

# The Development of Tree Crops and Associated Industries on Farmland in Western Australia

Presentation to the  
Australian National University, Canberra

28 May 1998

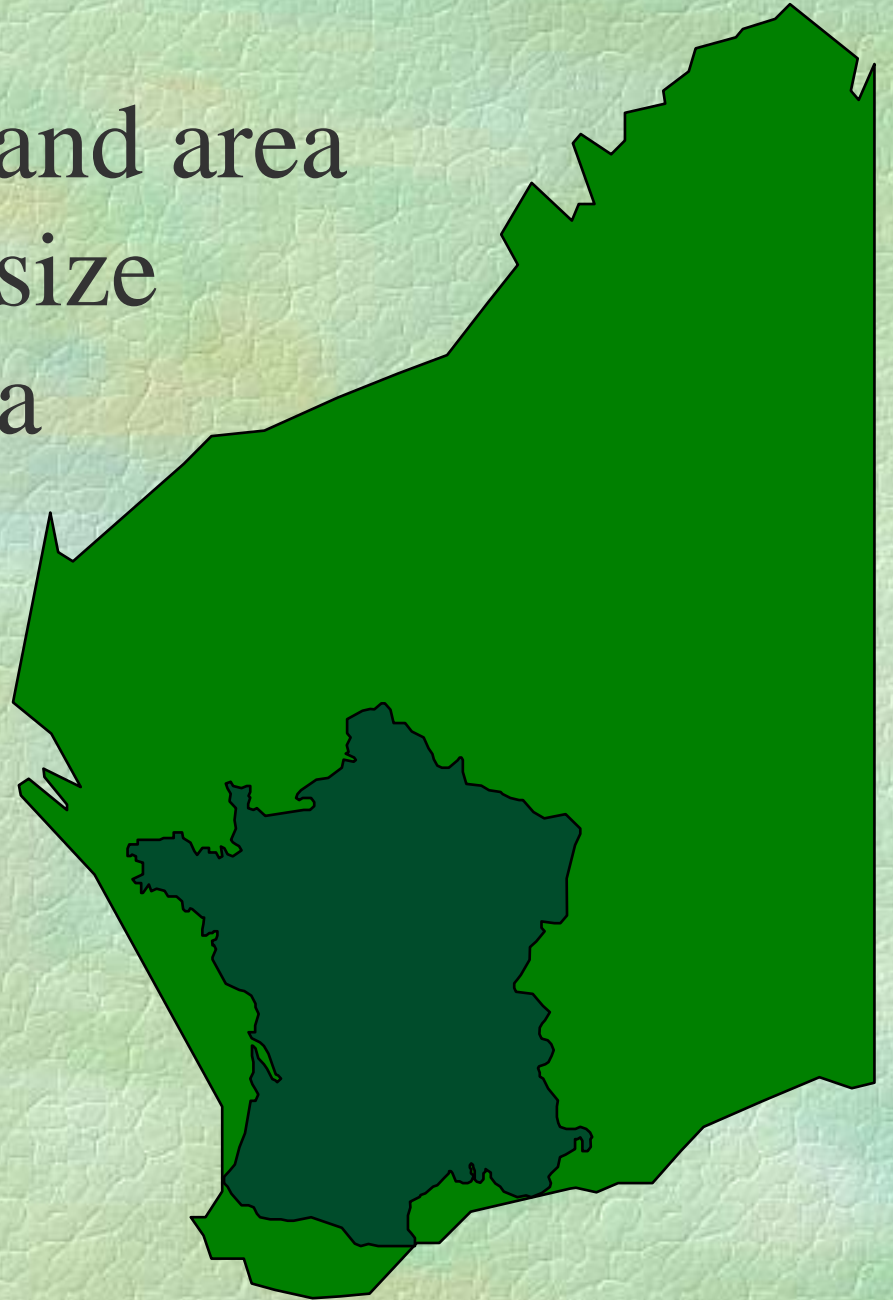
Dr Syd Shea

Executive Director

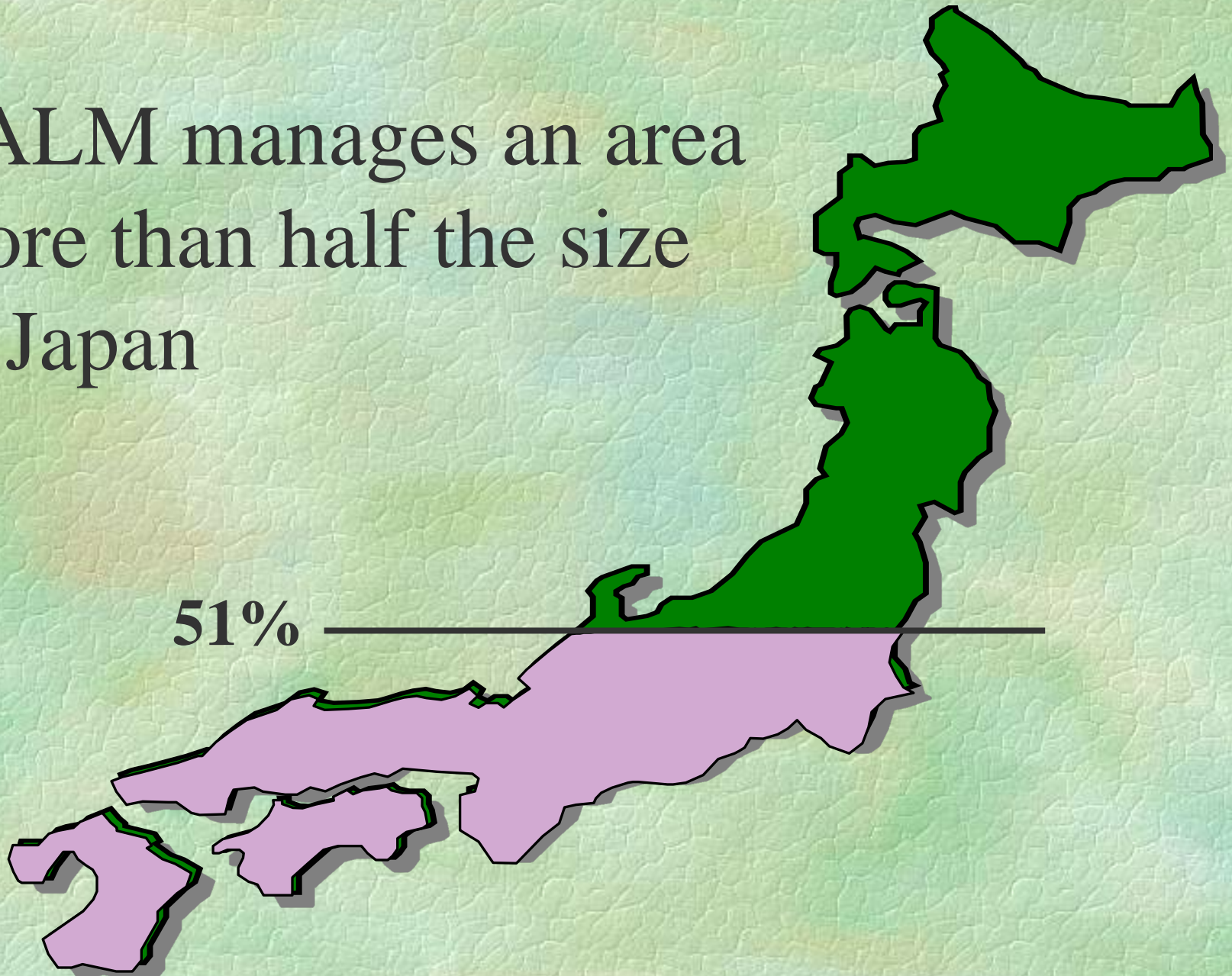
Department of Conservation and Land  
Management, Western Australia



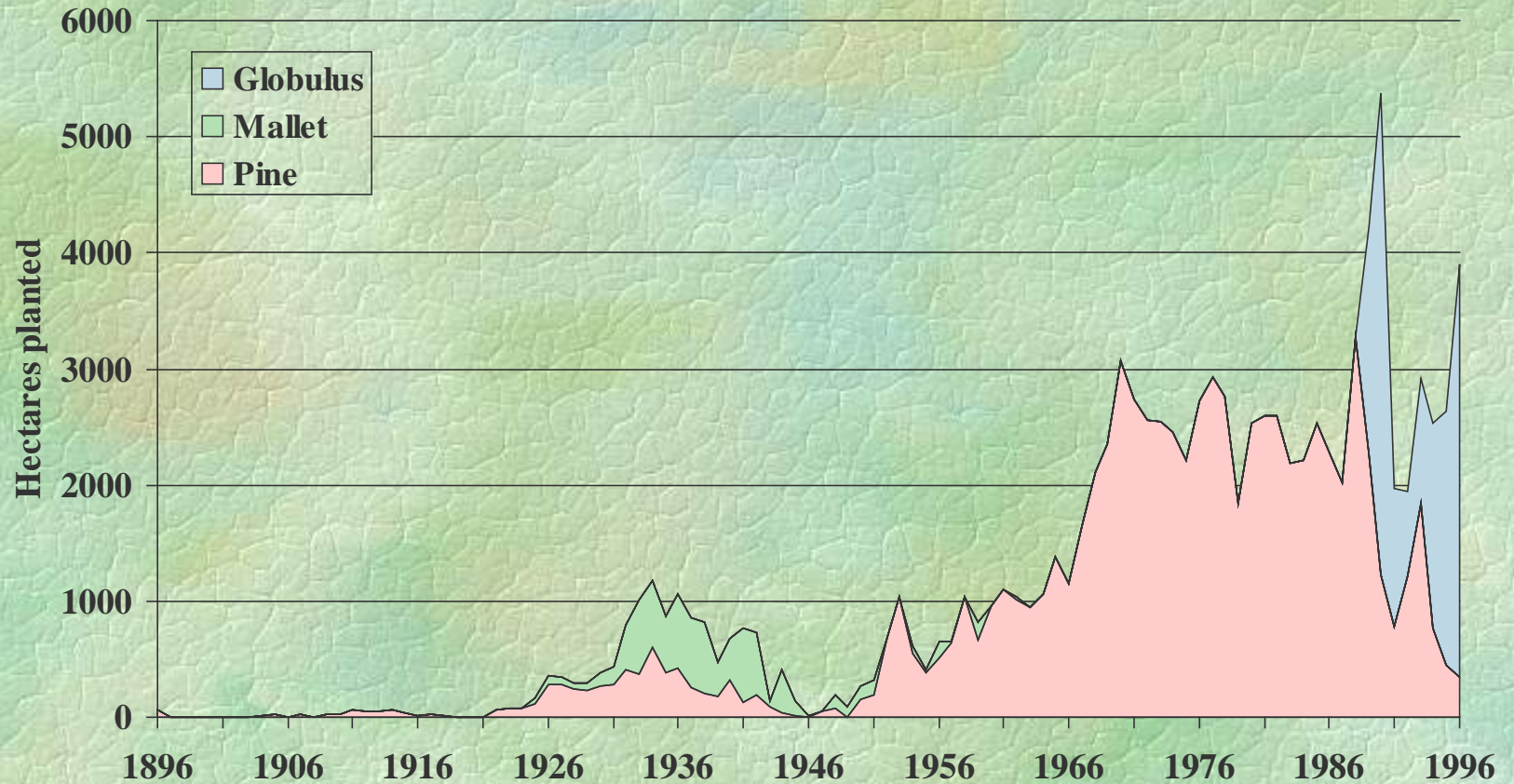
France occupies a land area  
about a quarter the size  
of Western Australia

