Forest Products Division

Department of Conservation and Land Management
Western Australia

Investing in maritime pine

July 2000

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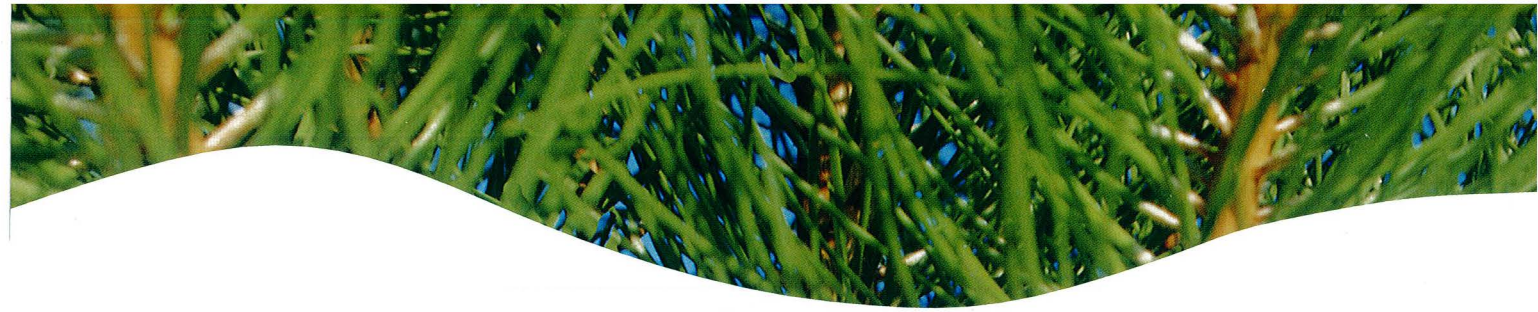
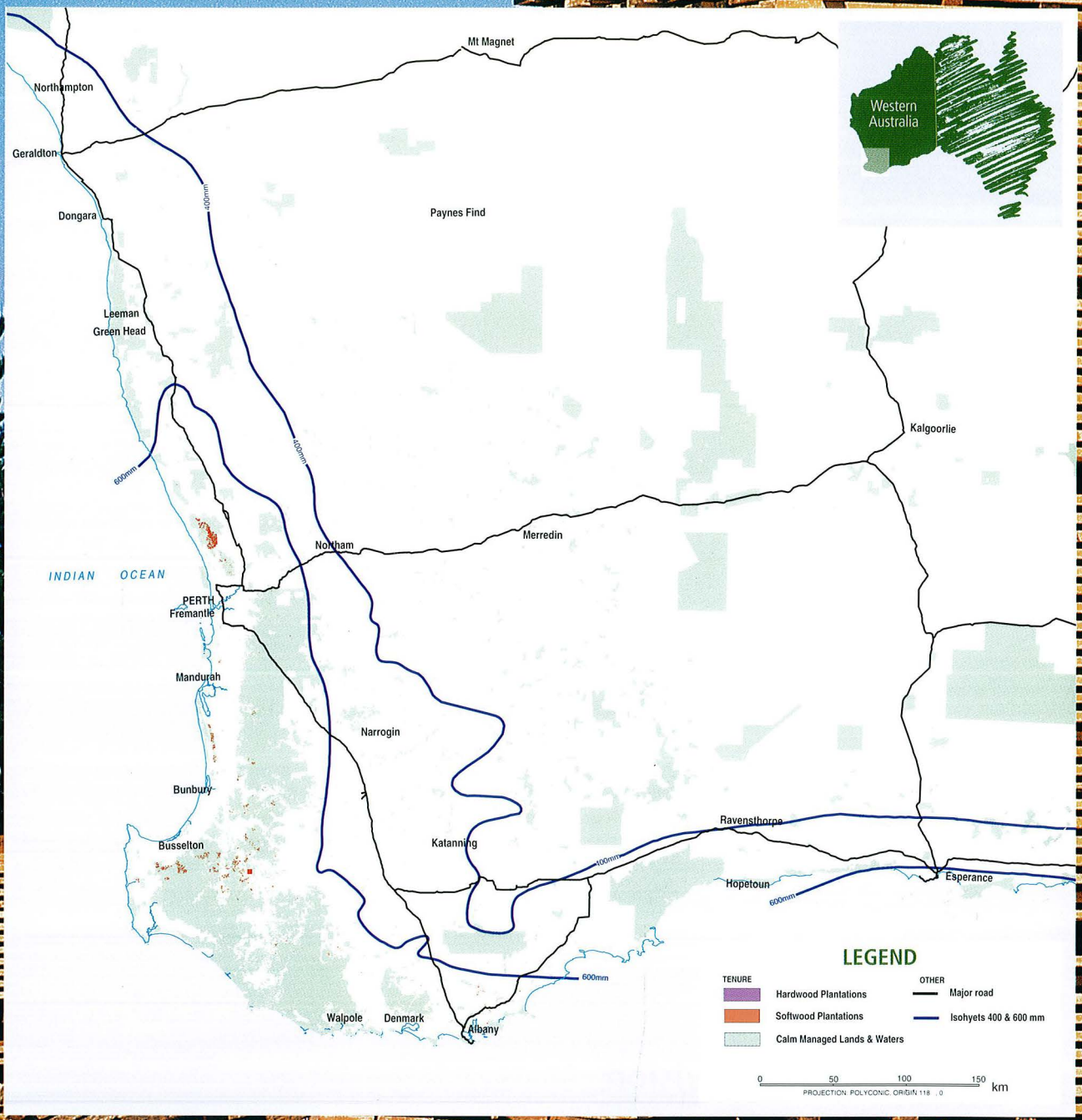
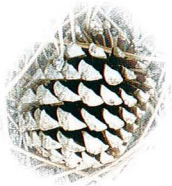


