland and how to include flora and fauna conservation in revegetation schemes can be obtained from:

- **Land for Wildlife Coordinator, CALM**, Phone: 9334 0530 (for individuals); and
- **Greening Australia (WA)**, Phone: 9335 8933 (for groups). Greening Australia can also advise groups on how to obtain grants.

Funding is available to help groups undertake revegetation, especially if conserving biodiversity is one of their main aims. Group coordinators can ring:

- **State Natural Heritage Trust Coordinator**, Phone: 9325 0000 or 1800 198 231
- **Gordon Reid Foundation for Conservation (Lotteries Commission)**, Phone: 9340 5270 or 1800 655 270

Anyone wanting to volunteer their time to revegetation projects can call:

- **The Australian Trust for Conservation Volunteers**, Phone: 9336 6911
- **Men of the Trees**, Phone: 9250 1888

Information on how to manage bush in the metropolitan area and local contact details can be obtained from the **Swan Catchment Centre**, Phone: 9220 5300. For information about groups involved in revegetation projects outside the metropolitan area, call your local CALM or Agriculture Western Australia office.

CONTACTS

CALM Sharefarms, Mid West, Guildford
Ph: 1800 231 242 or 9279 4088

CALM Sharefarms, Lower West, Collie
Ph: 1800 241 688 or 9734 1688

CALM Sharefarms, Katanning
Ph: 9821 1296

South Coast Sharefarms, Albany
Ph: 9842 4530

CALM Sharefarms, Esperance
Ph: 9071 3733

Farm Forestry Unit
Perth Ph: 9334 0322
Busselton Ph: 9752 1677
Esperance Ph: 9071 3733

Further information about CALM's tree crops on farms project can be found at:
http://www.calm.wa.gov.au/projects/plantations_splash.html

IN BRIEF

▲ *A new crop of bluegums.*

CALM has developed unique collaborations with Western Power and the Water Corporation. Under the first agreement, CALM has planted a 716-hectare bluegum plantation on Western Power land at Coolangatta, the site of the new Collie power station. This agreement has allowed CALM to expand plantings in the Wellington catchment, which is under threat from rising water tables, and provided Western Power with an opportunity to increase the value of its asset by growing a commercial crop on the buffer around the power station.

The agreement between CALM and the Water Corporation means that a bluegum plantation in Albany has replaced the need to discharge the town's treated effluent into the ocean. The Water Corporation now pumps about 3000 kilolitres of treated effluent a day to its land disposal site, where CALM has planted 365 hectares of bluegums. The wastewater is used to irrigate about 60 per cent of the plantation and a research project by The University of Western Australia is measuring the differences in growth between the irrigated and non-irrigated sections.

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The search is on to find native tree species suitable as new commercial tree crops.

The four-year, $1.2 million project is being funded by the State Government and the Bushcare and Farm Forestry programs of the Commonwealth Government's Natural Heritage Trust.

An additional $250 000 will be spent by landowners taking part in the scheme, which began last winter.

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CALM and one its predecessors have been carrying out tree breeding programs for decades. The earliest was begun by Forests Department scientists in 1957, to produce straighter maritime pines, better suited to Western Australian conditions.

Initial trials showed a 36 per cent increase in volume. For selections now being grafted, an 80 per cent improvement in productivity compared to the first seed orchards has been achieved.

Bluegums—originally from Tasmania and south-eastern Victoria—have also been bred for local conditions. CALM registered the Western Bluegum trademark after 14 years of research, for bluegum seedlings or cuttings produced from the Department's tree breeding and improvement program.

Based on measurements of two-year-old trials, Western Bluegums have achieved gains of 32 per cent increase in volume produced over unimproved seedlings. If problems with flowering synchronisation can be overcome, based on the performance of elite trees, it will be possible to achieve productivity gains of 80 per cent.