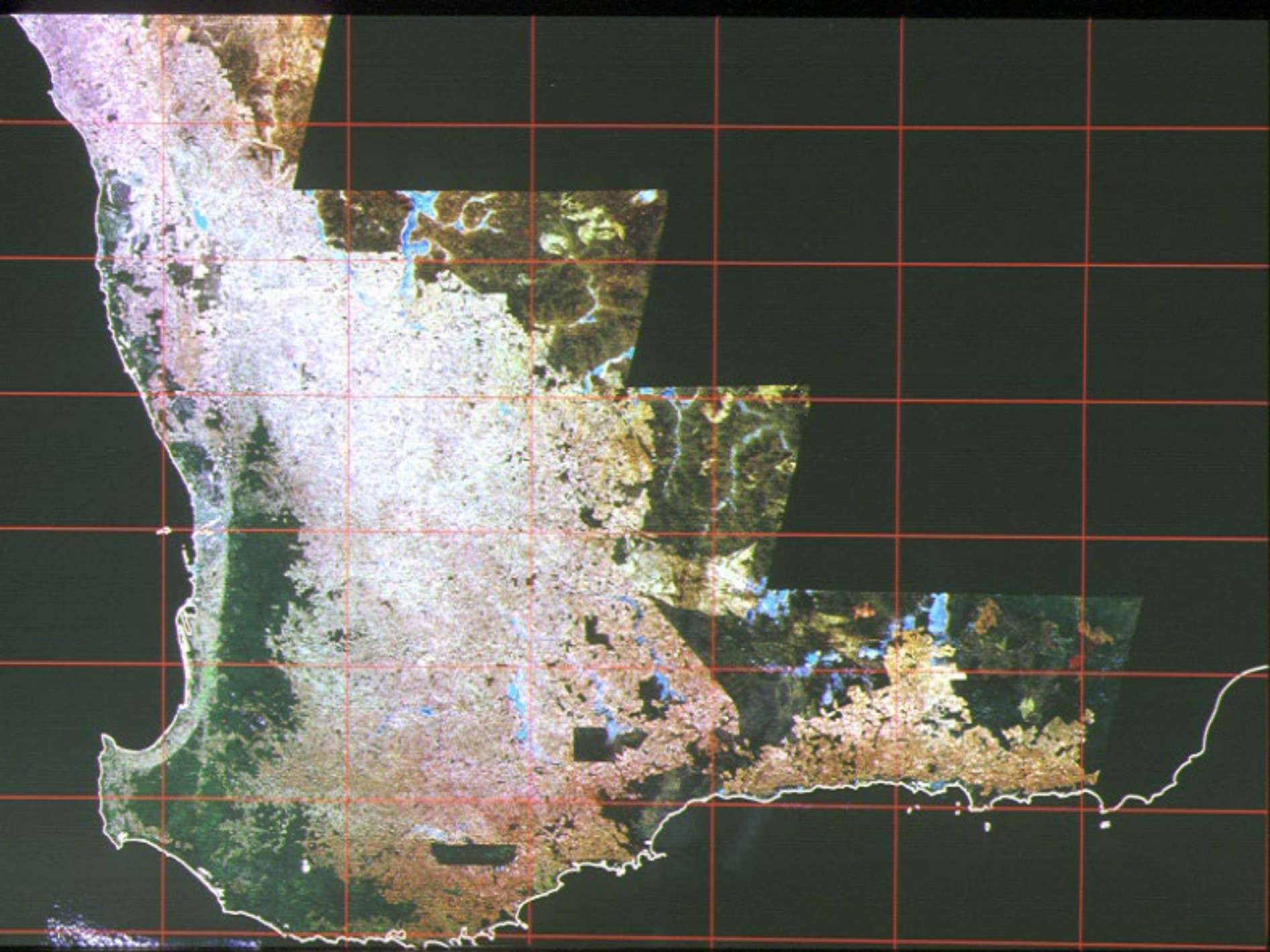


CALM manages an area  
more than half the size  
of Japan



# Tree plantings in Western Australia (WAFD/CALM)

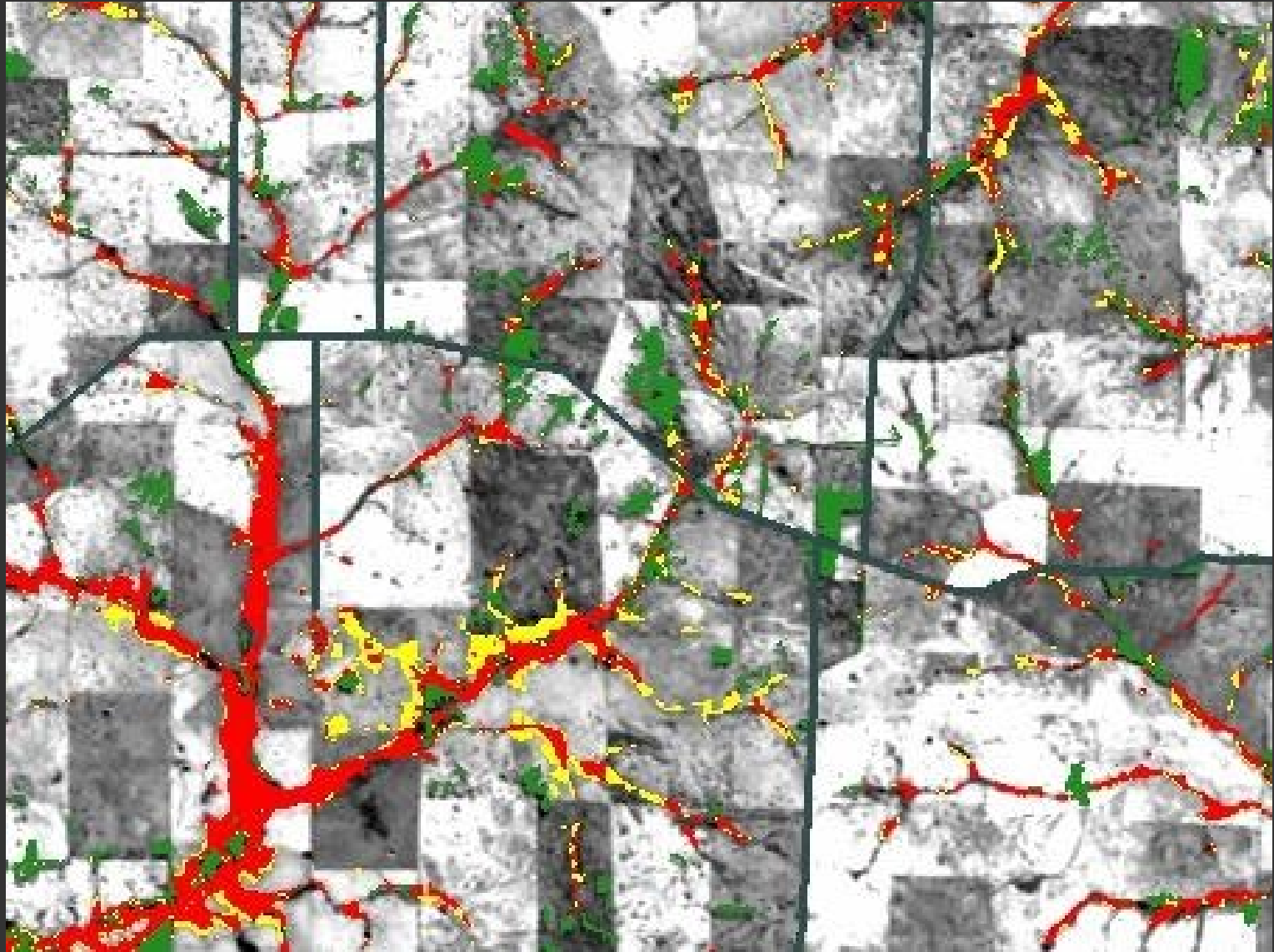




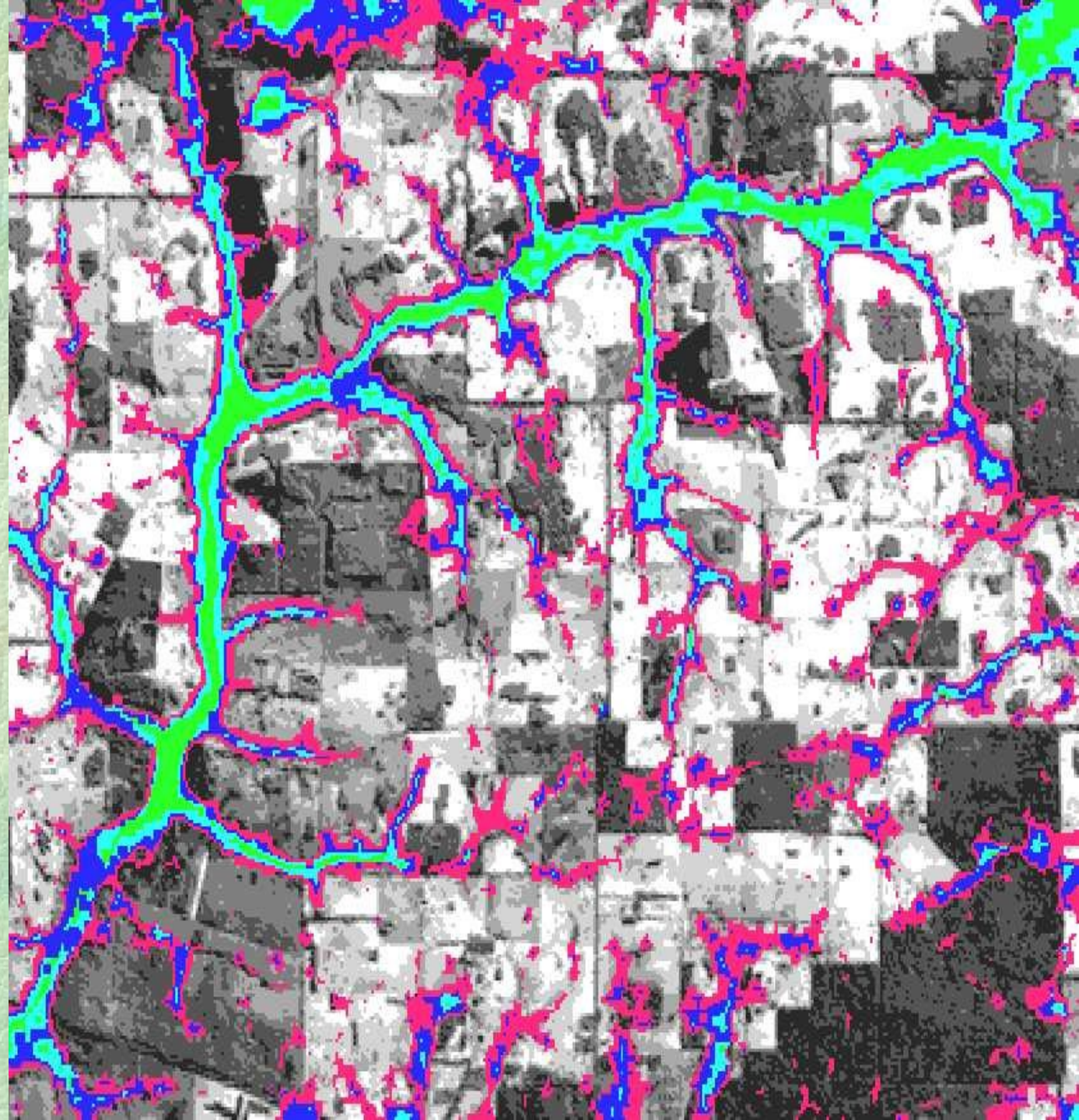








Predicted  
Salinity  
Risk Areas



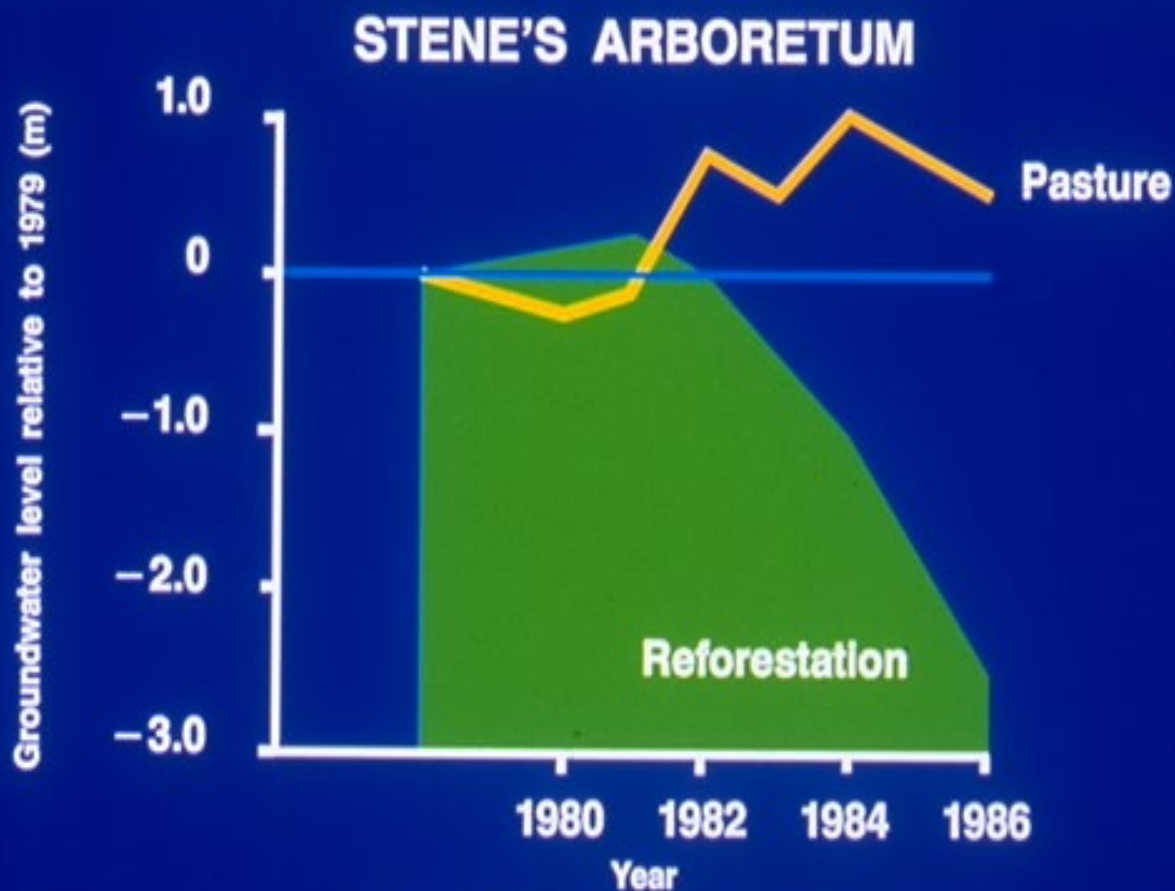






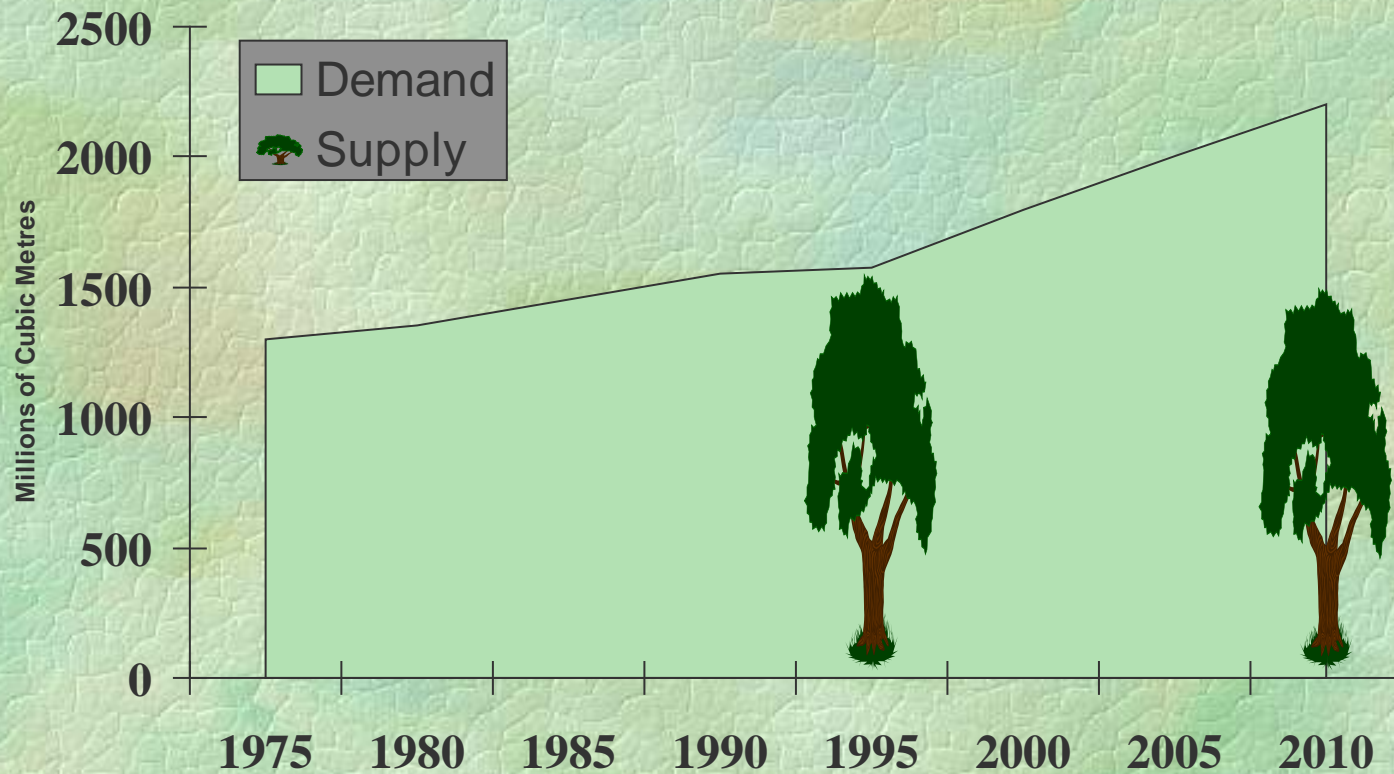


# THE EFFECT OF TREE CROPS ON WATER TABLE LEVELS



Water Authority of Western Australia  
July 1989  
Report No. WS 33

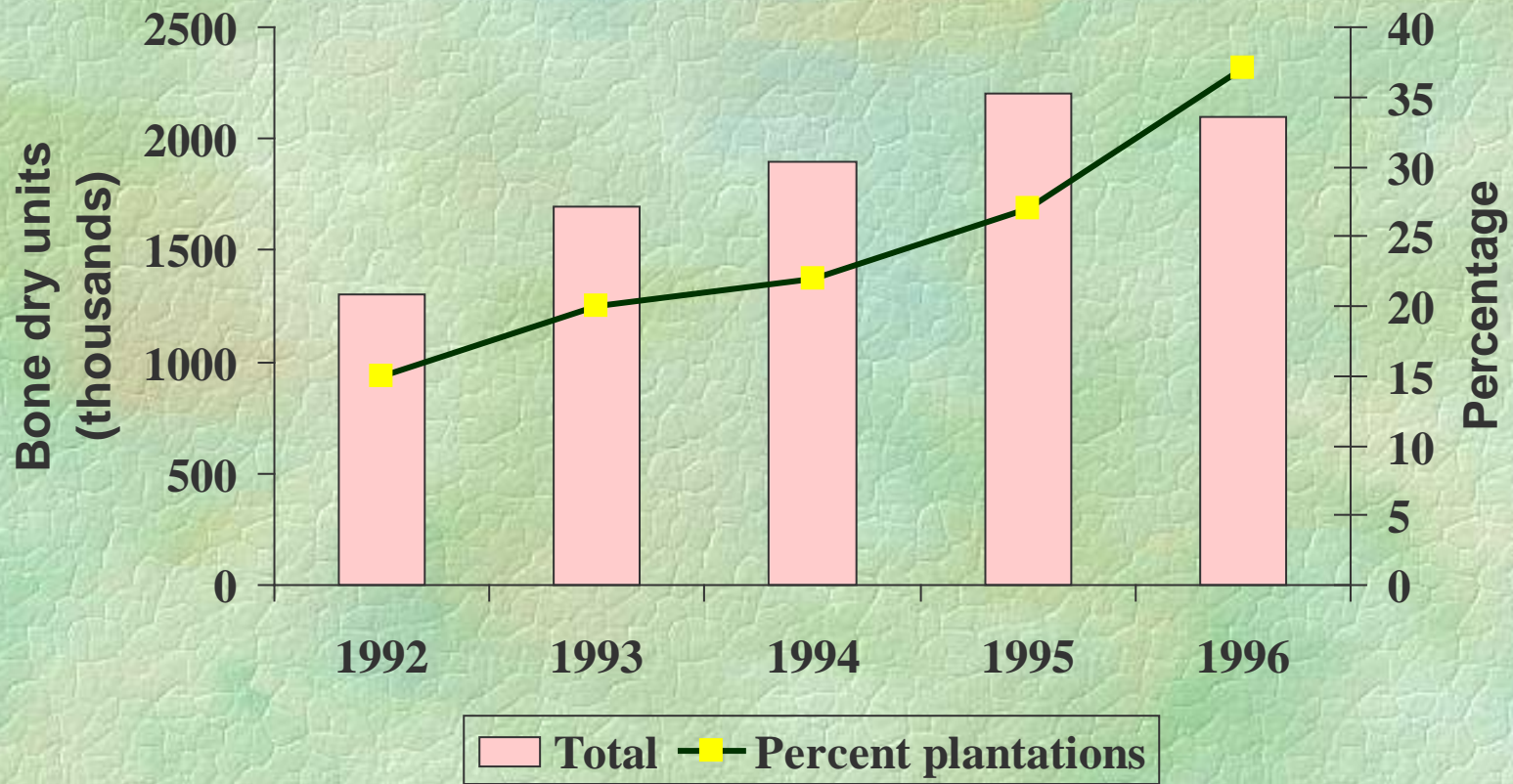
# Global wood demand rises as supply falls





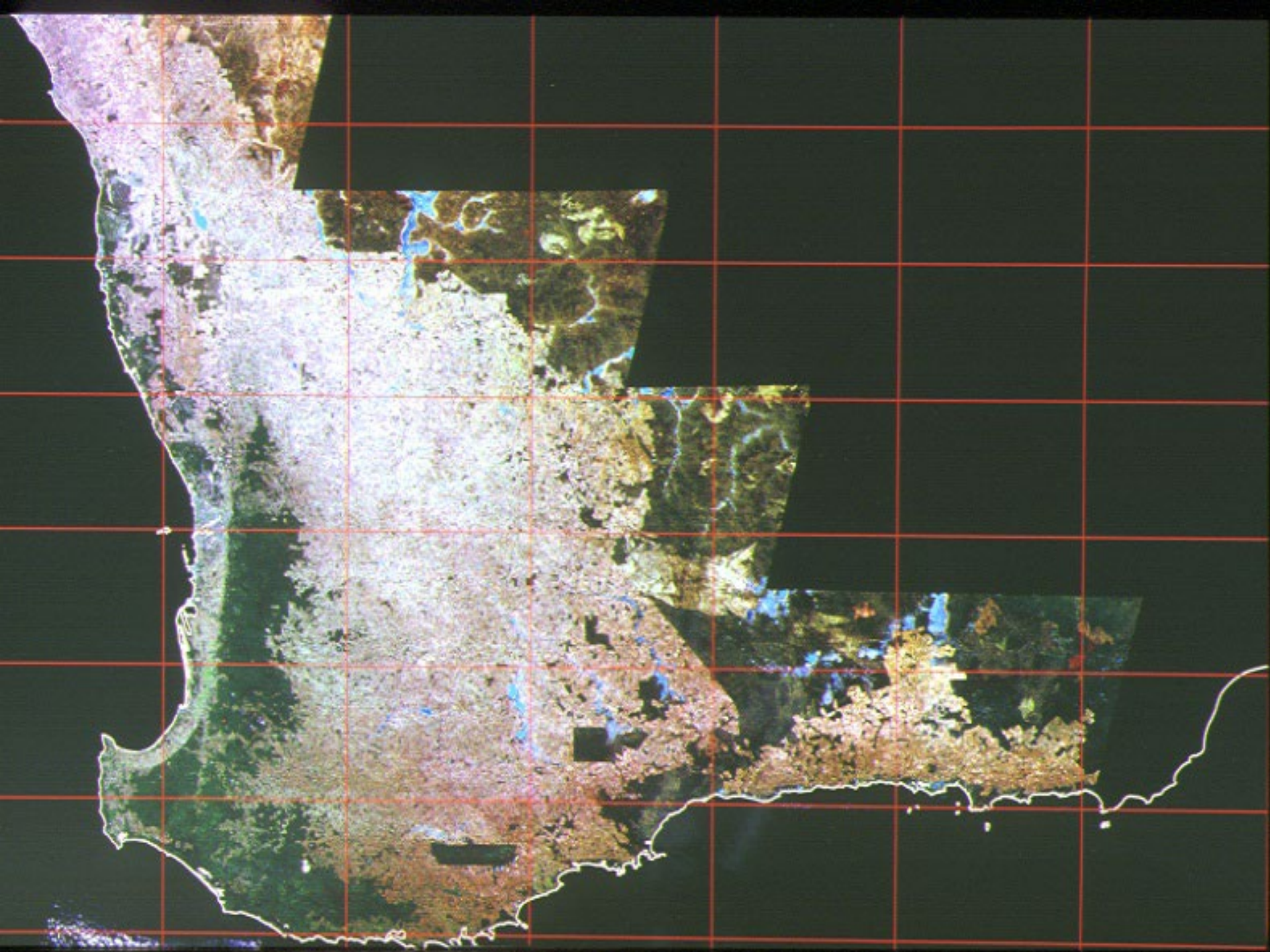


# Total hardwood chip imports and the percentage of the imports sourced from plantations



# Suitability by country for hardwood pulpwood plantation development to supply Asian markets





# Farm Forestry Zones by area and rainfall

	<i>Rainfall (mm)</i>	<i>Area (x 10<sup>6</sup> ha)</i>		
		<i>Cleared land<sup>1</sup></i>	<i>Suitable land<sup>2</sup></i>	<i>Plantable land<sup>3</sup></i>
<i>Pine and Bluegum</i>	>600 mm	2	1.3	.26
<i>New Maritime Pine</i>	400-600 mm	6	4.0	0.8
<i>Wheatbelt</i>	<400 mm	10	6.7	1.3
<b><i>Total</i></b>		<b>18</b>	<b>12.0</b>	<b>2.36</b>



CALM SHAREFARMS

MARITIME PINE

DORMAN PLANTATION PLANTED 1996



FORM P2  
APPROVAL NO. B1629  
WESTERN AUSTRALIA

TRANSFER OF LAND ACT 1893 AS AMENDED  
**PROFIT A PRENDRE**

[Under s.34B Conservation and Land Management Act 1984 as amended]

DESCRIPTION OF LAND (Note 1)	EXTENT	VOLUME	FOLIO

ESTATE AND INTEREST (Note 2)

--

ENCUMBRANCES (Note 3)

--

OWNER (Registered Proprietor) (Note 4)

--

GRANTEE (Note 5)

<b>EXECUTIVE DIRECTOR OF THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT</b> a body corporate constituted by the Conservation and Land Management Act 1984 ("the Act") of Corner of Hackett Drive and Australia II Drive, Crawley Western Australia.
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TERM OF PROFIT A PRENDRE (Note 6)

40 years, subject to earlier termination in accordance with clause 8, commencing on and including the First day of January 1998.
--

The Owner hereby Grants a Profit a Prendre to the Grantee for the term specified above over the land described above subject to the encumbrances shown hereon in accordance with the terms and conditions contained in this Deed.