CALM managed lands and waters — hardwood and softwood plantations





Investing in maritime pine

Registration of interest in plantation investment

Company name: _____

Address: _____

_____ Postcode: _____

Company contact:
Name: _____

Position: _____

Contact Details:
Address: _____

_____ Postcode: _____

Telephone: _____ Facsimile: _____

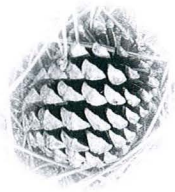
Email: _____

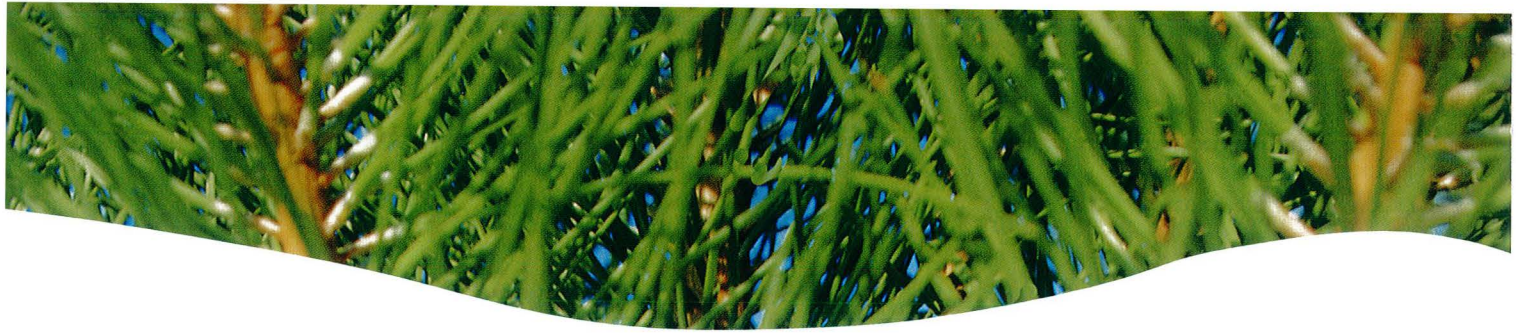
Current interests in the proposal

☐ Follow-up literature on plantation developments

☐ Arrange inspection of opportunities

☐ Develop a detailed plantation proposal for this company





INTRODUCTION

The Department of Conservation and Land Management (CALM) is uniquely placed to implement tree planting programs capable of significant carbon sequestration within the time constraints imposed by the Kyoto Protocol. Western Australia has a large land resource; a major tree planting and land rehabilitation program is already under way; and the technical and economic skills required to acquire land, establish trees and quantify growth and carbon sequestration rates are already being employed.

The tree crops on farms program initiated by the Department 12 years ago is based on joint ventures with farmers and does not require land purchase. CALM's Forest Products Division (FPD) coordinates the program, but a large proportion of the work is carried out by private contractors based in regional centres.

Western Australia offers a unique combination of factors that make it possible to establish tree crops for carbon sinks quickly, efficiently and on a large scale. These factors are:

- a minimum land resource of three million hectares out of a total of 18 million hectares of cleared agricultural land which is readily available;
- a legal, economic and social framework to use private land for tree crops that is well accepted in the community;
- FPD's internationally-recognised scientific and management experience in plantations and tree crops, including a demonstrated record in managing multi-million dollar projects for private investors;
- the capacity to implement the program rapidly;
- an urgent need to plant trees for environmental reasons.

CALM is a State Government agency responsible for management of 20 million hectares of public lands, nature conservation and forestry. The Forest Products Division and its predecessors have been involved in plantation management since the first trials of maritime pine were planted in Western Australia in 1896. The Department has a record of innovation and success in creating commercially-viable tree crop industries in the south-west that also generate environmental benefits.

FPD also manages 27,000 hectares of bluegum plantations and 7000 hectares of maritime pine plantations, most of which are privately owned. The Department has been contracted as plantation manager for three separate bluegum projects financed by major overseas investors who investigated potential sites around the world before selecting Western Australia. The investors, including Oji Paper Co and Itochu Corporation, have a combined 10-year planting target of at least 60,000 hectares.

In 1999, the Department began a study with British Petroleum (BP) to test the feasibility and management of tree crops for carbon sequestration as well as landcare and biodiversity. The study is believed to be the first tree planting project in Australia specifically designed to offset greenhouse gas emissions.

The Department has the necessary infrastructure and can provide the complete range of services to implement tree crop projects as agent for the investor. This includes:

- promoting the project;
- liaising with landowners to acquire land for plantations;
- establishing and managing plantations;
- monitoring and verifying carbon;
- monitoring and seeking to influence relevant developments in the external greenhouse environment;
- marketing and harvesting timber and other resources; and
- monitoring and reporting on social and environmental benefits.

FPD is taking a prominent role in State and national forums concerning the development and management of Australian obligations under international conventions. FPD applies this experience and authority to its commercial forestry activities.