# CALM SHAREFARMS LOWER WEST

## JACKSON

Nelson Loc's 2868, 2869 & 2870.

### PLANTATION PLAN LEGEND

	P.97 TREE CROP AREA E.globulus G.P.S. CAPTURE.		SEALED ROAD
	P.96 TREE CROP AREA E.globulus G.P.S. CAPTURE.		UNSEALED ROAD
	EXISTING BUSH G.P.S. Capture inside tree crop area only.		POWERLINE, PYLON
	SALT AFFECTED G.P.S. CAPTURE.		SWAMP
	PRIVATE PLANTING		DAM
	CALM PLANTING		WATER POINT
	FENCE		BUILDINGS
	CADASTRAL BOUNDARY G.P.S. CAPTURE		CADASTRAL BOUNDARY NON G.P.S. CAPTURE

### STATISTICAL REPORT

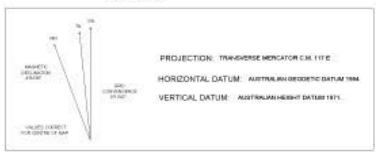
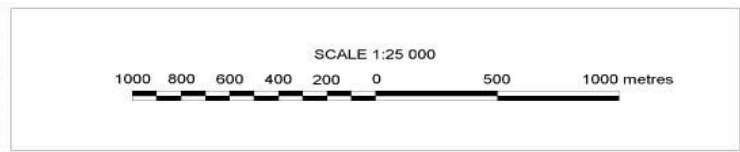
Categories	Area (ha)
P.97 TREE CROP AREA	372.5
<b>TOTAL AREA</b>	<b>372.5</b>

SHIRE: BOYUP BROOK
MAIN ACCESS ROAD: CRAIGIE ROAD
FIRE CONTROL DETAILS
OWNER:
CONTACT:
FIRE CONTROL CONTACTS:
1.
2.
3.
FIREBREAKS
10m BOUNDARY
10m ADJOINING 1st CLASS ROADS
10m ADJOINING 2nd CLASS ROADS
6m INTERNAL BETWEEN COMPARTMENTS
6m INTERNAL

NB - The surrounding location boundaries have been determined using 50 series mapping and are for schematic purposes only, there may be inconsistencies between the G.P.S. plot and the Cadastral data. It is important for the intended use that the matter must be resolved by reference to MBG.  
DEPARTMENTAL PLAN FOR OPERATIONAL USE ONLY.

Part of CALM 1/50 000 map 2230-4  
Part of CALM 1/25 000 map 2230-4SW & SE  
G.P.S. (Global Positioning System).  
The Global Positioning System used is a real time  
differential G.P.S. which obtains accuracy of  $\pm 1.5m$ .

G.P.S. Surveyed By: JOHN MOSAJ	Date: MAY 97
Plan Compiled By: S. MOUNTFORD	Date: JULY 97
Plan Checked By:	Date:



**CALM**  
CONSERVATION AND LAND MANAGEMENT

PREPARED BY: FOREST MANAGEMENT BRANCH UNDER THE DIRECTION OF  
DR. SHYAM K. SINGH, CHIEF EXECUTIVE OFFICER OF THE DEPARTMENT  
OF CONSERVATION AND LAND MANAGEMENT, WESTERN AUSTRALIA.  
THE MAPS CONTAINED HEREIN DO NOT CONSTITUTE A CONTRACT.  
THE COPYRIGHT ACT, NO PART MAY BE REPRODUCED BY ANY PROCESS  
WITHOUT THE PERMISSION OF CALM.



CALM has joint ventures with 1303 farmers



CALM has contracts with 84 land management contractors







Inspect an *E. globulus* seedling for quality. Check the stem diameter, look for a pruned fibrous root system and notice if the foliage has a red tinge to show the seedling is hardy. All these aspects will help in the survival of the seedling. To be confident that the seedling will give you extra profit from its volume production in 10 years' time, look for the Western Blue Gum label.



# *Eucalyptus globulus*

## Breeding population trials

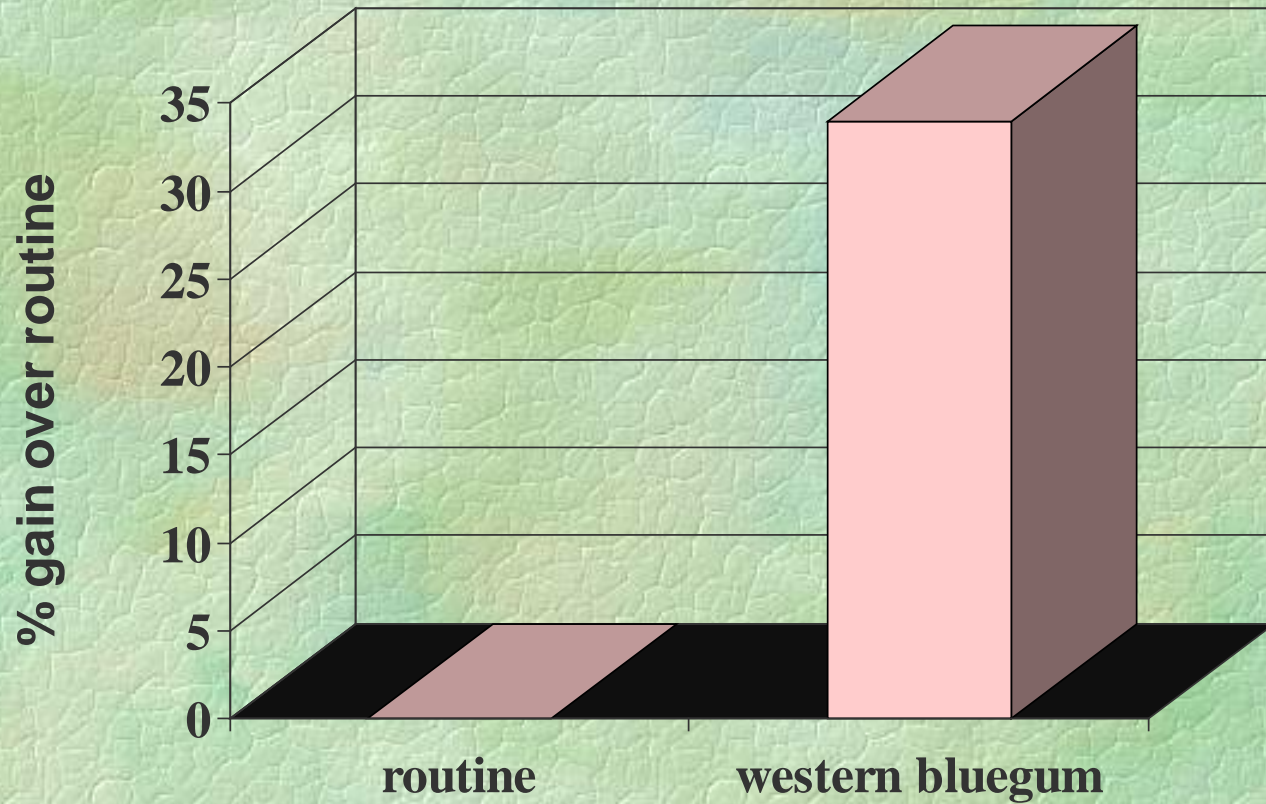
Program commenced in 1980

Source	Parents	Number	Area	Trees
CSIRO 1987 - 90	766	29	117 ha	107 000
King Island	83	1	3	3 000
Salt Tasmania	44	3	2	2 000
Orme	73	1	4	4 000
Orme (Prov)		2	11	6 000
APPM	73	4	4	3 000
CSIRO cc	135	1	3	3 000
Total	1174	41	144	128 000

# Traits assessed that influence breeding objective

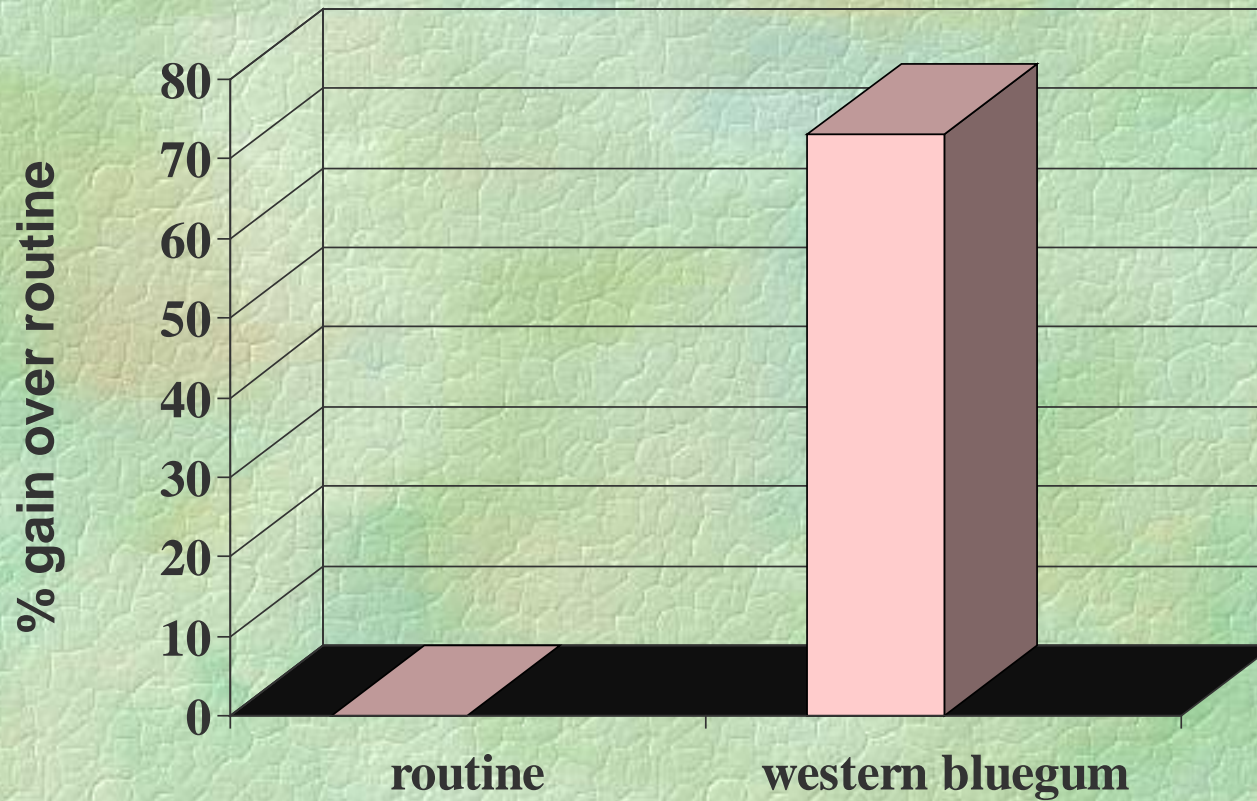
- survival and health
- growth rate
- wood density
- tree form and branching
- drought tolerance
- salinity tolerance
- pest resistance
- flowering precocity and synchrony
- graft compatibility
- rooting ability

# Genetic Gains Trial: **stem form**

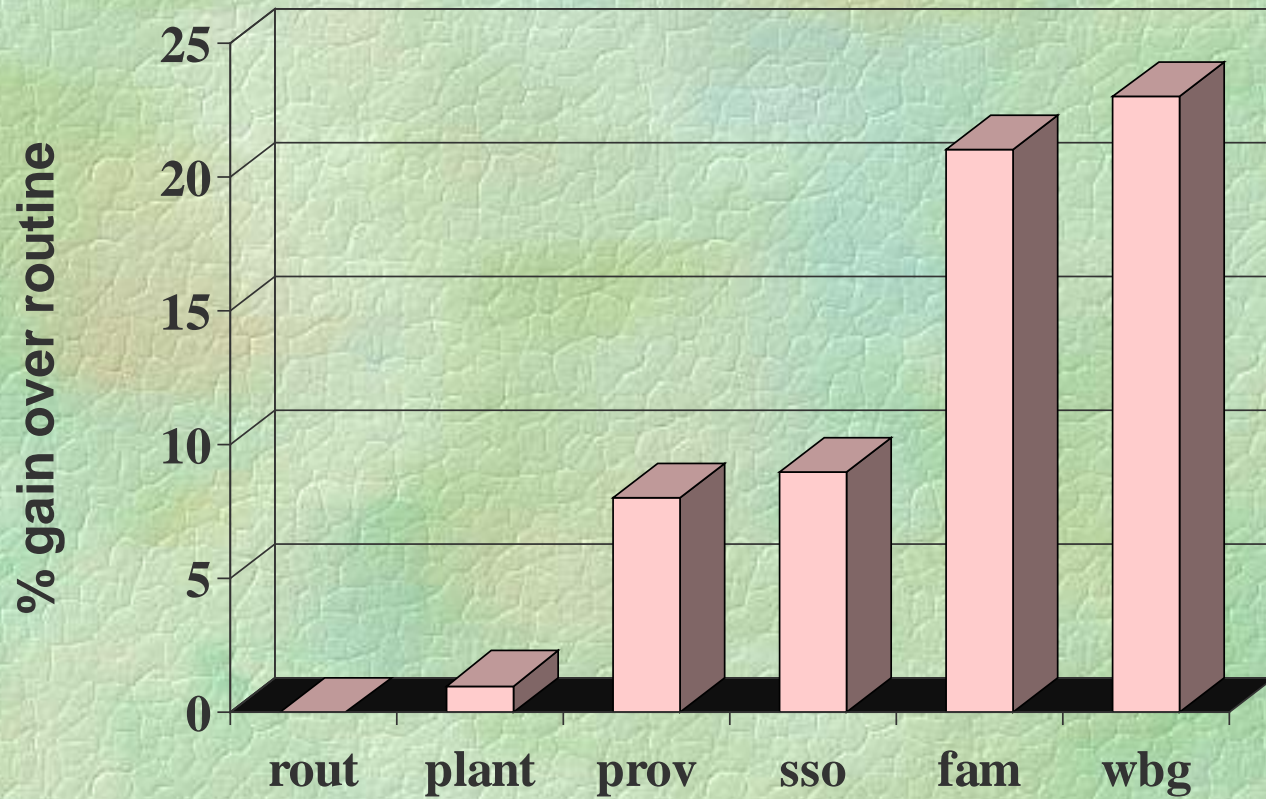




# Genetic Gains Trial: **crown**



# Genetic Gains Trial: **wood volume**



Western Bluegum

Tasmanian Bluegum

Trees are 2 years 8 months old





La Mancha

Maritime Pine





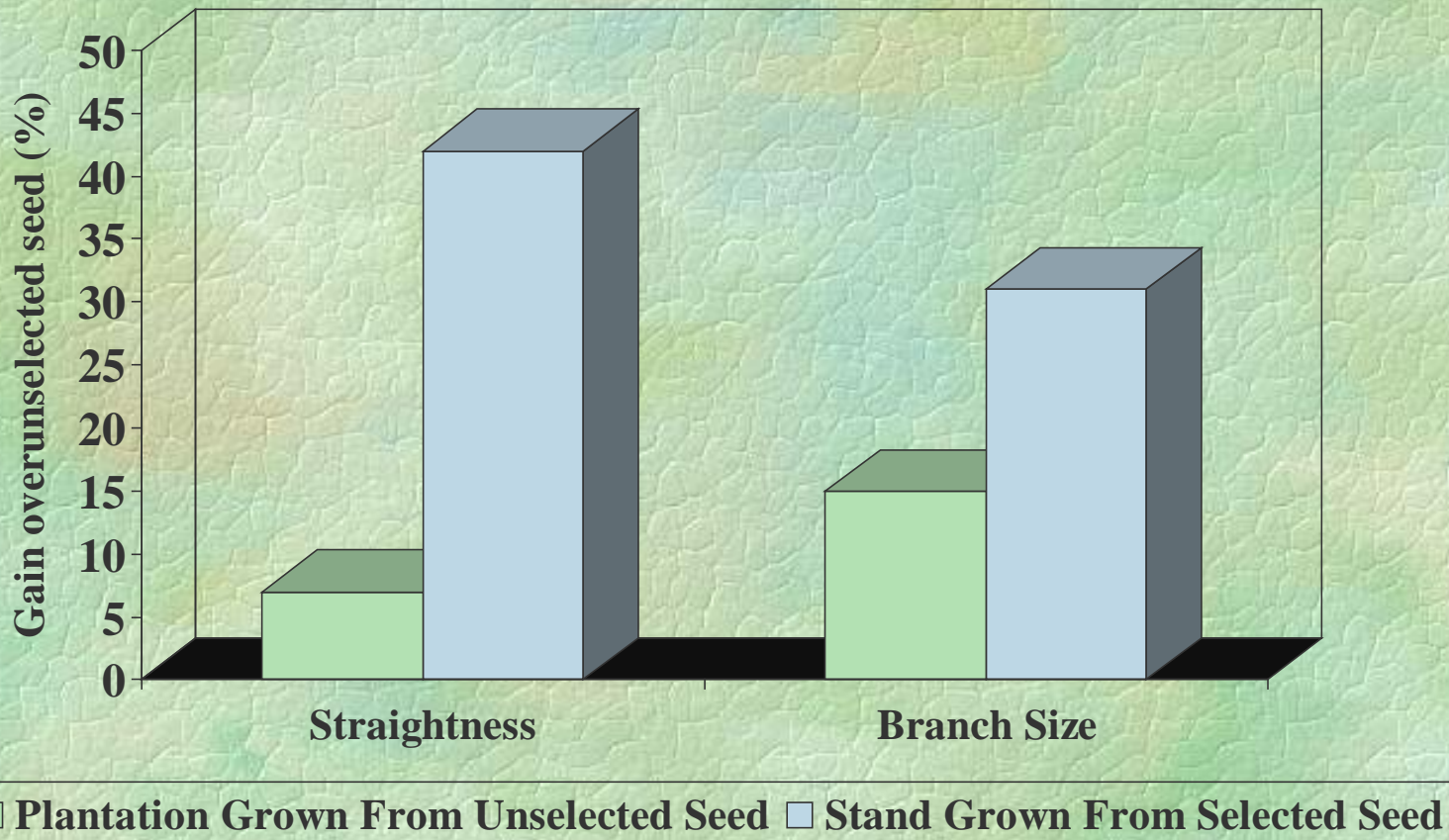
# CALM's Genetic Resource:

## *Pinus pinaster*

Program commenced in 1957

	Parents	Number	Area	Trees
Breeding Population Trials	313	93	171 ha	202 000
Breeding Research Trials		11	43 ha	45 000
Clonal Seed Orchards		4	48 ha	(24 ha active)
Clonal Archives		3	6 ha	

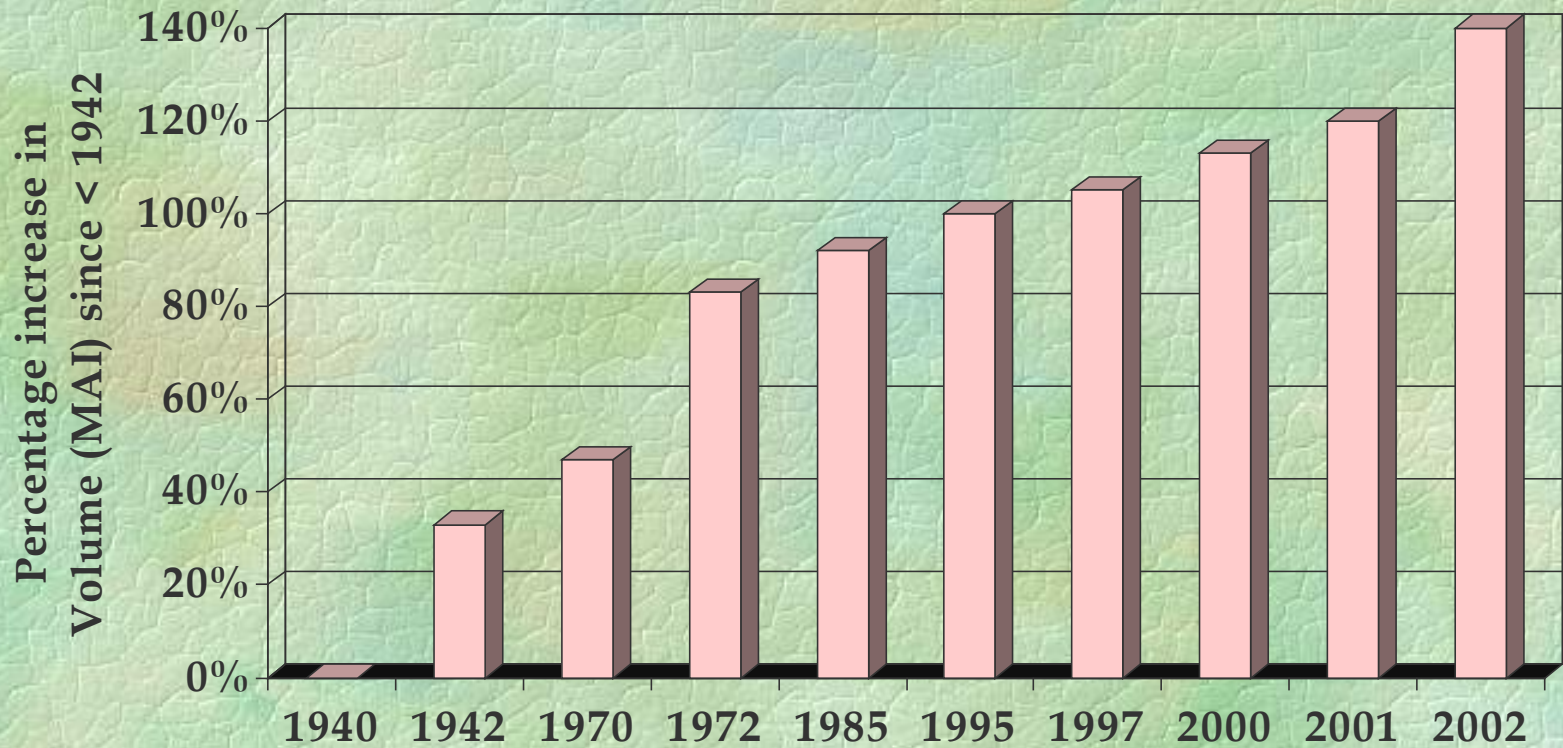
# Maritime Pine Breeding Improvement



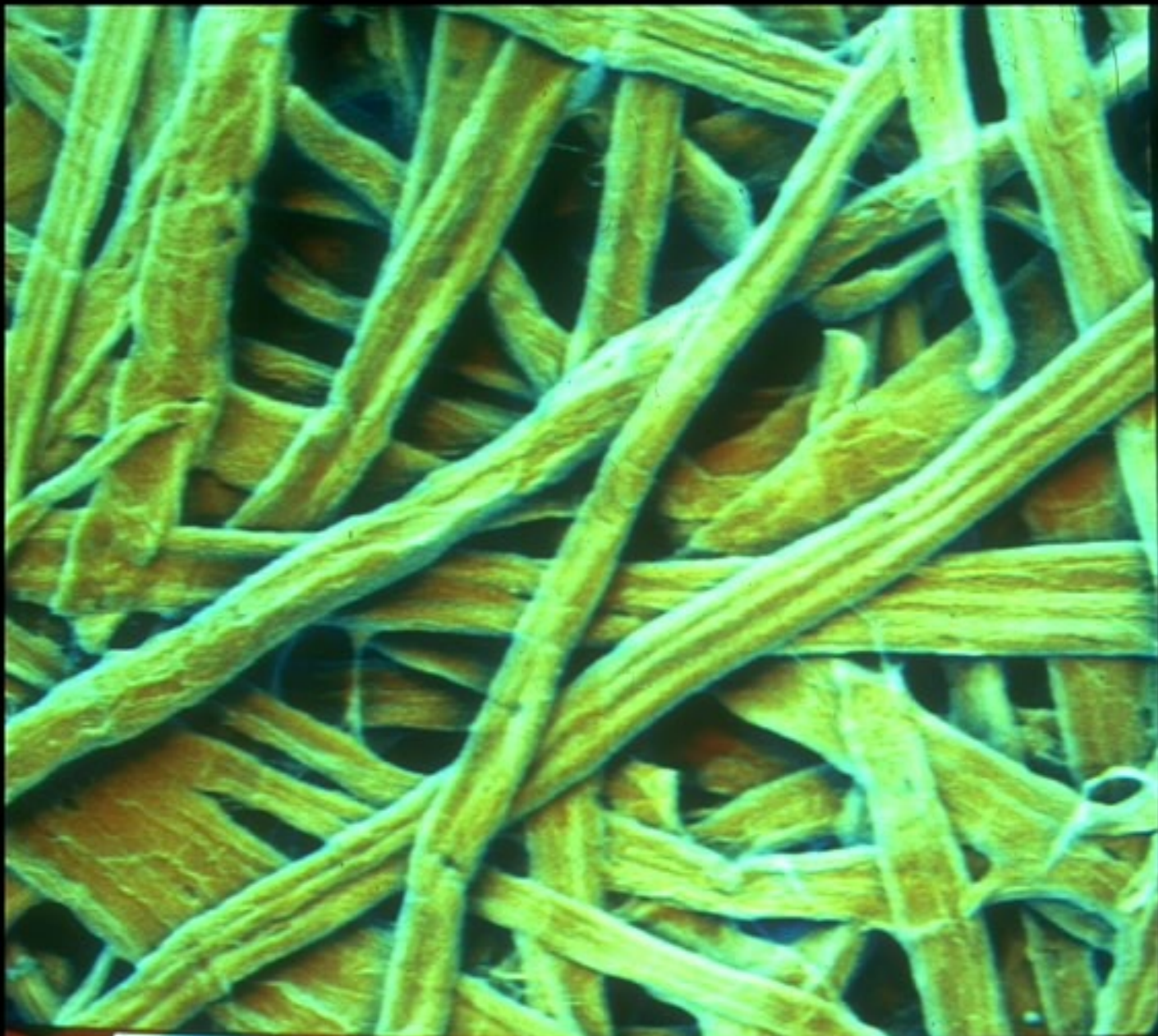




# Volume gains from the tree improvement program for Maritime pine







40µM

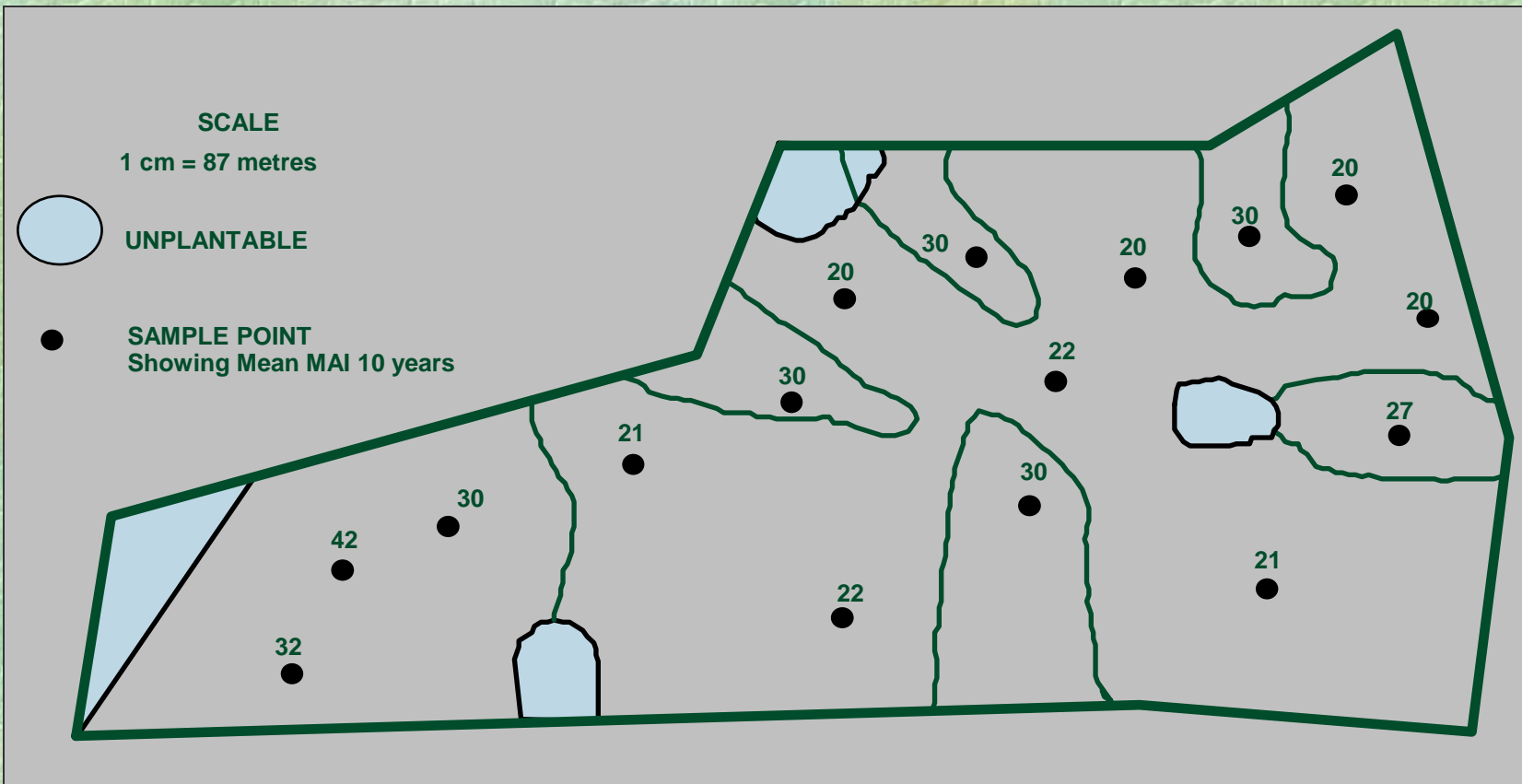
15KV

02

006

2

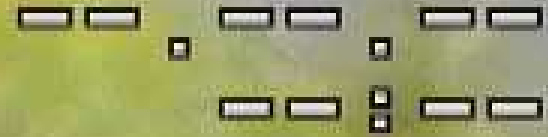
# *E. globulus* site productivity assessment for a typical farm