STATE GOVERNMENT POLICY

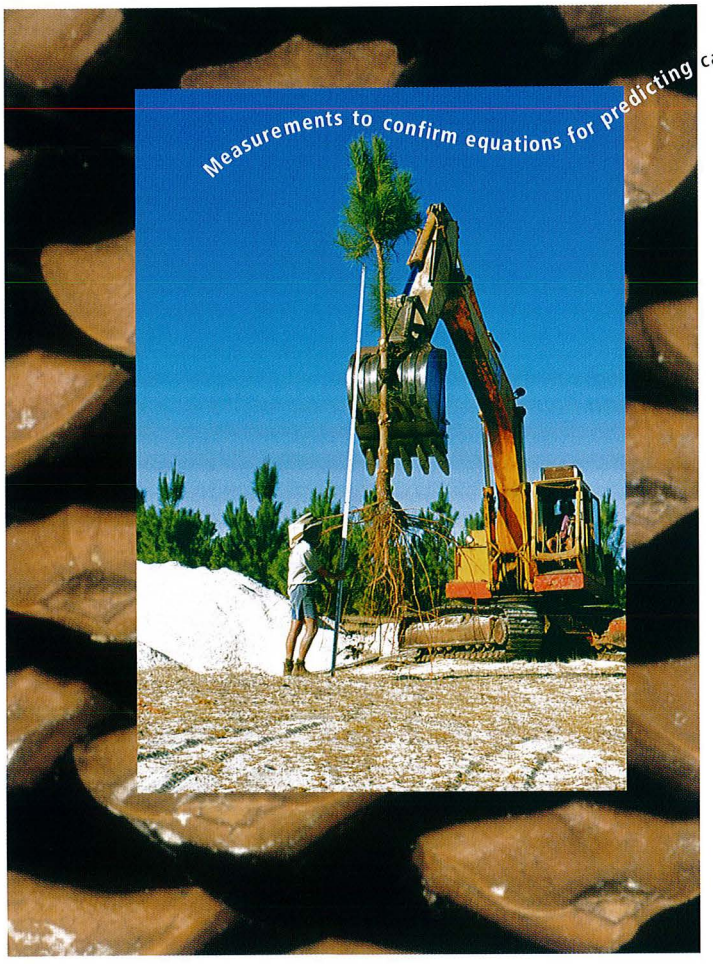
Greenhouse

The Government of Western Australia is a signatory to Australia's National Greenhouse Strategy, which explicitly aims to encourage plantations for carbon sequestration. Western Australia recognises that such plantations on cleared agricultural land also provide significant environmental and social benefits, largely through control of rising saline watertables. The State Government's Salinity Strategy sets an objective of more than three million hectares of revegetation in the State's south-west.

For these reasons, FPD has been supported in its actions to encourage investment in plantations from the private sector both locally and internationally.

Australia's State and Commonwealth governments have yet to approve final policies on emissions trading, pending progress with international negotiations. However, Australia's economy is based on free market philosophies and these offer greenhouse gas abatement at least cost.

Australia's national laws on foreign investment apply to investments in all States, and new projects will need to comply with the relevant approval mechanisms.



Measurements to confirm equations for predicting carbon content.

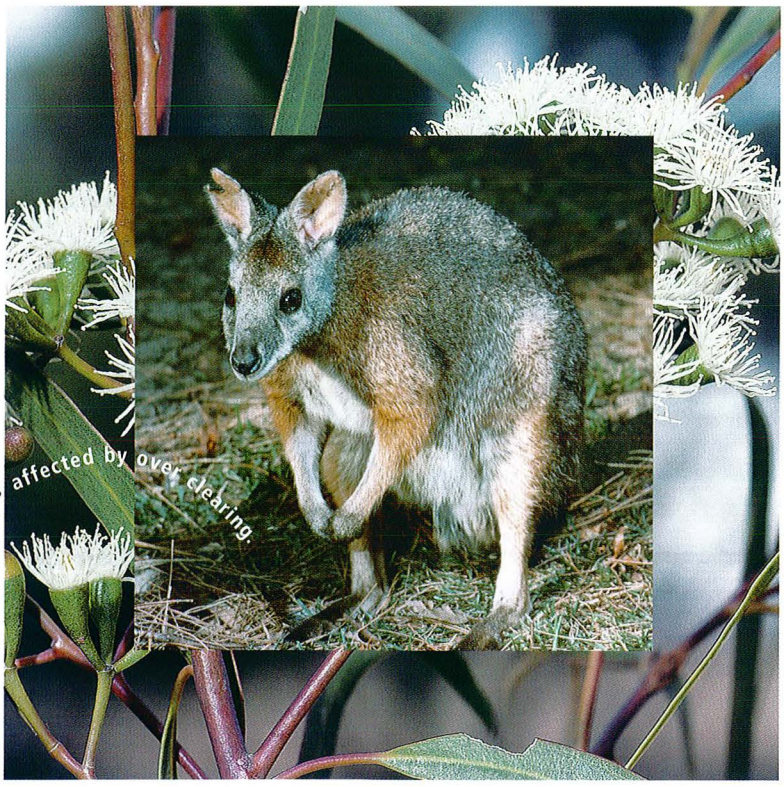
Environmental

Western Australia has adopted a policy of widespread tree planting in the south-west agricultural region in order to gain environmental benefits for nature conservation, water quality and agriculture.

Dryland salinity, caused by rising watertables, is a key issue for the State, posing a threat in a region that is internationally acclaimed for its diversity of native vegetation. The south-west land division has an estimated 9000 plant species of which more than 70 per cent occur nowhere else in the world. Loss of vegetation in turn means loss of habitat for native animals.

Rising salinity levels are the result of over clearing native vegetation, allowing watertables to rise and bring salt stored deep in the soil towards the surface.

The capacity of tree crops to reduce watertable levels significantly by using water stored in the soil profile has been demonstrated in trials with several different species. It has been estimated that provided trees are strategically located, groundwater control can be achieved by revegetating a portion of the landscape with trees.



The tammar wallaby is one species affected by over clearing.

PLANTATION DEVELOPMENT IN WESTERN AUSTRALIA

Western Australia's history of developing plantations and plantation-based industries spans more than a century. The State pioneered the concept of sharefarming, in which plantations are developed on agricultural land, in partnership with the farmer.

Commercial tree crops, either for wood products or for carbon sequestration can help pay for establishment of trees on farmlands and the environmental benefits they provide.

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.

Integrating maritime pine and traditional crops.

The tree crops program has shown the potential for such an industry and stimulated private investment in tree planting schemes. In just a decade, more than 130,000 hectares of bluegum have been planted on already cleared farmland by CALM and private investors.

The tree crop program was expanded to the medium rainfall zone (400 to 600 mm/year) of the agricultural region in 1996, under the State Government's Salinity Action Plan. This area was chosen because the superior stock produced through the Department's tree breeding program performs extremely well in this rainfall zone. Altogether, 7000 hectares of maritime pine have been planted to date and a further 5500 hectares are scheduled to be planted in 2000.

FPD 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.

In 1997, stakeholders (including plantation growing and processing industries and the Commonwealth and State governments) released Plantations for Australia: The 2020 Vision. This strategy seeks to treble Australia's plantations by the year 2020 to achieve both economic and environmental benefits. These include attracting $3 billion in investment, reversing land degradation, increasing and diversifying farm incomes, helping reduce the $2 billion trade deficit in wood and wood products, and creating up to 40,000 jobs.

To achieve this vision, Australia needs to establish 80,000 hectares of new plantations each year.

A 1999 Bureau of Rural Sciences report showed that Western Australia's tree crop program (both Government and private) expanded by an average of 20,365 hectares a year between 1994 and 1998. This compares with the national average increase of around 7000 hectares a year in the same period.

The area of tree crops on farms in Western Australia increased from around 130,000 hectares in 1994 to more than 212,000 in 1998.