# Tree Crop Establishment



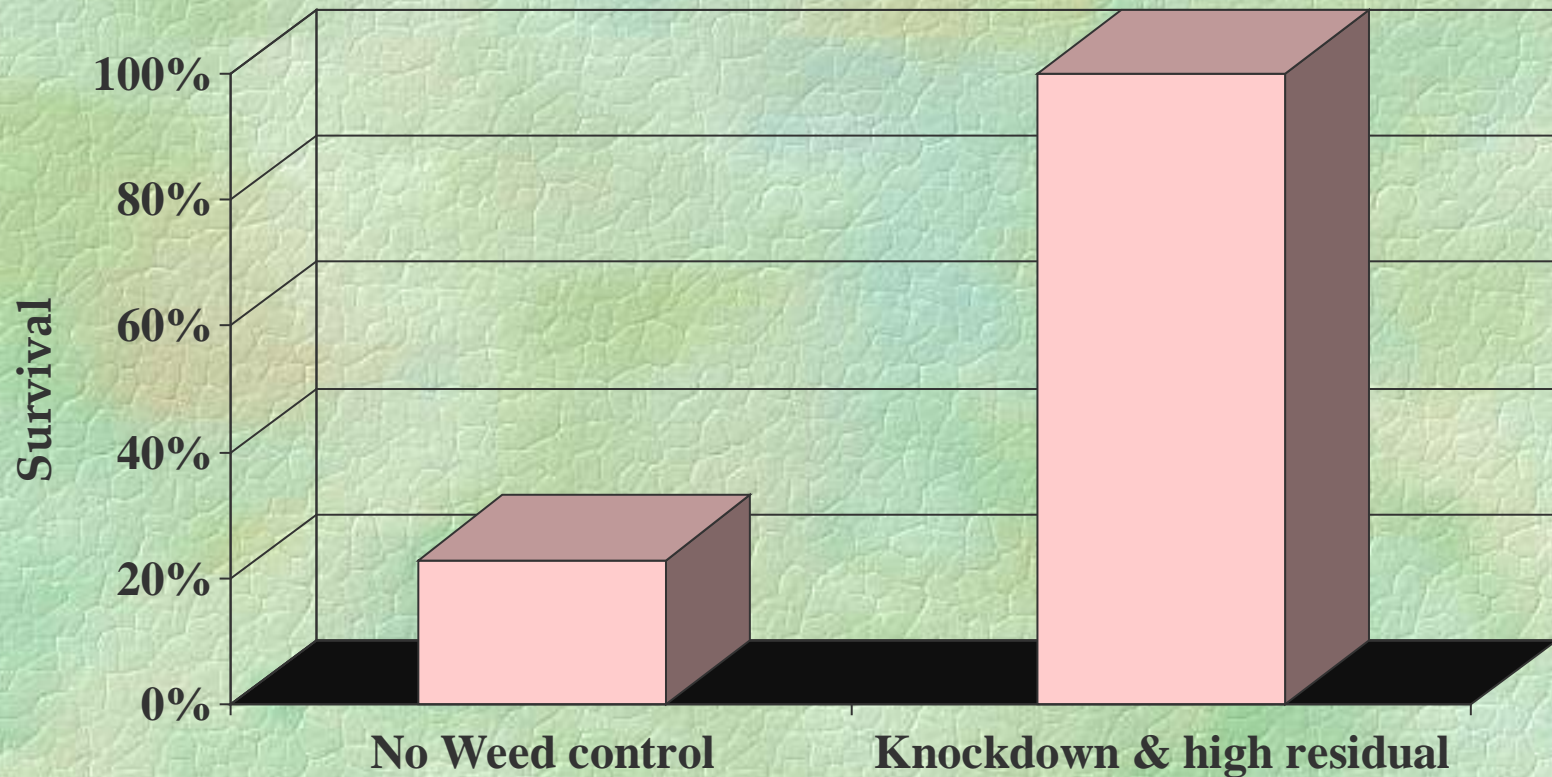








# Effect of chemical weed control on *Tree Crops*









# Basal area response to Nitrogen and Phosphorus over four years after fertilization

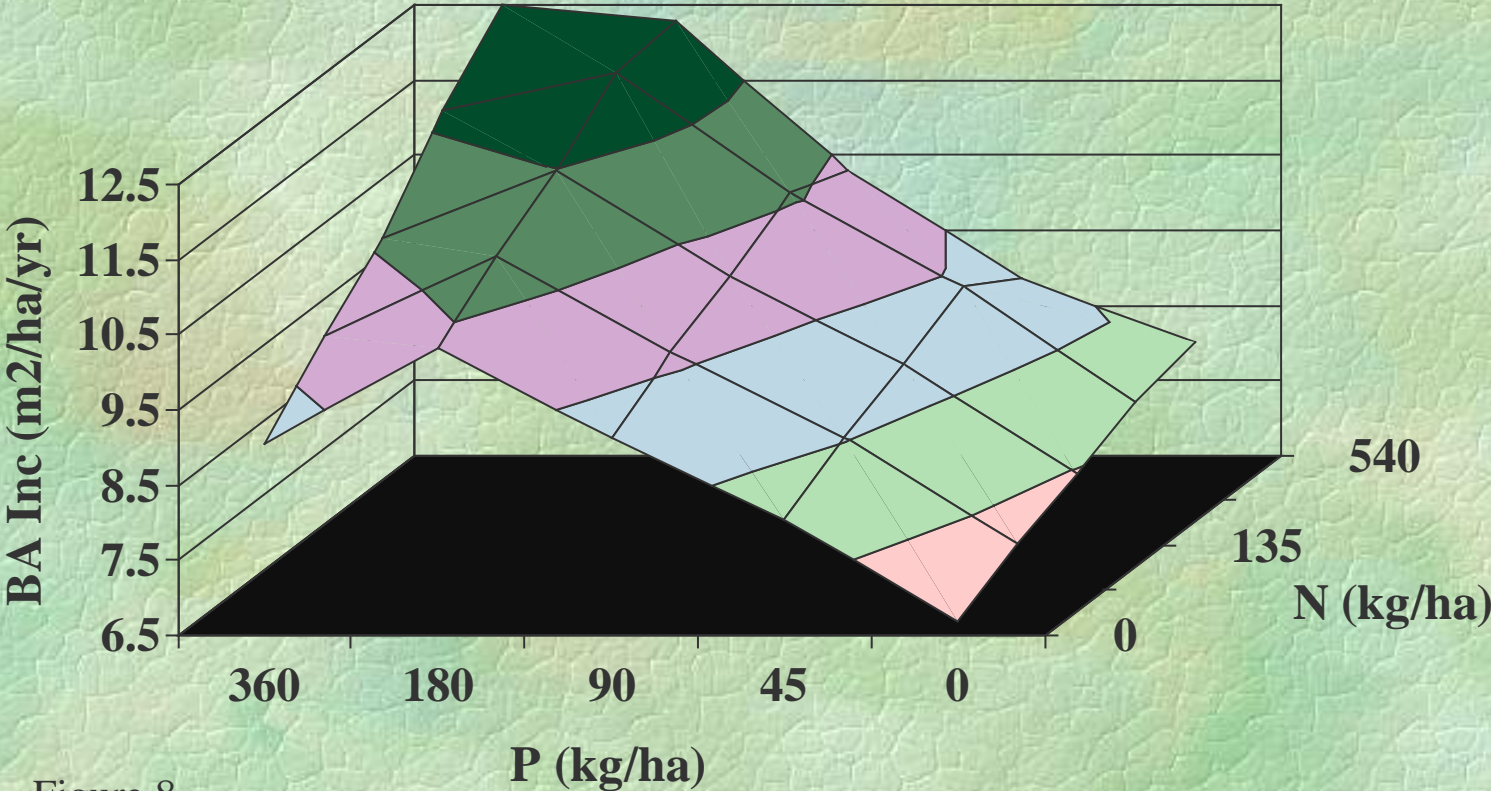
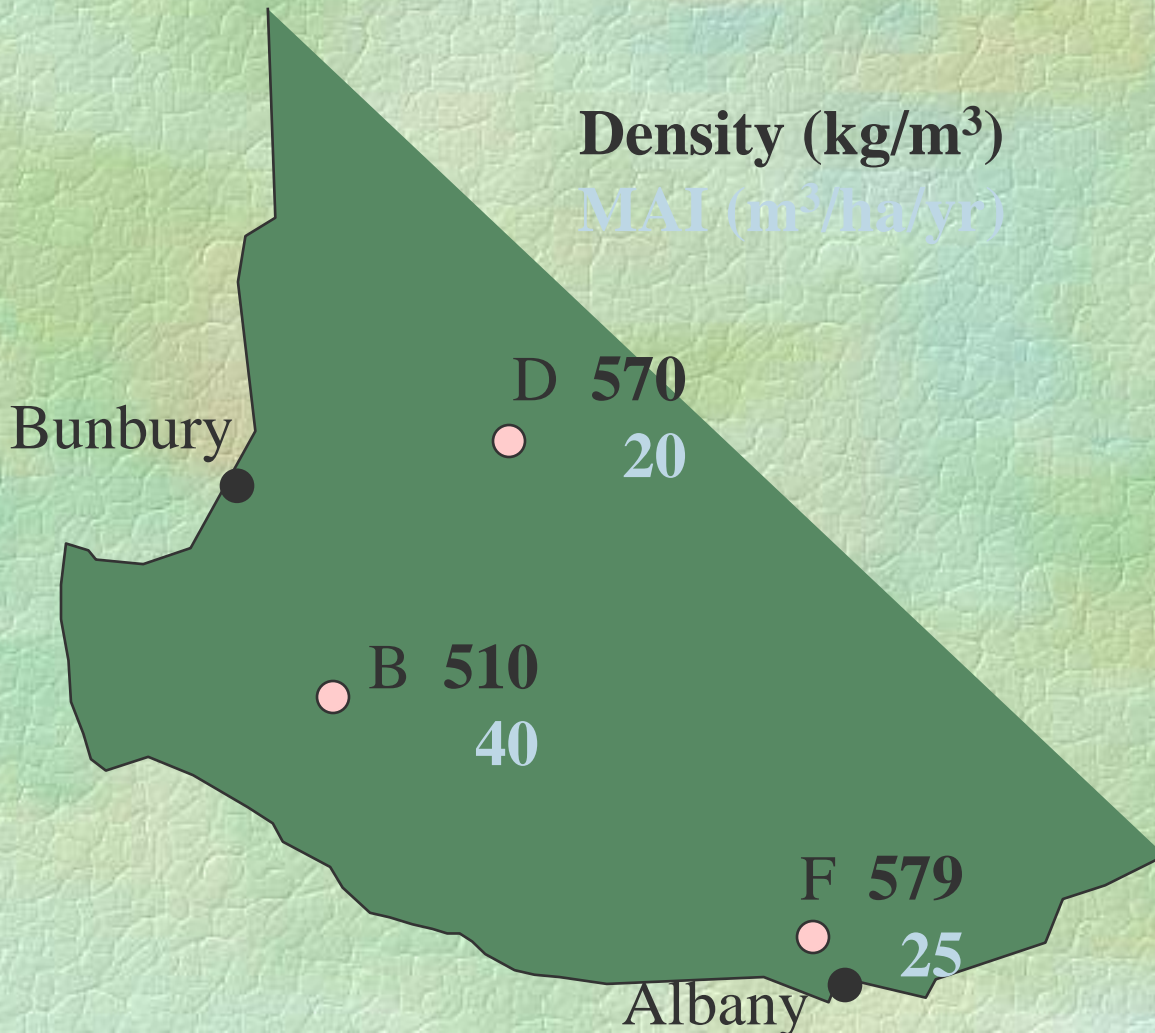
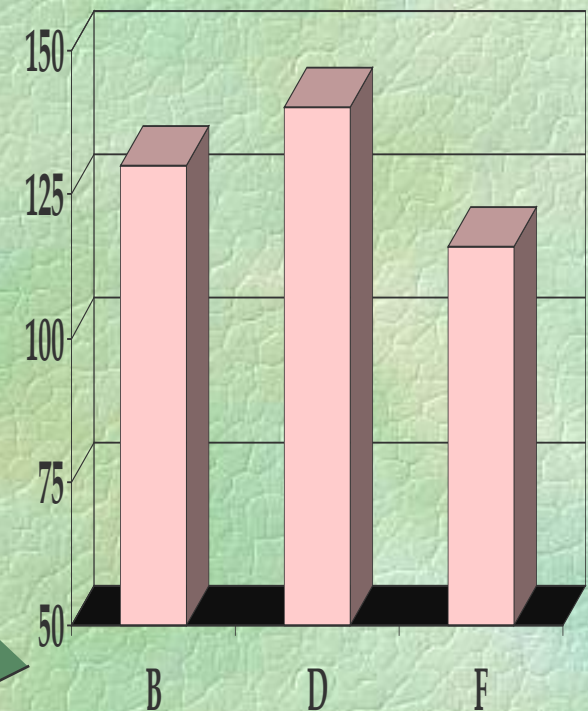


Figure 8

# Costs of E. globulus fibre at the port from farms at different locations and with different site productivities



Compounded cost of chips at port (\$/BDU, FOB)



# Costs of production

<i>Species</i>	<i>Rotation Age</i>	<i>Net Present Value @ 7%</i> \$	<i>Establishment Costs</i> \$	<i>Intermediate Costs</i> \$	<i>Total</i> \$
<b>Maritime Pine</b>	30	1 920	1 580	860	2 440
<i>P. radiata</i>	30	4 332	2 120	5 890	8 010
<i>E. globulus</i>	10x2	4 920	2 117	5 920	8 037
<b>Mallee</b>	100+	1 000	1 000	---	1 000

# Effect of growth rate on the timber rate of return from a conventional regime of 30 years

<i>Increase in stumpage over current</i>	<i>Growth rate</i>	
	<i>12m<sup>3</sup>/ha/yr</i>	<i>16m<sup>3</sup>/ha/yr</i>
Current	5.1%	6.7%
20%	6.2%	7.8%
40%	6.8%	8.4%

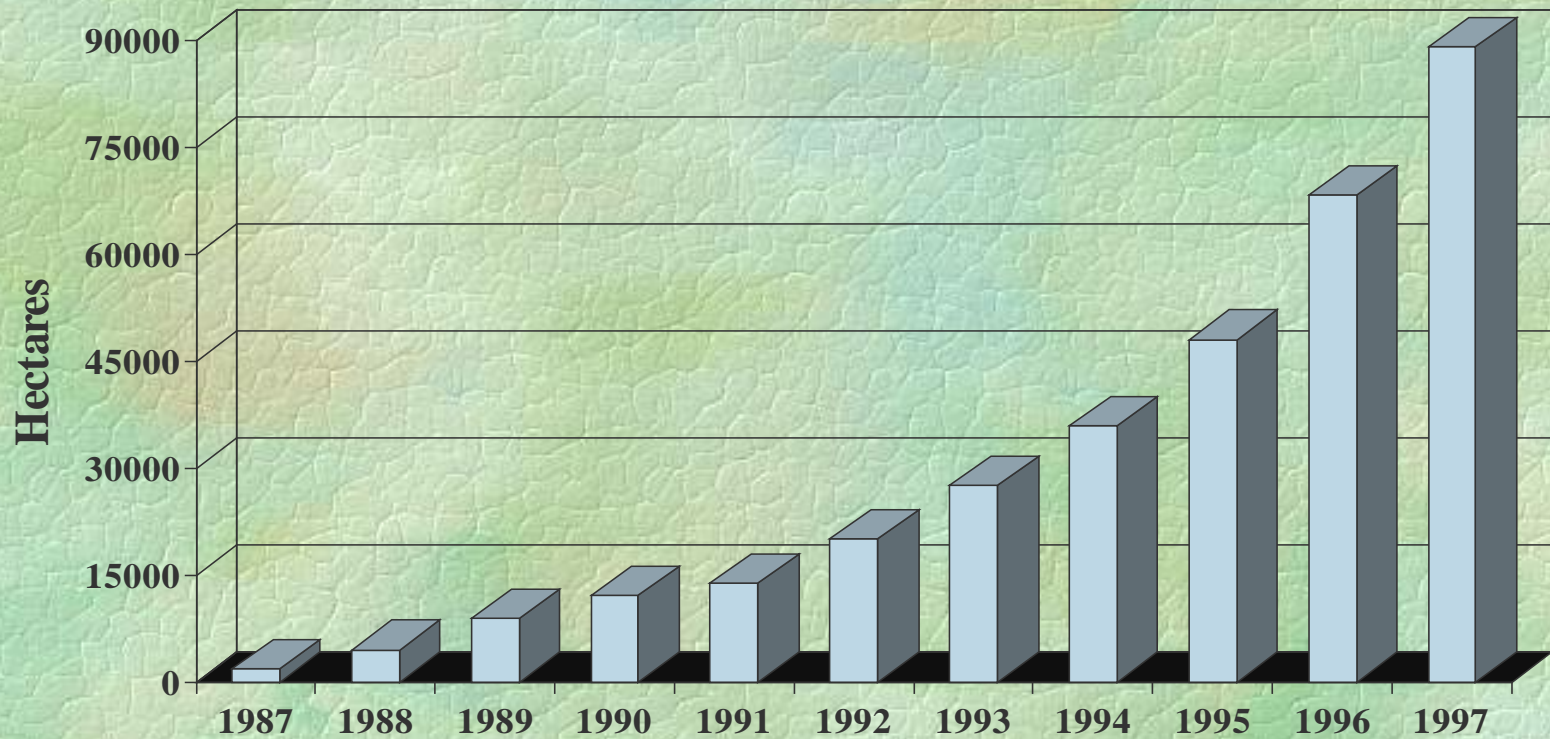




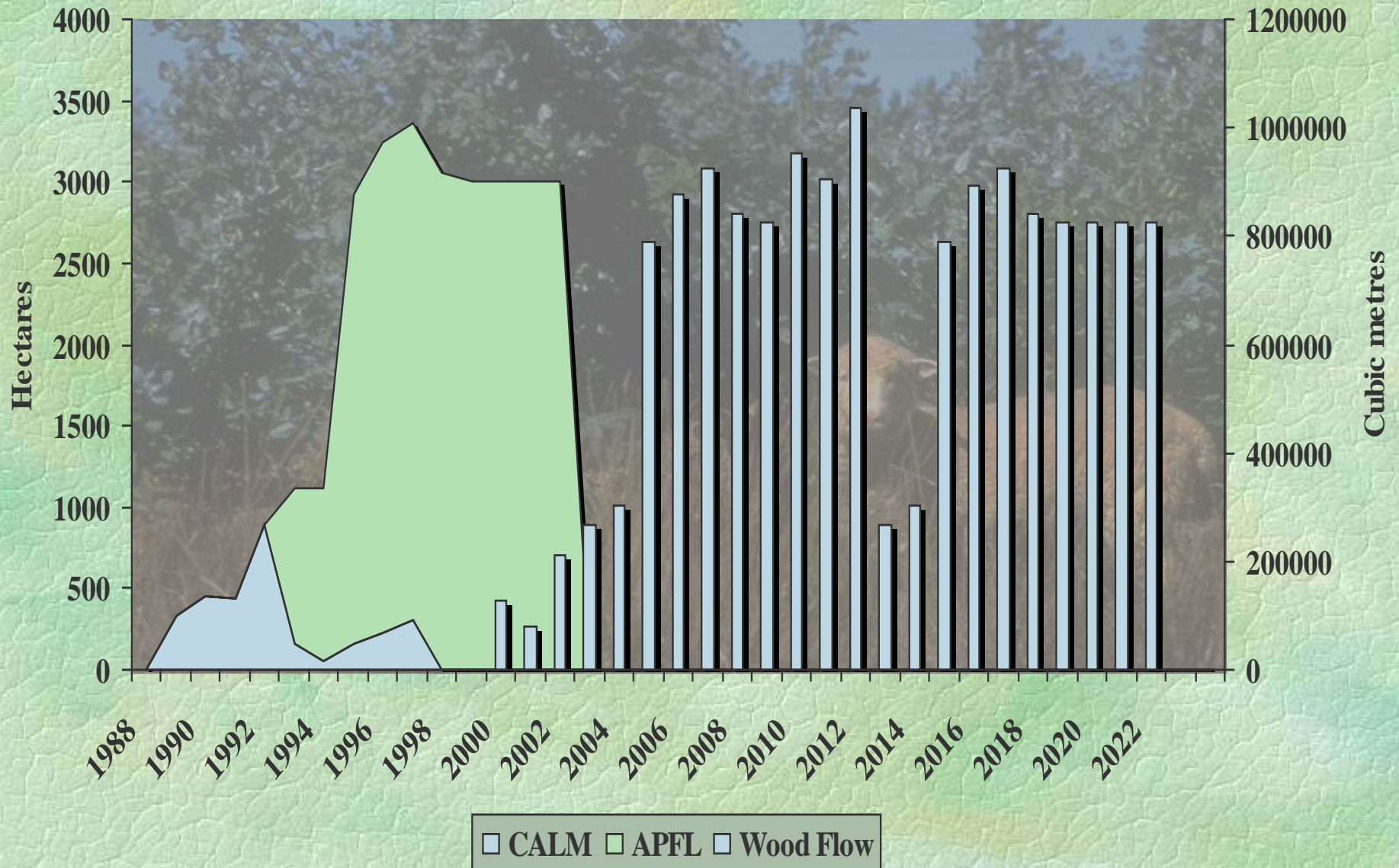




# Total area of *E. globulus* in WA



# Area of bluegums planted each year (CALM and APFL) and predicted wood flows



## Investment to date:

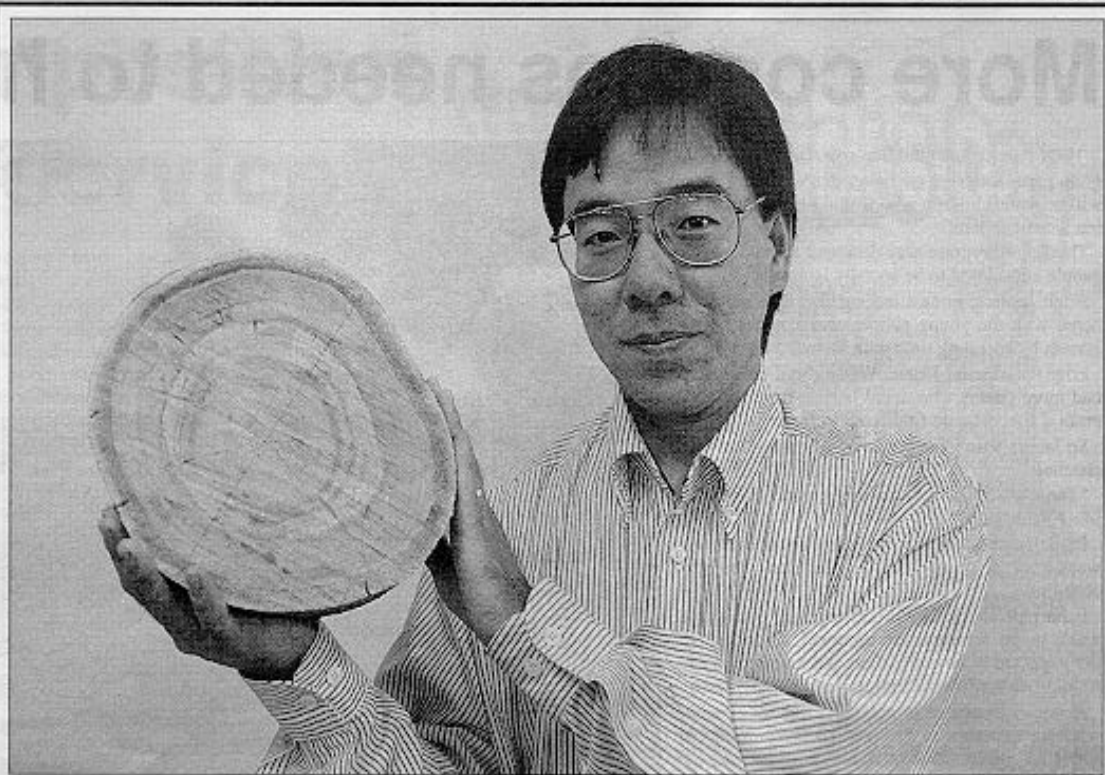
- \$20 million

## Investment to complete plantation program:

- \$30 million

## Investment required for harvesting, transport and processing:

- \$20 million to upgrade facilities at Albany Port
- \$15 million for a mill to process the harvested logs
- \$3-4 million for a transport system
- \$16 million for harvesters
- \$12 million for loading machinery
- \$22 million for log trucks



**WINNING WAYS:** Albany Plantation Forest Company director Tom Okada plans to accept the Asia Pacific Marketing Federation's inaugural gold environmental marketing award in Bangkok later this month.

## Conservation work wins praise

AN Albany company has won an international award for its services to the environment.

Albany Plantation Forest Company this week took out the Asia Pacific Marketing Federation's award inaugural gold marketing award, launched last year to encourage environmental conservation.

It was chosen from four finalists, from companies working in the 15 countries represented in the Asia Pacific Marketing Federation.

The company was formed in 1993 and plans to establish more than 20,000 hectares of bluegum

plantations in the Albany region.

Working with CALM, it had already planted nearly 14 million trees locally.

Its parent companies Oij Paper and Itochu Corporation are part of a WA-Japanese joint venture (with Bunnings Forest Products) who are planning a \$30 million woodchipping mill in the Great Southern. The project has been tipped to be operational by next year.

Director Tom Okada said the company was committed to preserving the global environment.

"Our project to establish commercial bluegum plantation is a long-term commitment to the environment and

economy of the Albany region," he said.

"Our sophisticated sharefarming scheme, which is being carried out in partnership with the local community, has now brought APFC international recognition."

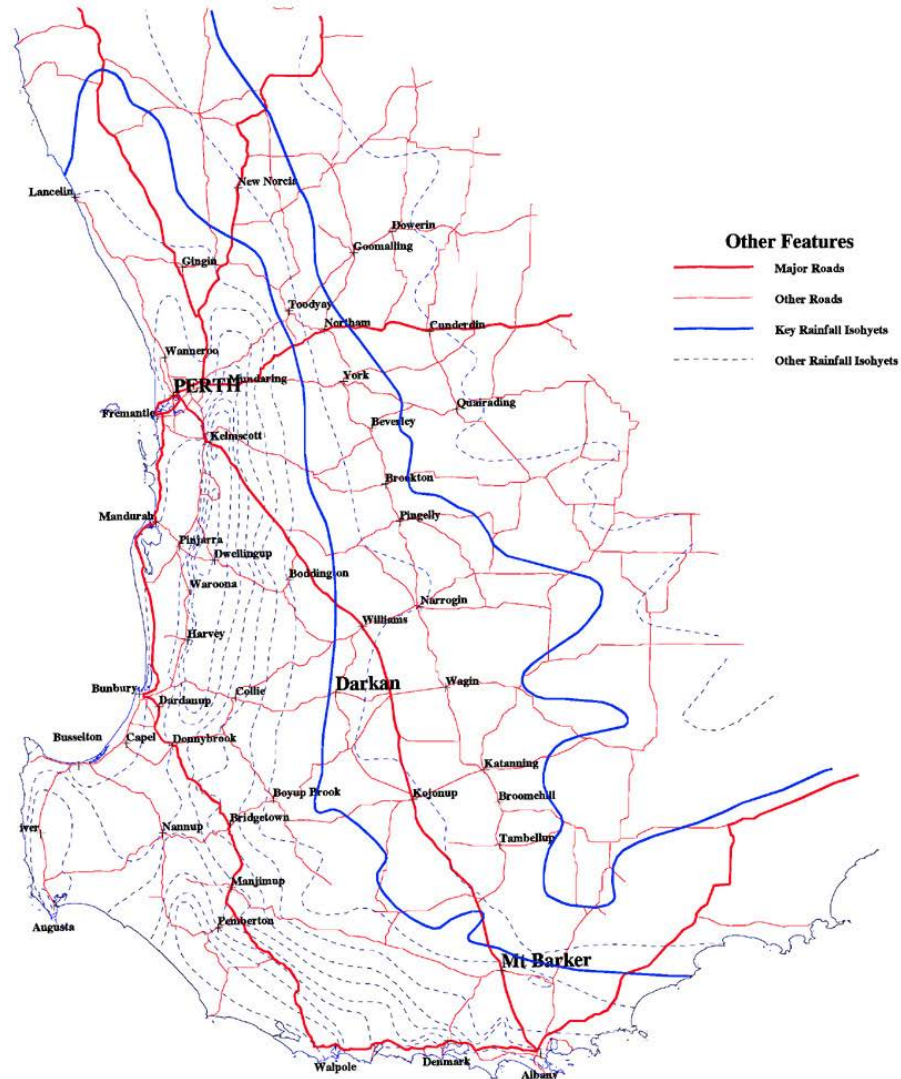
Mr Okada will accept the award, with representatives Oij Paper, Itochu Corporation and Senshukai Co Ltd, at a ceremony in Bangkok on March 26 by her Royal Highness Princess Maha Chakri Sirindhorn. It is the second environmental award won by the company. In 1995 it won the Landcare Australia award for WA business.





# Rainfall Isohyets for South West of Western Australia

## Average Annual Rainfall Highlighting the 400 and 600 millimetre Isohyets



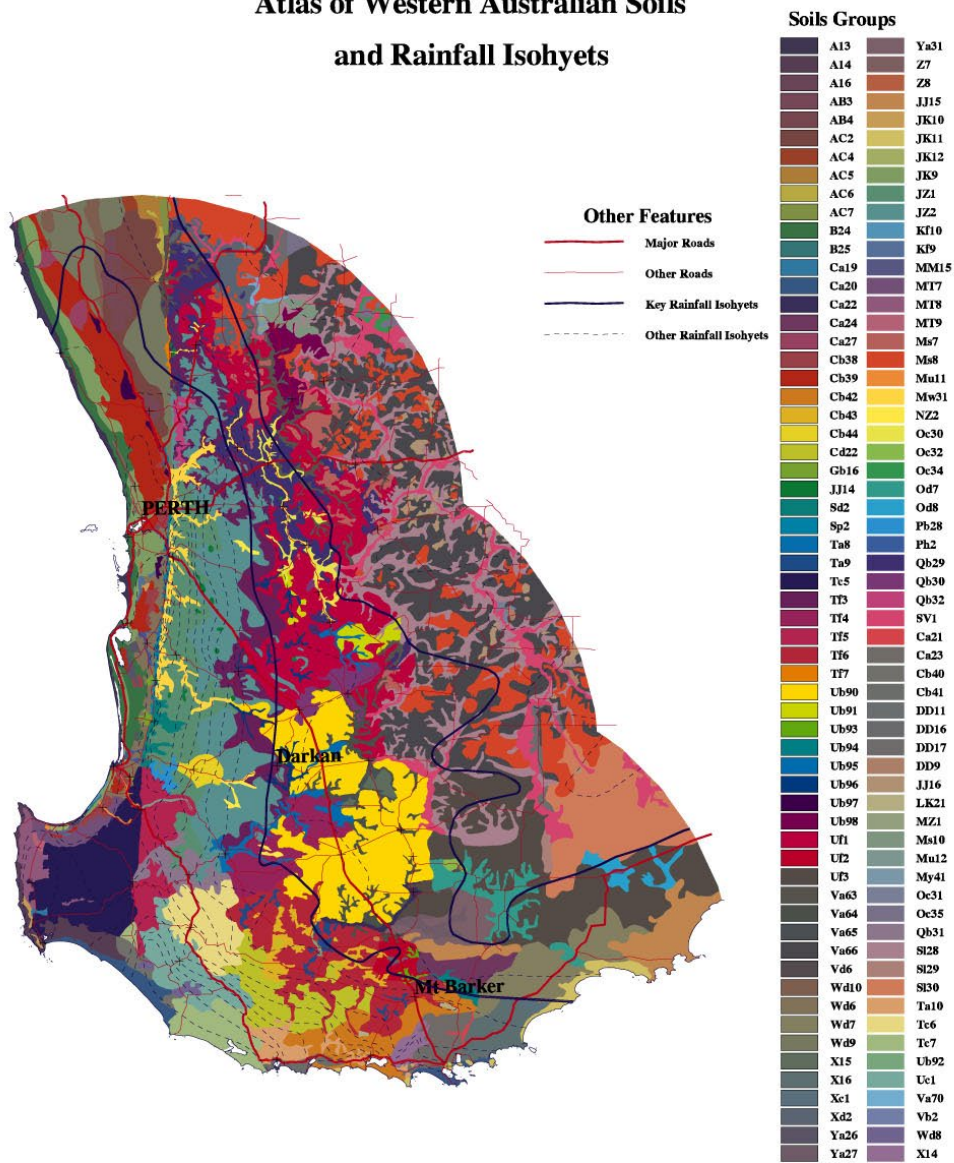
- Other Features**
- Major Roads
  - Other Roads
  - Key Rainfall Isohyets
  - Other Rainfall Isohyets

Scale 1:2500000  
Projection: UTM(Zone50)  
Date: 13/05/1998

Data Sources Used  
TENURE - Department of Land Administration  
VEGETATION - Conservation and Land Management  
SOILS - Agriculture, Western Australia  
RAINFALL - Ministry for Planning

# Atlas of Western Australian Soils

## Atlas of Western Australian Soils and Rainfall Isohyets



Scale 1:3000000

Projection: UTM(Zone50)

Date: 07/05/1998

**Conservation and Land Management**

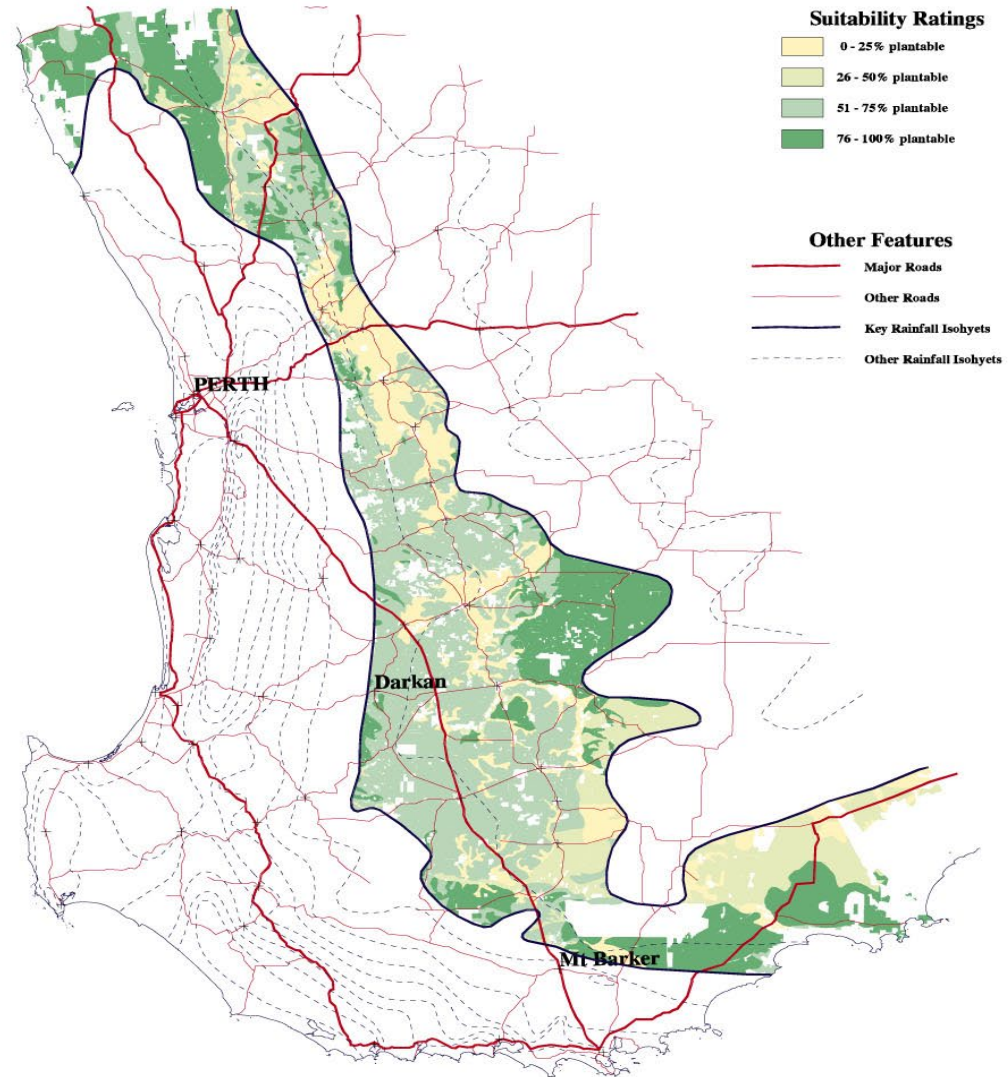
IMB/GISS Job No.98042104-xx2

Data Sources Used

TENURE - Department of Land Administration  
 VEGETATION - Conservation and Land Management  
 SOILS - Agriculture, Western Australia  
 RAINFALL - Ministry for Planning

# Land Suitability Study for Maritime Pine

**Land Suitability Study for Maritime Pine**  
with an average annual rainfall between 400 and 600 millimetres



Scale 1:2500000

Projection: UTM(Zone50)

Date: 07/05/1998

**Conservation and Land Management**

IMB/GISS Job No.98042104-xx1

**Data Sources Used**

TENURE - Department of Land Administration  
VEGETATION - Conservation and Land Management  
SOILS - Agriculture, Western Australia  
RAINFALL - Ministry for Planning



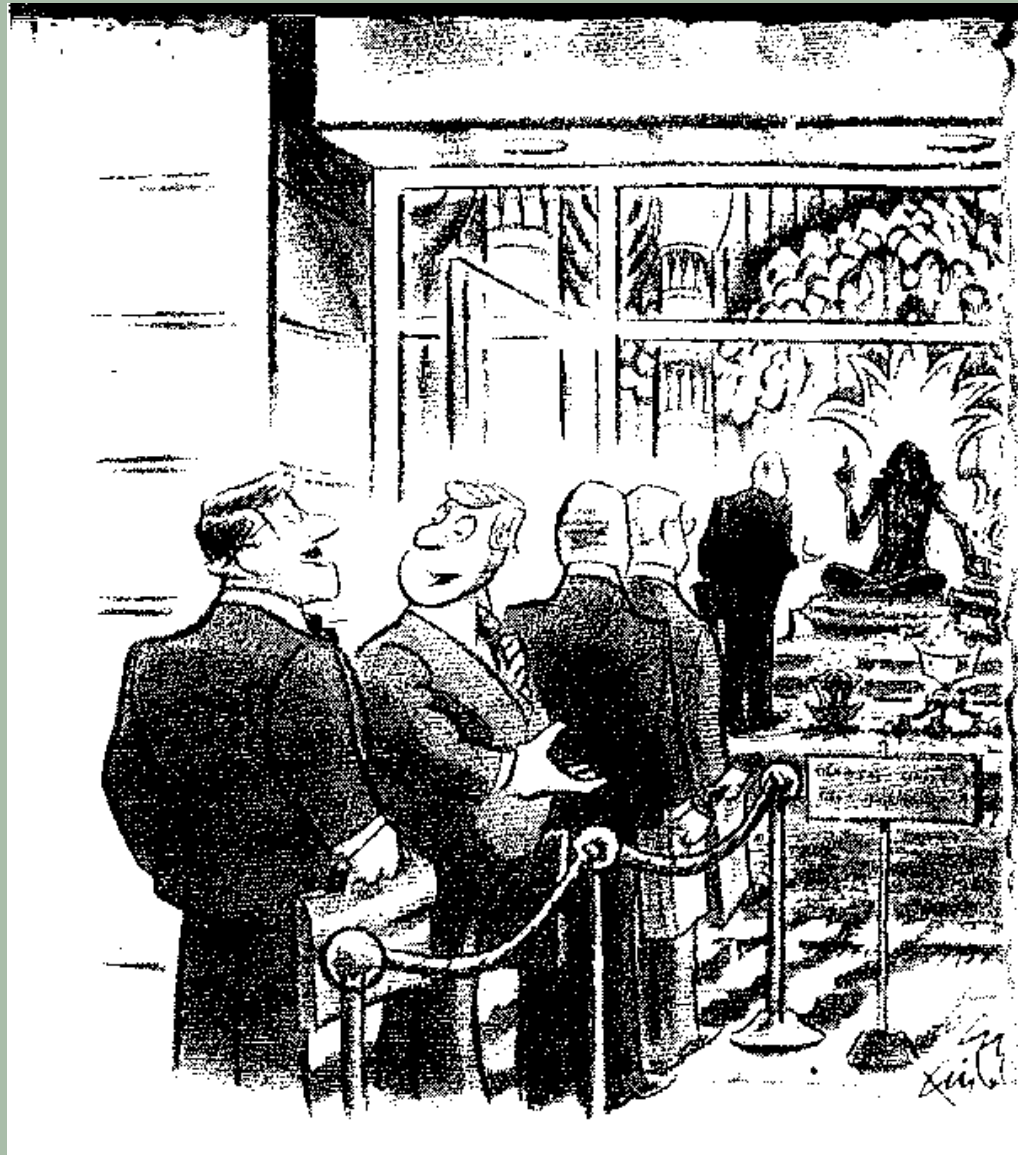








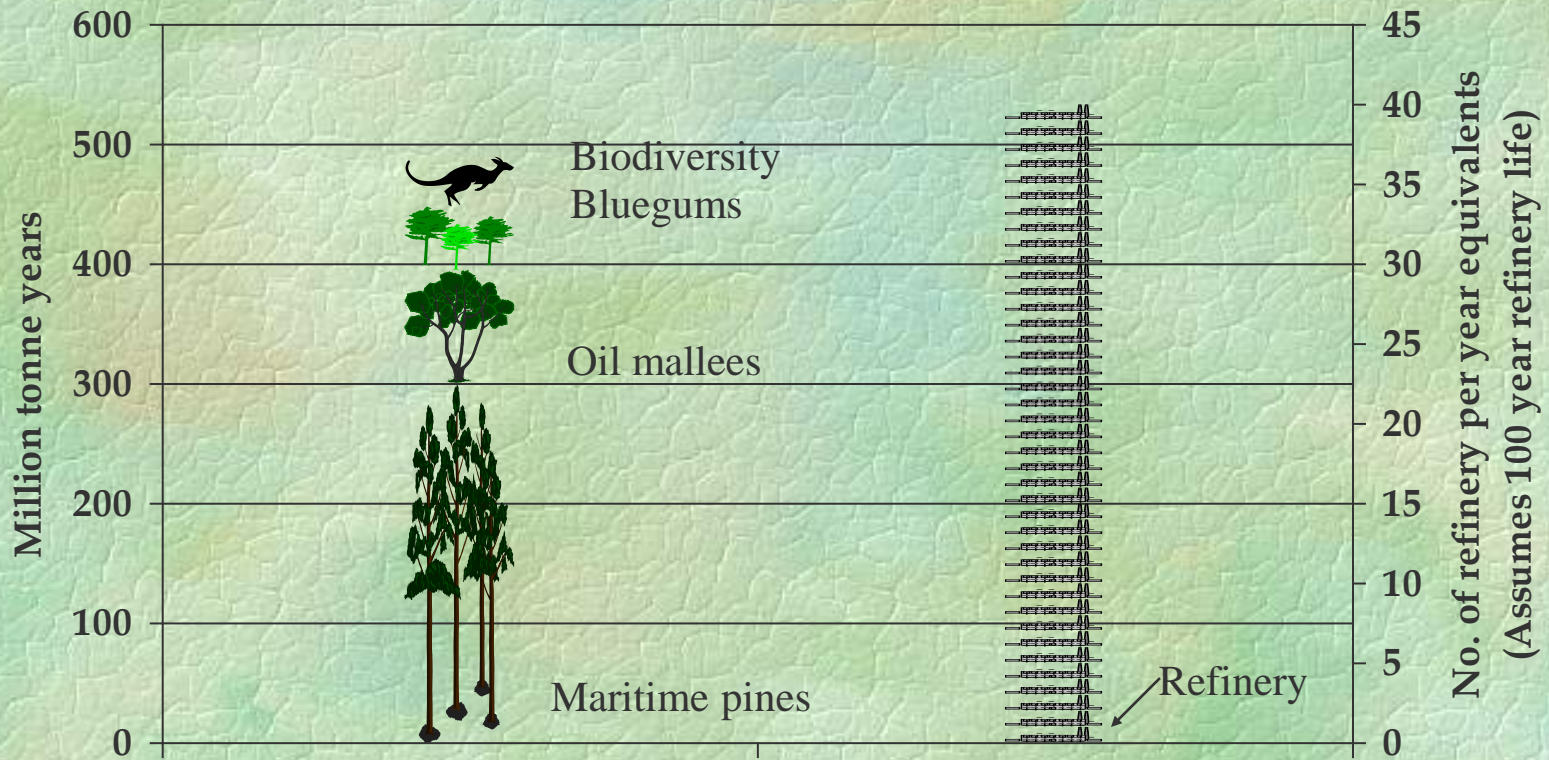




*“It’s great! You just tell him how much pollution your company is responsible for and he tells you how many trees you have to plant to atone for it.”*