Western Australia has a huge land base for tree crops.

MARITIME PINE

Maritime pine, which is native to the western Mediterranean region, was one of the many species brought to Western Australia in 1896 for trial plantings to find a softwood suitable for local conditions. It performed best on sandy soils and was the species chosen for the Gnangara plantation, just north of Perth, in the 1920s.

This State-owned plantation estate now totals more than 27,000 hectares and a further 43,000 hectares of radiata pine plantations have been planted. However, this is not expected to be enough to meet future demand for pine timber.

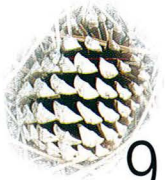
Maritime pine, Pinus pinaster.

The increasing demand for timber and for the landcare benefits of large-scale tree planting led the Department to begin sharefarming with maritime pines in the agricultural regions close to Perth in 1994.

This work was expanded in 1996 as part of the State Government's Salinity Action Plan. The Plan focused on revegetation as a key tool, setting a target of an extra three million hectares of woody perennial plant cover to control salinity in the south-west agricultural region. The updated Salinity Strategy, released in April 2000, has revised this target to more than three million hectares.

The Maritime Pine Project is being implemented in the medium rainfall areas of the agricultural region (400 to 600 mm/year) and selected catchments on the coastal plain near Perth.

Development of a yield prediction model for maritime pine on farmland in the 400 to 600 mm/year rainfall zone is now well advanced. Work is also well under way to calibrate the carbon sink model with field measurements of carbon pools. It is expected that the standard rotation for maritime pine will be 30 years with thinnings at age 12, 18 and 24 years producing material for a variety of wood



products, including medium density fibreboard (MDF), panel-board products and sawn timber. Thinnings are part of the standard regime developed for maritime pine plantations. The trees are planted at a high density and thinned out as the plantation matures. This stimulates early growth and carbon sequestration. Both planting and thinning can be varied to favour carbon sequestration.

Satellite image of cleared land in south-west Western Australia.

Typical yield is expected to be 360 cubic metres of stemwood, i.e. a mean annual increment (MAI) of 12 cubic metres per hectare per annum. Current FPD carbon sink models indicate that a 1000-hectare program over five years beginning in 2001 would lead to the sequestration of 105,000 tonnes of carbon dioxide during the first Kyoto commitment period (2008-2012). Sequestration predicted for the next five-year period (2013-2017) is 145,000 tonnes of carbon dioxide. (These figures do not include the carbon sequestered in wood products derived from the trees.)

Variations can be developed in consultation with the investor to achieve a different balance between timber production and carbon sequestration. FPD has the capacity to model different management options to maximise carbon sequestration while maintaining the vigour and health of the plantation.

Potential for expansion

There are 18 million hectares of cleared land in Western Australia's south-west agricultural region. FPD estimates the minimum land resource available for tree crops is three million hectares and recommends that new plantations focus on designated zones that provide:

- concentrated watertable control;
- identifiable connections with individual investors;
- concentrated social and community benefits; and
- more effective project management.

There are large areas of land in many countries that have the potential to establish extensive plantations. However, there are legal, political and social barriers to establishing tree plantations on public land that is already vegetated, and at the very least disincentives under the Kyoto Protocol.

Securing degraded land for plantations in developing countries can also be difficult because ownership of land is complex and not amenable to commercial legal practices. Tree planting is a relatively long-term business and political and legal security is essential.

One of the most important factors in the success of the Western Australian tree crops on farms program is availability of land. Farmers and local government authorities recognised the benefits of tree crops and a legal instrument (a Deed of Grant of Profit a Prendre) was developed in consultation with farmers to protect the rights of landowners and investors.

The Department has established more than 1000 sharefarm agreements with farmers to plant tree crops on privately-owned land since 1987.

More than 500 000 hectares are suitable for maritime pine.

Western Australian sandalwood is also planted under the Maritime Pine Project.

SECURING THE LAND

Western Australia has an extensive land resource available for tree crops.

The Department recommends that land for new plantations be secured under the sharefarming model, which is similar to leasing land from farmers. The Western Australian Farmer's Federation helped develop the original profit a prendre document used by the Department, to ensure it protected and served farmers' interests and it has since been progressively amended to improve interpretation and cater for unforeseeable circumstances. Sharefarming and alternative strategies for securing land can be discussed with potential investors.

FPD's promotional strategies to attract landowners to join the Maritime Pine Project have included using existing networks through landcare and other related groups, direct mail, local newspaper, radio and television advertising, media releases, local agricultural shows and field days.

Incentives for landowners to participate

The major land use in the region targeted for maritime pine crops is agriculture, mainly mixed cereal cropping and sheep and cattle grazing. Declining prices for these commodities have led to increased efficiency and property consolidation, but agriculture is not prosperous and farmers are looking for opportunities to diversify their income. Tree crops provide such an opportunity.

The south-west agricultural region is also facing severe land degradation problems, including rising salinity levels, waterlogging and erosion. The 2000 Salinity Strategy predicts that by 2050, annual losses from agricultural production alone will rise to $300 to $400 million in present day terms, unless urgent remedial action is taken. Many of the salinity management tools available require a capital outlay from farmers to implement, but strategically-located tree crops will lower watertables and return a profit.

The Maritime Pine Project offers three further incentives to farmers:

- an initial signing payment;
- a fencing allowance of $75 per hectare to protect the young trees from grazing; and
- FPD will plant native tree species for landcare, at the ratio of 10 per cent of the area planted with maritime pine, to enhance on-farm biodiversity.

The offer to landowners

Under current Maritime Pine Project offers, landowners receive up to 30 per cent of the revenue from wood harvested, and may receive a share in the value of carbon sequestered.

Rights to sequestered carbon remain with the investor though mechanisms have been developed to share the value of the carbon with the landowner.

The rights of the investor

The Deed of Grant of Profit a Prendre attached to the land title defines the relationship between the landowner and the investor and secures the investor's rights.

By attachment to the land title, the investor's rights are retained even if the property's ownership is transferred, is bankrupted or other significant changes occur.

The Department has legal advice that this instrument is also suitable to secure an interest in carbon sinks and has had the existing document updated to incorporate carbon sequestration explicitly.