Ed Fisher © 1989 The New Yorker Magazine

# Optimistic scenario

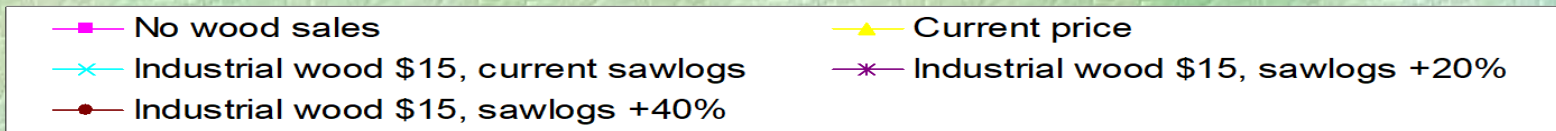
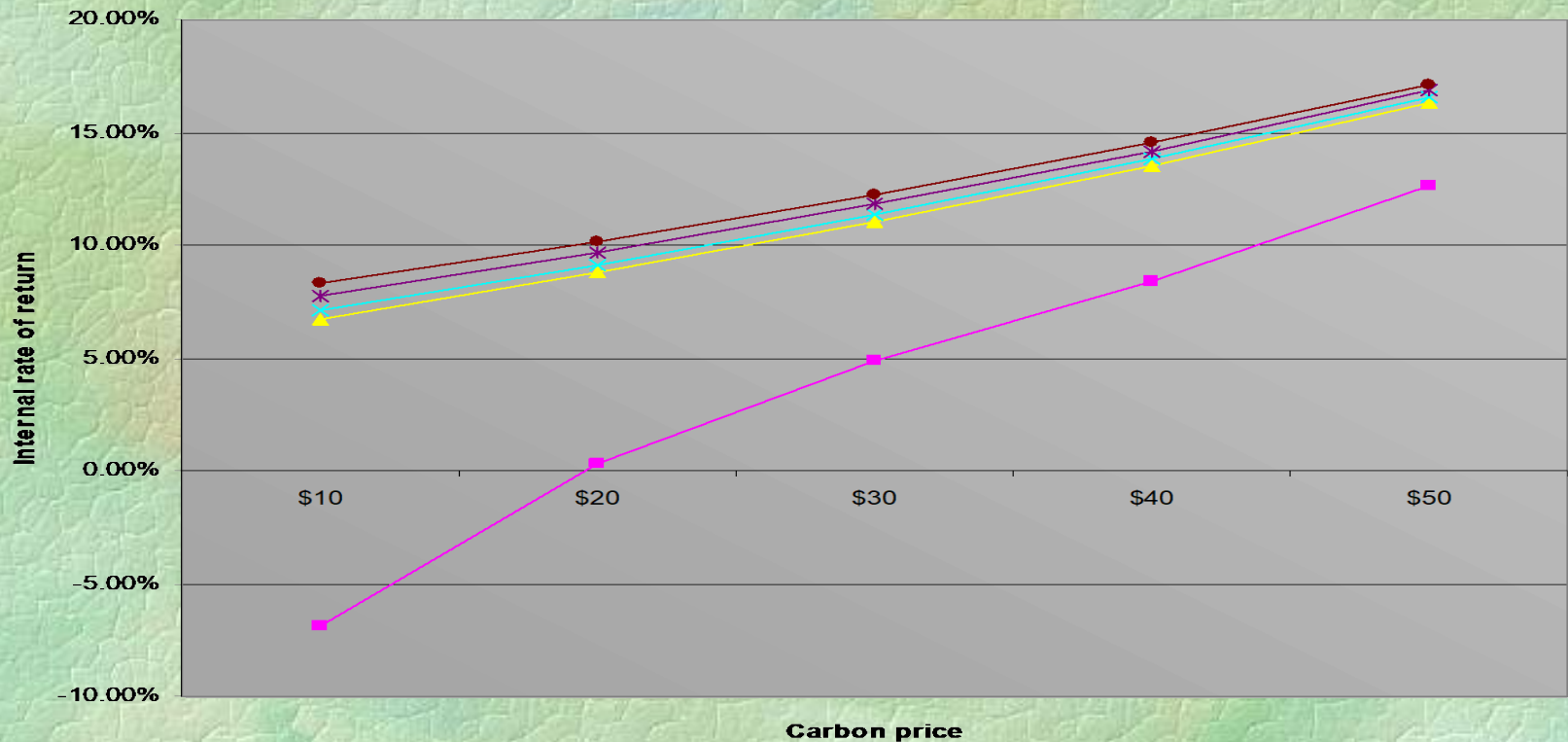


## Assumptions

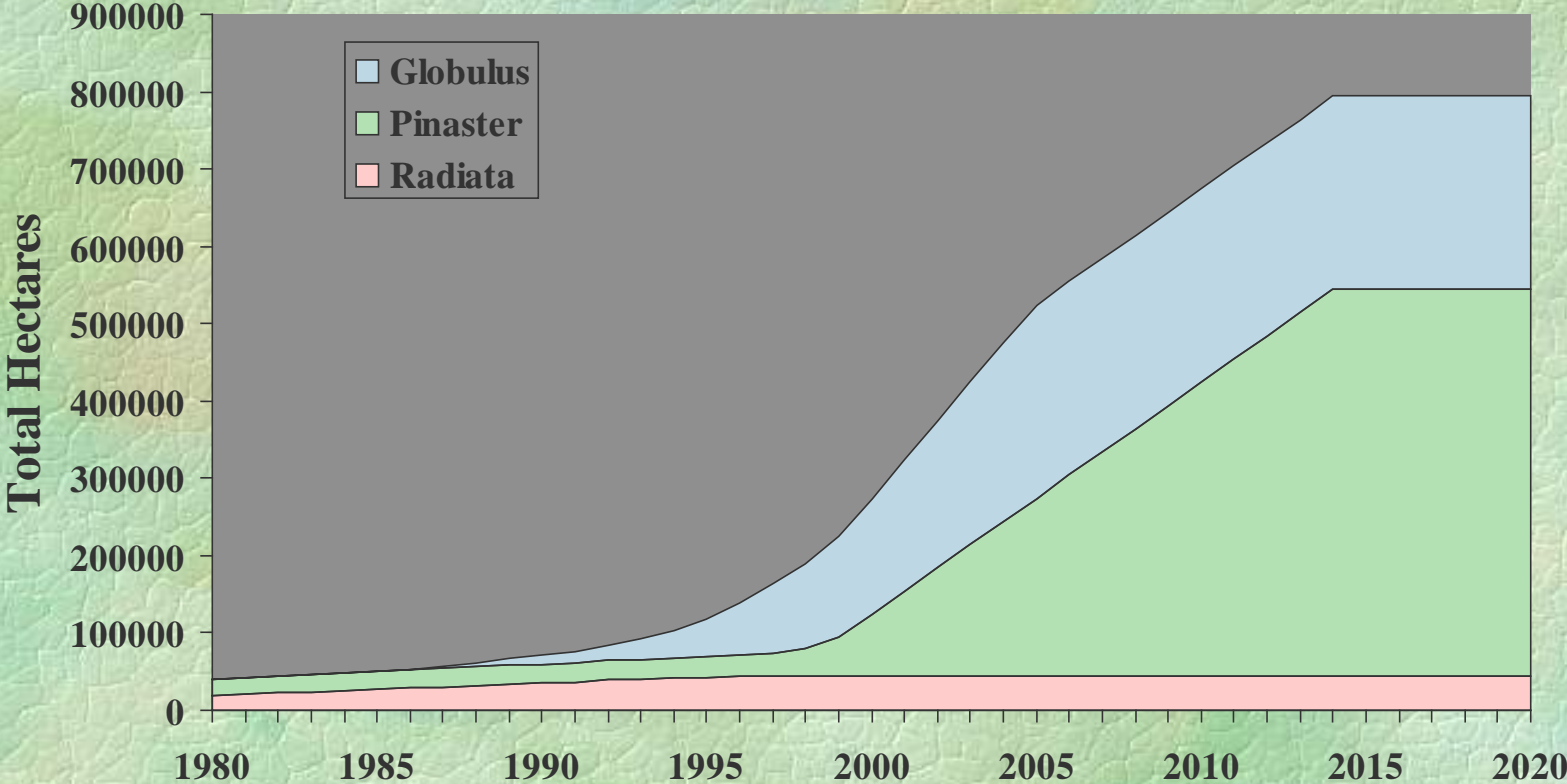
Half life of refinery.

double carbon storage times for pine, bluegum and biodiversity plantings

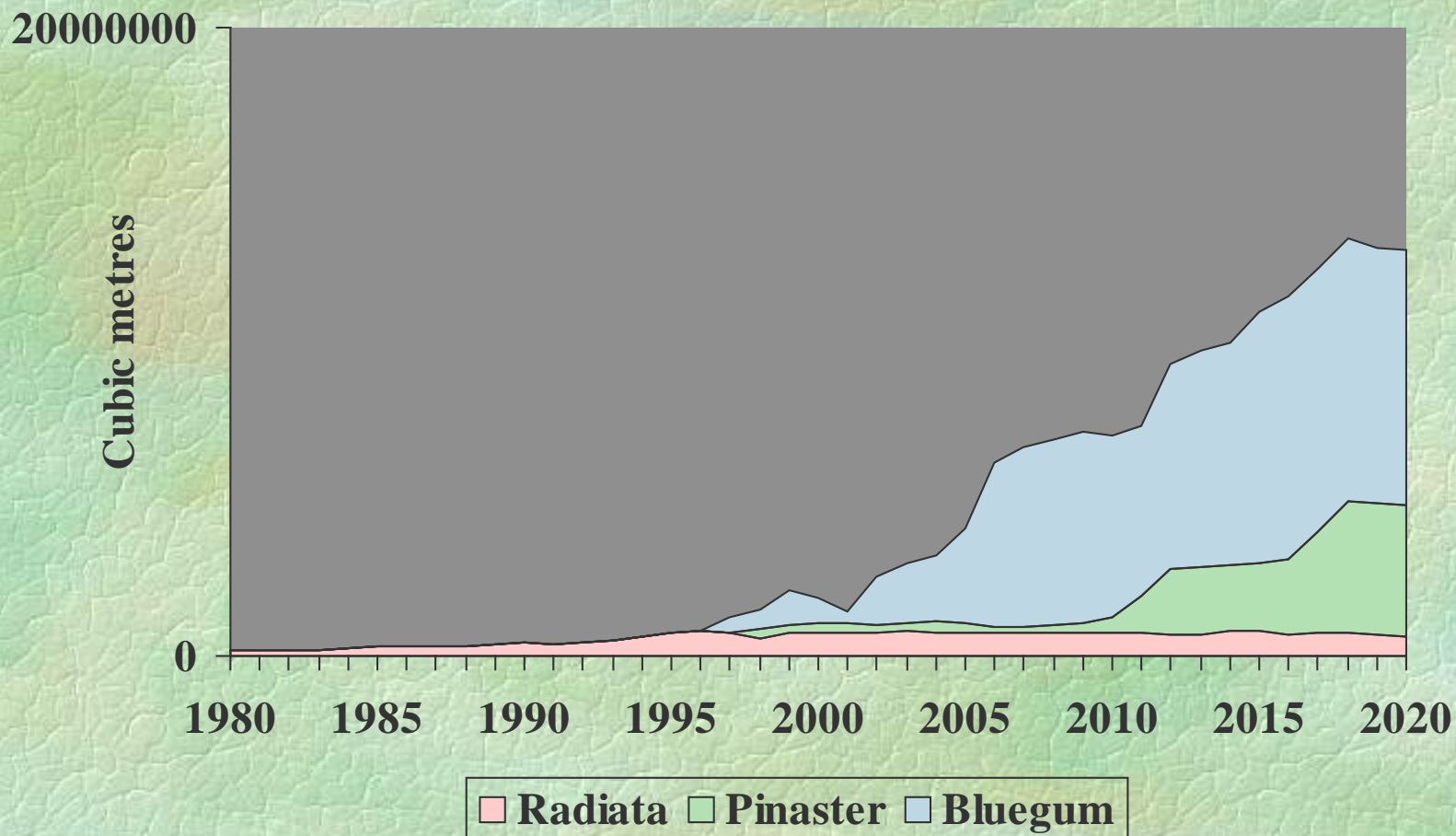
# Effect of varying wood and carbon price on internal rate of return for 30 year rotation



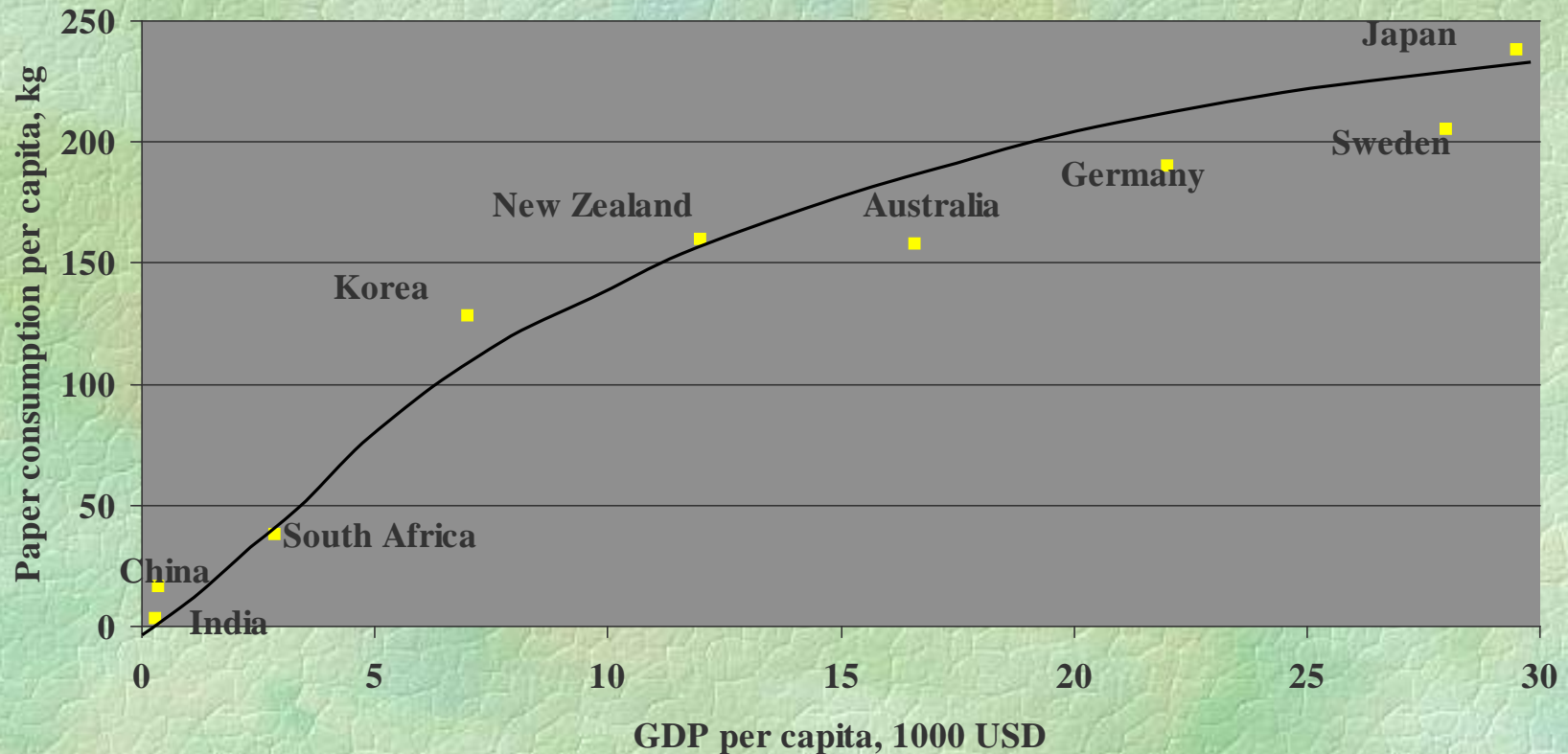
# Predicted growth of tree crop plantings in Western Australia