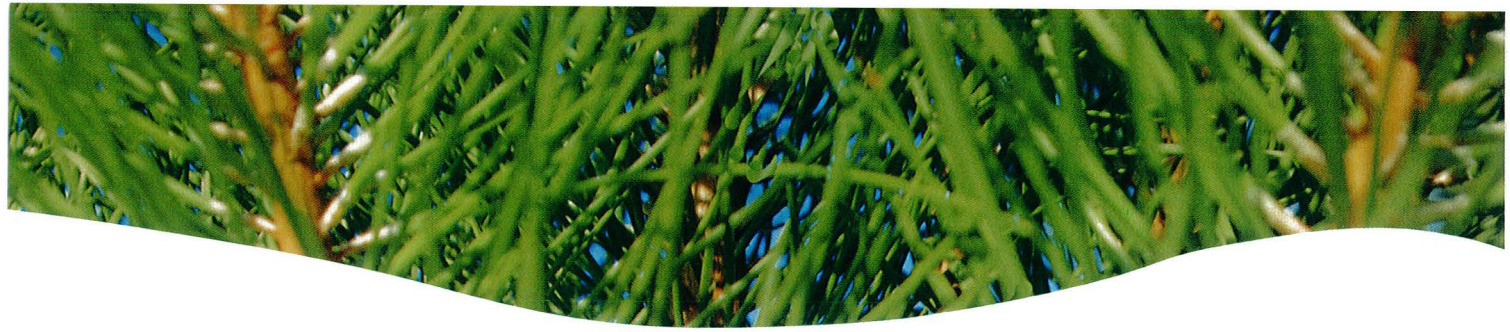
The development of the carbon sink in the plantation would be measured and verified to meet the necessary standards that are yet to be fully defined through international agreements and national legislation. The necessary tools to undertake predictive and monitoring work for timber inventory already exist in the Department. Carbon sequestration models have been developed for maritime pine and are currently being refined.

The benefits of the plantation are shared between the investor and the landowner, as defined in the Deed, and based on the proportionate value of the inputs of both parties. Timber and other products produced by the plantation will be harvested and sold and the proceeds shared between the investor and the landowner.

The key features of the Deed are:

- the parties agree to establish tree plantations on the landowner's property;
- the investor may enter the land to undertake necessary actions to grow the plantations and the costs are borne by the investor;
- any financial proceeds of the plantation will be shared in a fixed ratio, or by other agreed means; and
- the landowner may continue to use the land, provided it does not affect the plantations.

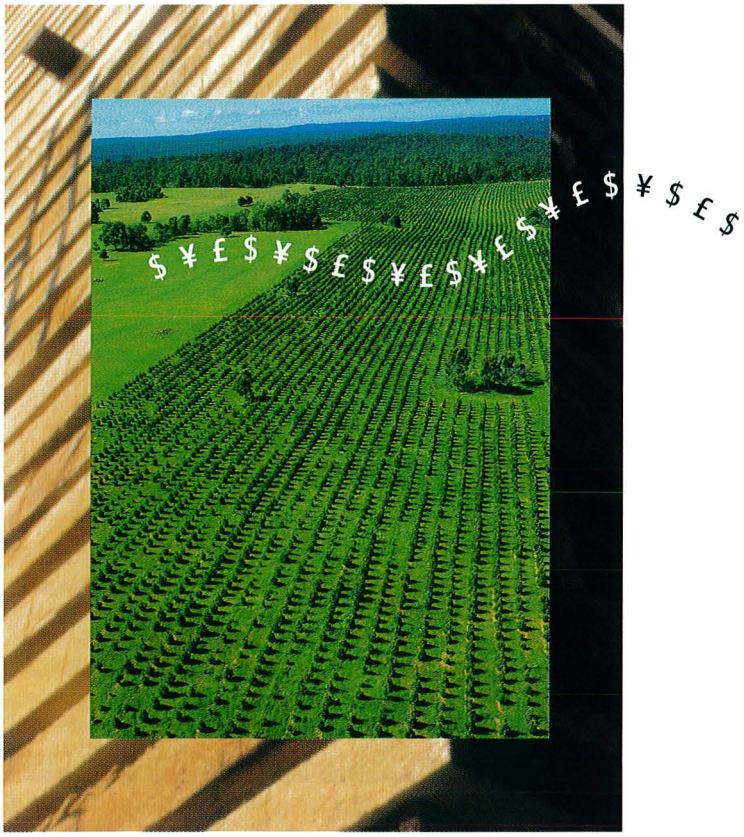
The landowner is responsible for monitoring the health of the plantation, completing firebreaks and undertaking all normal responsibilities incumbent on a landowner.



PROJECT COSTS AND REVENUES

Detailed costs and revenues from maritime pine projects depend on the objectives of the investor, the level of management required, and planting locations. These are negotiated as each project is developed, but indicative financial estimates are available.

Establishment costs are incurred over the first three years of each plantation and include a signing payment to the landowner, fencing and site preparation, weed and pest control, planting, and management of the operation. This amounts to approximately AU$1600 to $2000 per hectare in year one and up to AU$200 per hectare over the following two years. These costs will vary according to the scale of the project.



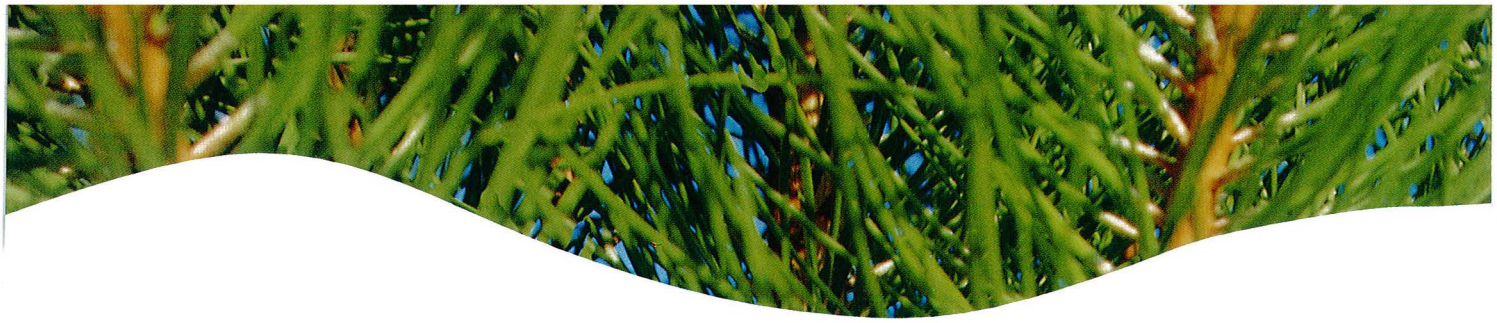
The FPD provides ongoing management throughout the life of the plantation, at a cost of AU$20 to $30 per hectare per year.

Pruning and fertilising are scheduled as needed depending on the markets for the timber and the nutrient status of each site. If required, the costs of these operations are negotiated with the investor during the course of the project.

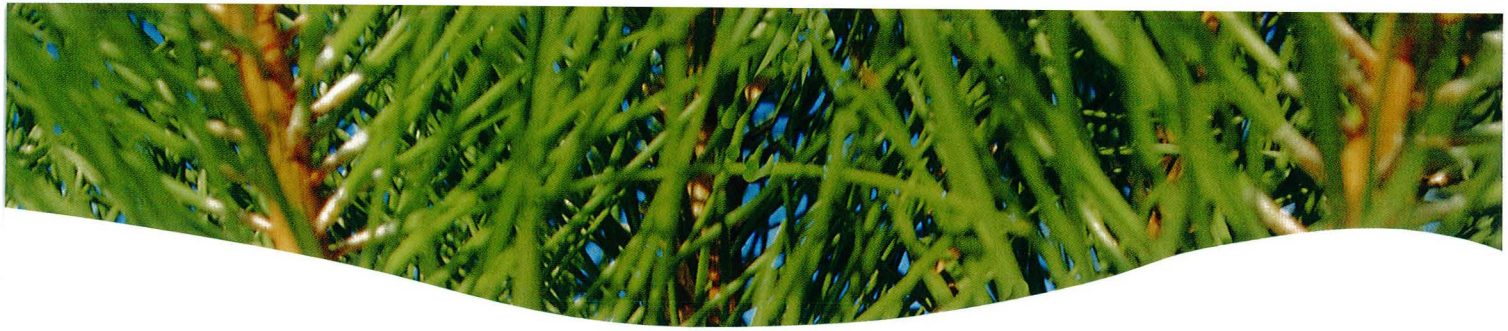
Inventory of the growing resource costs AU$20 per hectare for each measurement, with methods and frequency depending on the requirements of the investor for both timber resource projections and carbon accounting.

Revenues from timber will depend on the productivity of each site. Maritime pine has established markets in Western Australia and current stumpages (price at stump, without harvesting, roading, administration or delivery costs) are AU$10 to $12 per m^3 for industrial wood (for medium density fibreboard and particle board), AU$25 per m^3 for pine rounds (for uses such as fencing or vineyard poles), AU$20 per m^3 for small sawlogs and AU$34 per m^3 for large sawlogs.

Various options are available for sharing proceeds from timber harvest. The most common models return the harvest revenue to the investor and the landowner in the ratio 70:30 or 80:20 respectively. The ratio chosen depends on factors such as the value of any incentive payments which may be made to the landowner and the nature of arrangements for the sharing of any carbon revenues eventuating from the project. Any values for, or payments related to carbon sequestration will depend on future international agreements.



Monitoring growth in an older stand of maritime pine.



TECHNICAL AND FUNCTIONAL BACKGROUND

Sharefarm units

The Department's Plantations Operations Group was set up as a series of semi-autonomous sharefarm business units in 1994. These units, located in regional centres to work directly with landowners, coordinate the project and a large proportion of the work is carried out by local subcontractors.

The Plantations Operations Group brings together the State's softwood and hardwood plantations and major tree propagation facility. The Plantations Operations Group also draws on the resources and expertise of various other professionals in the Department, including scientists, fire fighters and cartographers.

Experience in plantation management dating back to the 1920s has earned the Department international recognition for it expertise in plantation technology, from site evaluation to genetic improvement programs.

The FPD maintains a computerised Plantation Management Information System to manage more than 79,000 hectares of public and 26,000 hectares of private plantations. Developed over several decades, FPD's inventory and modelling systems are used to manage the sale of more than 2.1 million tonnes of logs each year from both native forests and plantations. The associated financial system monitors financial transactions exceeding A$110 million annually. The Western Australian Auditor General undertakes annual audits of these financial, log delivery and standing asset valuations.

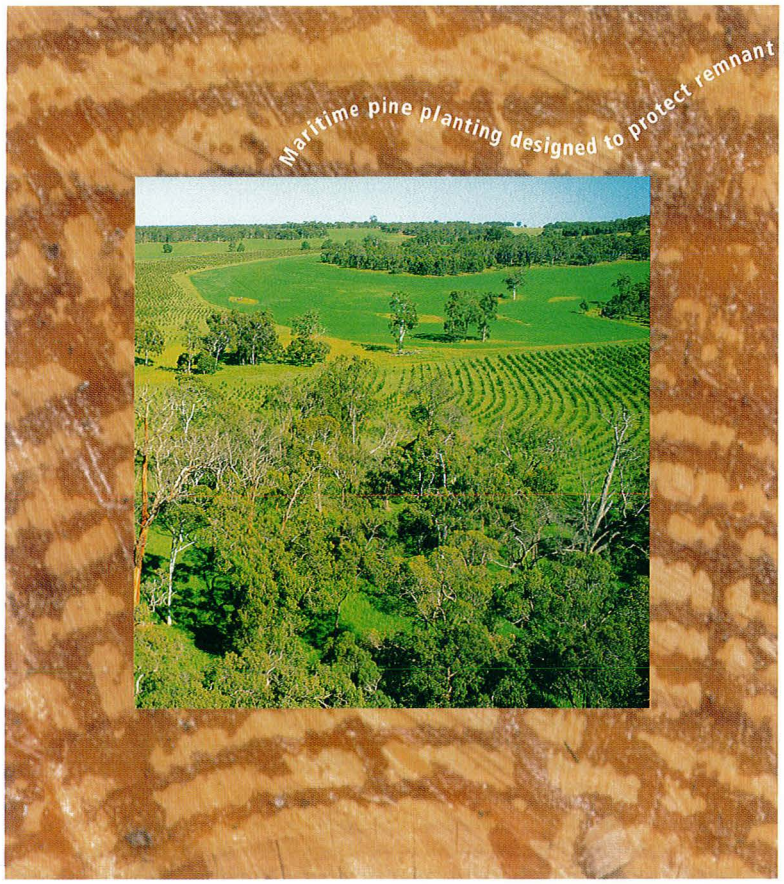
These same systems are used to provide, under contract, plantation mapping and management services to other government agencies and to a number of private companies.