# Current and predicted wood fibre production from tree crops and plantations in Western Australia



# GDP and paper consumption (for selected countries in 1992)

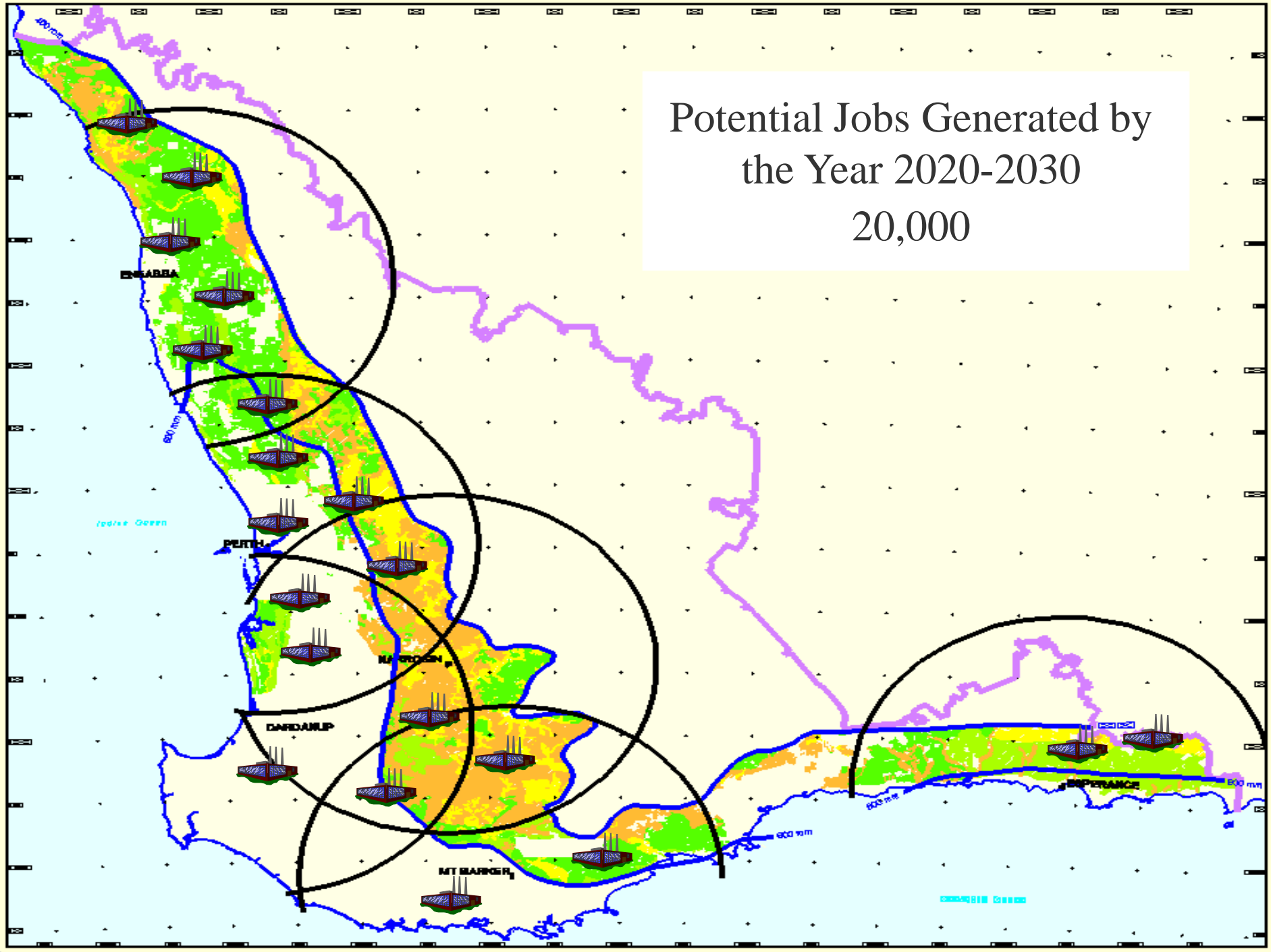


If growth 1990-96 (12% pa) continues, China will use the current world paper demand (279 million Mt) by 2015

Source: Jaakko Poyry  
Dana Ltd

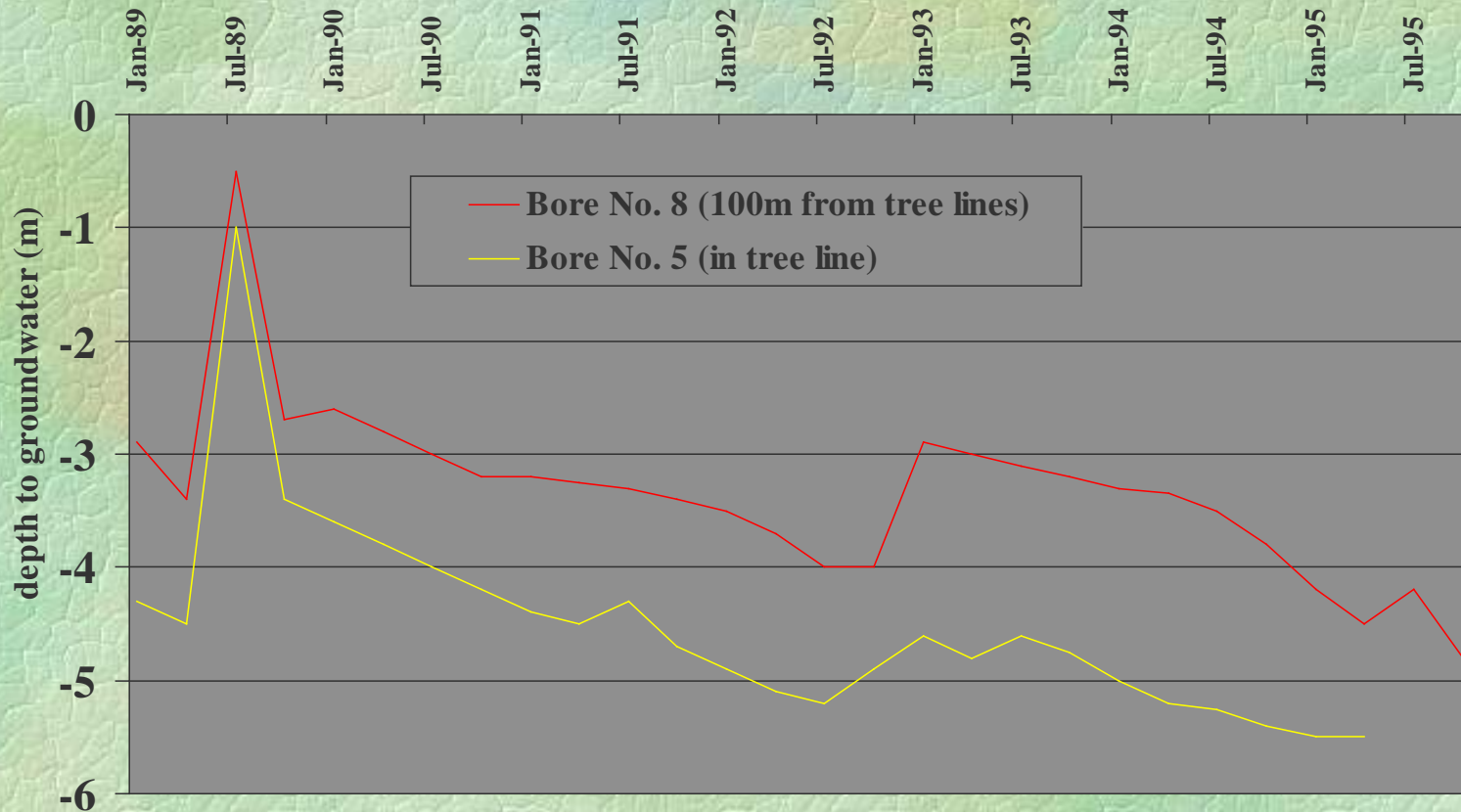


Potential Jobs Generated by  
the Year 2020-2030  
20,000





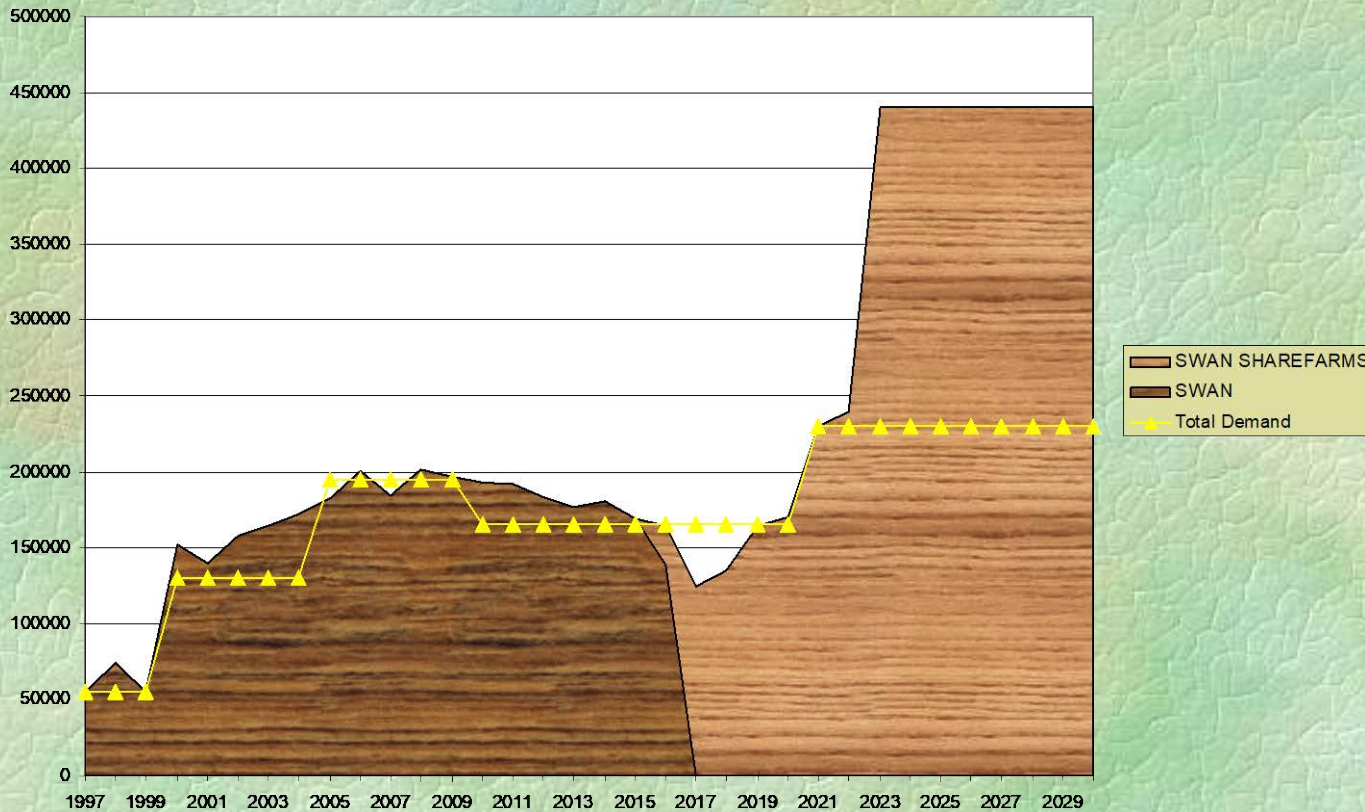
# Hydrograph showing groundwater response to alley farming system (after Short and Skinner, 1996)



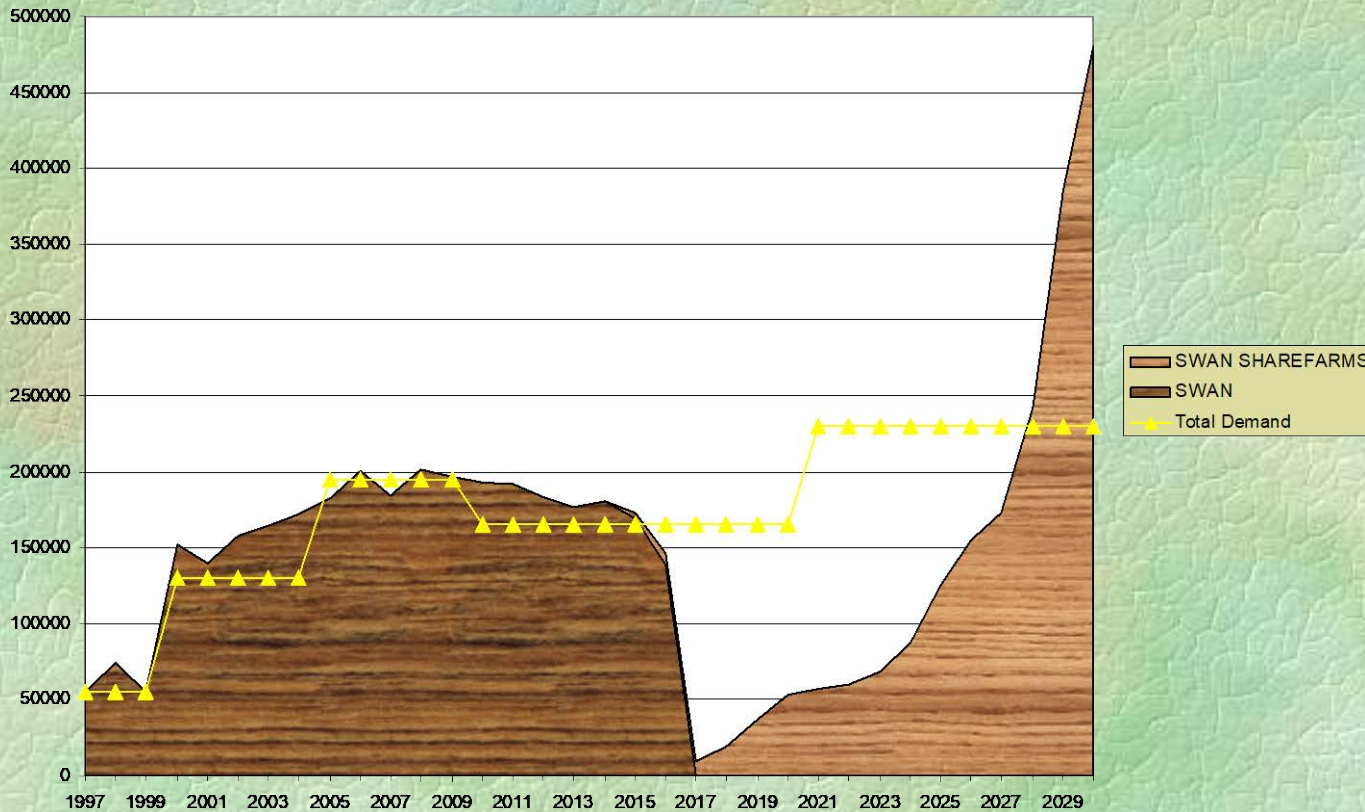




# Swan Sawlog Supply and Demand with Sharefarms Regime changed to 22 year rotation

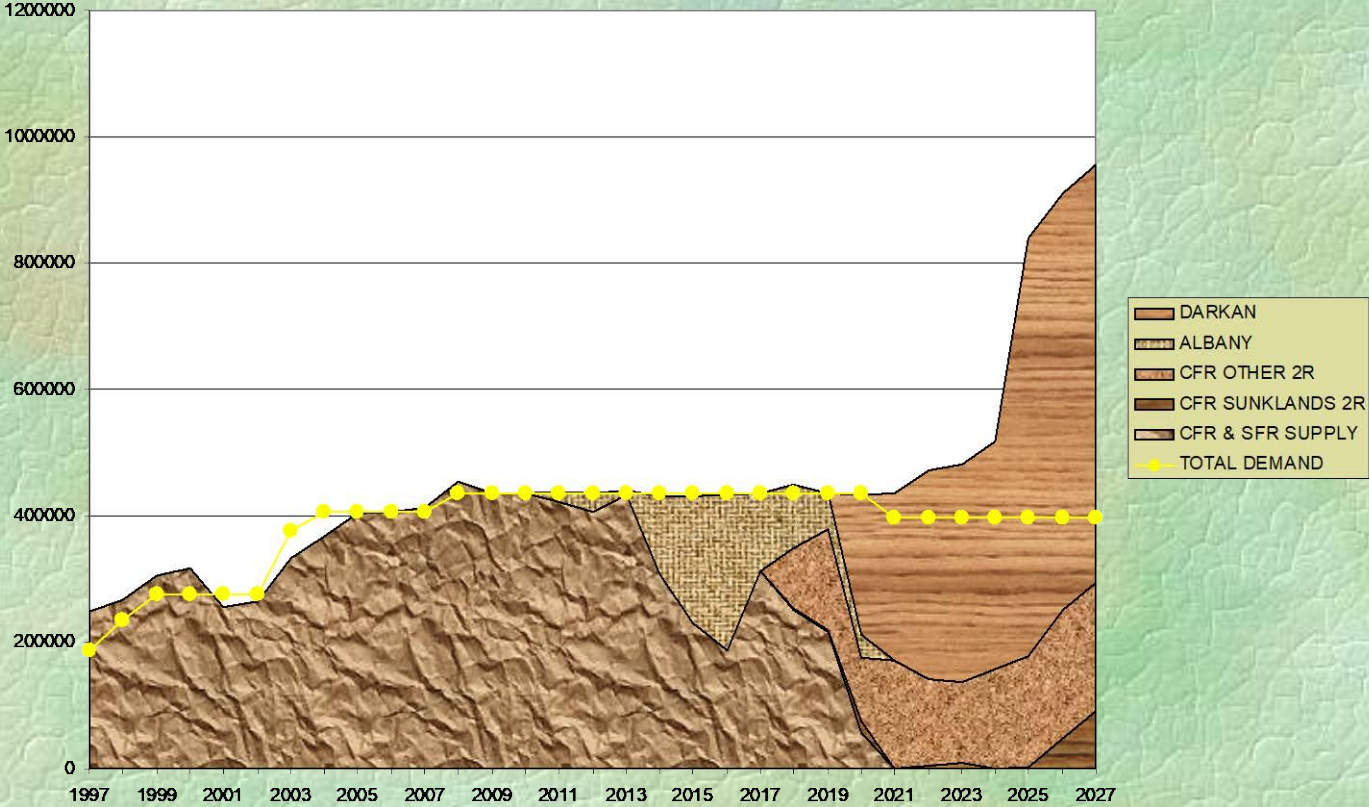


# Swan Sawlog Supply and Demand with Standard Sharefarms Regime



# Chart of Supply vs Demand of large sawlogs in Central Forest Region, Southern Forest Region, Darkan and Albany

(note: second rotation CFR assumes all State forest and 50% of Executive Director land planted)



# Wesfi Industrial Wood Average Annual Demand and Supply