Site selection

Soil water storage and salinity are the factors most likely to affect maritime pine survival and growth. For trees to establish successfully and grow in the medium rainfall zone (400 to 600mm/year), soils must be non-saline, of adequate depth and have fresh water additions from seepage or groundwater. For soil to be suitable for planting, depth of root-penetrable material must be at least two metres.

FPD is undertaking a major study to refine prediction of site quality, growth and yield of maritime pine on farms in the medium rainfall zone. Some 180 plots have been established in plantings on farms from north of Geraldton to east of Esperance (see map on page 2). Preliminary results indicate that maritime pine can establish and grow in a wide range of soils including duplex and sandy loams, as well as sandy soils.

Potential planting areas are assessed using aerial photography and land management units are identified by examining landform and vegetation features. Soil sampling of different land management units is then carried out using a drill rig, or backhoe if necessary.



Maritime pine planting designed to protect remnant native vegetation.

The selection of land is based on that which is suitable for maritime pine and that which the landowner is willing to plant with trees.
The offer for additional trees can be used to plant less suitable land, or to round out plantation boundaries to existing fencelines. The landowner may need to adjust farm boundaries to meet the needs of the new plantation. As grazing must be excluded for up to three years, fencing may have to be adjusted to accommodate both the trees and grazing land.

The final design of the plantation takes into account the particular requirements of the landowner, such as windbreaks and aesthetics.

Plantation management

Establishing and maintaining maritime pine and other tree species in sharefarm plantations involve the following key elements:

- promoting the project to attract new sharefarmers;
- identifying suitable land for plantation establishment through direct farmer liaison;
- developing a planting plan in conjunction with the landowner;
- conducting a Global Positioning Survey of the proposed area and producing maps;
- preparing and signing contract documents;
- obtaining necessary local government approvals;
- ground preparation such as ripping, ploughing and mounding operations for the successful establishment of seedlings;
- controlling rabbits, insects and any other pests that may pose a threat to the seedlings as required;
- applying herbicides to control existing weed competition and inhibit new weed germination;
- applying herbicides for post planting weed control as necessary;
- erecting a stock proof fence if required to enclose the tree crop area during the early years;
- planting seedlings;
- monitoring weeds and pests and appropriate treatment as required;
- monitoring tree survival and growth with infill plantings as required;
- monitoring carbon sequestration.

FPD field officer monitoring for pests.

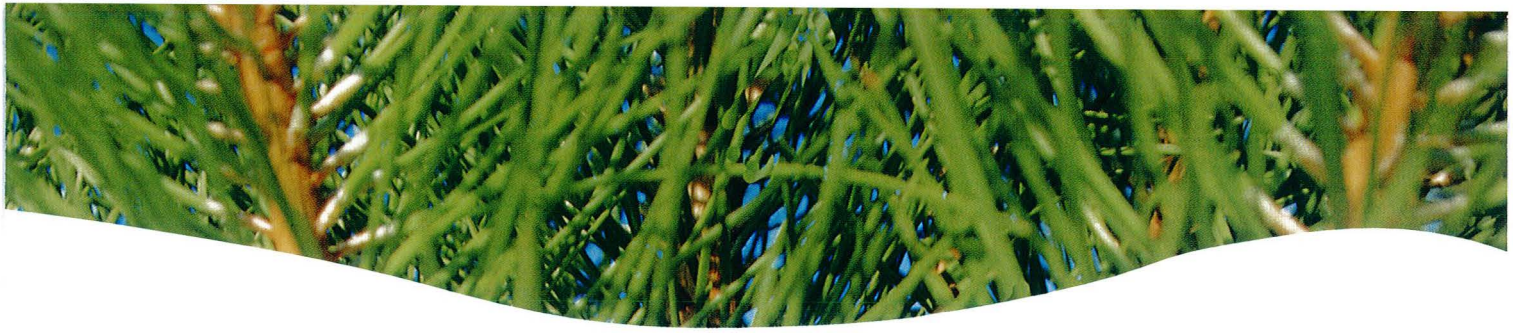
Nursery

Located at Manjimup, the FPD's tree nursery and seed centre form the biggest facility of its kind in Australia. The nursery uses scientifically advanced methods of plant propagation based on the results of a large, ongoing research and development program.

A $9 million expansion program has increased the nursery's capacity from 26 million seedlings in 1999, to 45 million seedlings. Production in 2000 includes:

- 20.5 million bluegum;
- 13 million maritime pine;
- 3.7 million karri;
- 2 million radiata pine;
- 760,000 oil mallees;
- 1.6 million mixed native species.

The nursery also houses a seed centre that stores approximately 3200 kilograms of seed from more than 540 native and exotic species. This seed is used for CALM conservation programs as well as being available to the public.



Inventory

Forest managers have been measuring and monitoring the changes in merchantable timber volumes for centuries. Estimating the carbon sink storage in tree crops is a simple extension of these methods. The growth of tree crops is predictable within known parameters of species, age of crop, climate (rainfall/temperature), edaphic conditions (soil type, soil depth, landscape position, etc.), management practices (stocking levels) and planted area.

The most important factors in determining the level of inventory required in the accounting for carbon are the precision required for the estimate of carbon sequestered and the variability within the planted area. These will determine the intensity of sampling required to monitor sequestered carbon and verify the models used. Until these factors are precisely known it is not possible to specify the sampling intensity in detail. The cost of this process can only be fully determined when its specifications are defined.

Research

FPD and one of its predecessors, the Forests Department, 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. An 80 per cent improvement in productivity compared to the first seed orchards has already been achieved.

The Department's current research program is building on well-established procedures for measuring timber volumes, to develop equations to predict tree carbon content from easily measured parameters. While most change in carbon on site is expected from the growing and harvesting of trees, FPD scientists are considering the five major carbon pools in a tree crop:

- trees—includes stem, branches, leaves and roots of live trees;
- litter—includes fallen branches and leaves and logging residues (stumps and roots, branches, tops and bark);
- soil carbon—in soil organic matter and carbonate minerals;
- other vegetation—pasture and shrub species that may be growing in the forest;
- wood products—timber, paper or other products from harvesting.

Marketing

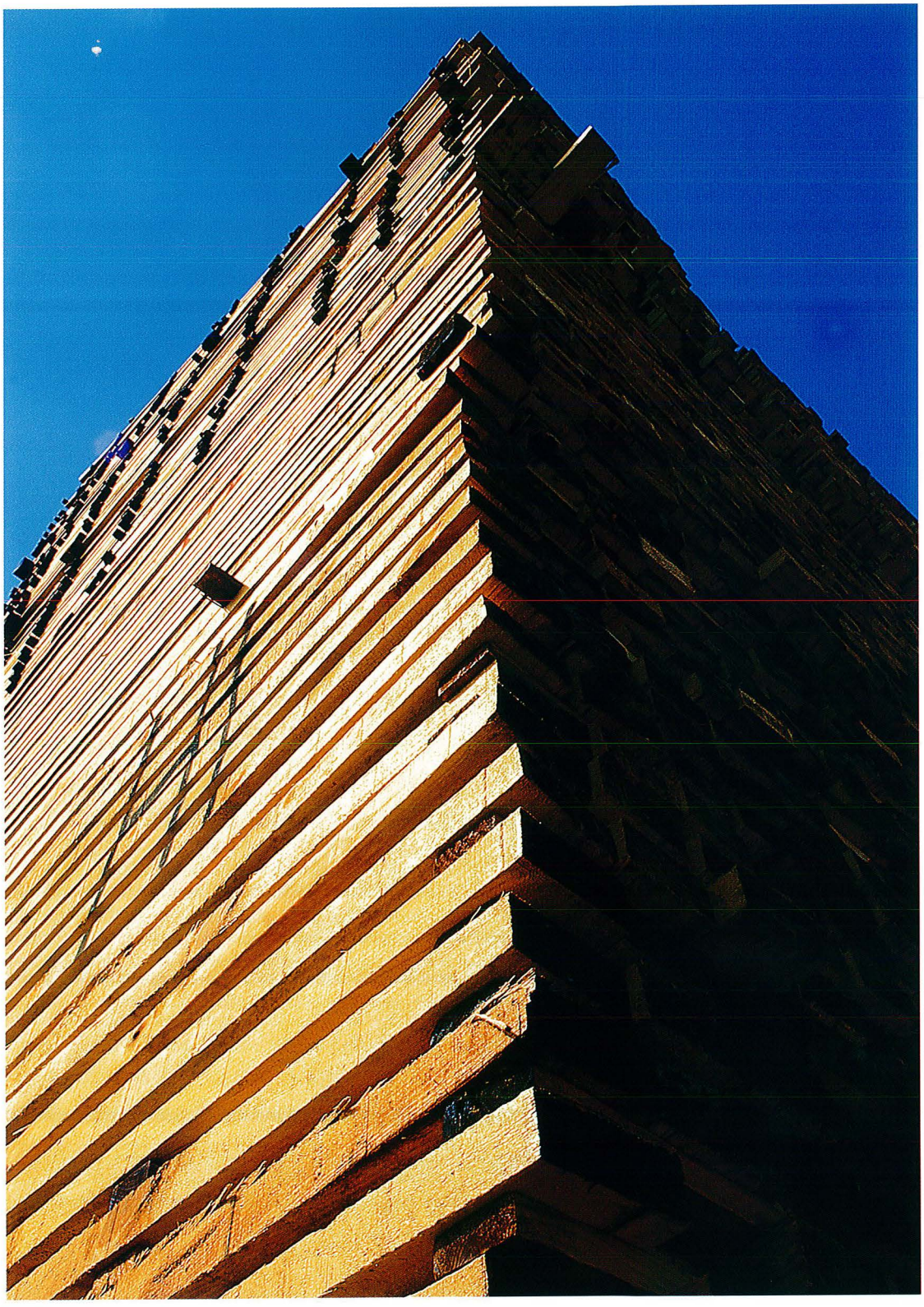
In 1997-98, 805,789 cubic metres of softwood logs were produced from pine plantations in Western Australia. Trends in the production of timber from Western Australia indicate both an increasing quantity and proportion of the timber resource from softwood plantations. This trend is predicted to continue.

Future trends likely to influence the marketing of maritime pine resources are:

- alternative supplies of pine resource may be declining locally as there is little private planting of any pine species in Western Australia and FPD is not replanting all pine areas clearfelled—maritime pine on farmland is likely to become a much more important resource;
- the declining supply of wood resources globally, at the same time as the demand is increasing.

Maritime pine is stronger and denser than other softwoods, including radiata pine. In Western Australia, maritime pine is used mainly as structural grade timber and for panel products, such as medium density fibreboard (MDF) or particle board. Pruned logs produce appearance-grade timber suitable for furniture and plywood. Other products produced locally include cases, pallets, veneers, treated posts, poles and sawn timber.

Maritime pine has also been assessed as highly suitable for a structural veneer board product, laminated veneer lumber (LVL), and produces good quality paper pulps.



HOW TO INVEST IN MARITIME PINE

If you would like further information, or an opportunity to discuss investing in maritime pine in Western Australia, please contact:

Dr Paul Biggs
Acting General Manager
Forest Products Division
Phone: 61 8 9475 8801

Mr Gavin Butcher
Acting Manager Plantations Operations Division
Forest Products Division
Phone: 61 8 9475 8831

The FPD is seeking new investors both within Australia and from overseas, and will consider all proposals as they are received. To maximise the options available to them, including choice of plantation sites, potential investors are invited to contact the FPD as soon as possible.

Forest Products Division
Level 1, 117 Great Eastern Highway
RIVERVALE Western Australia 6103