

















The potential of tree crops to contribute to the restoration of the ecological and economic balance of agricultural lands

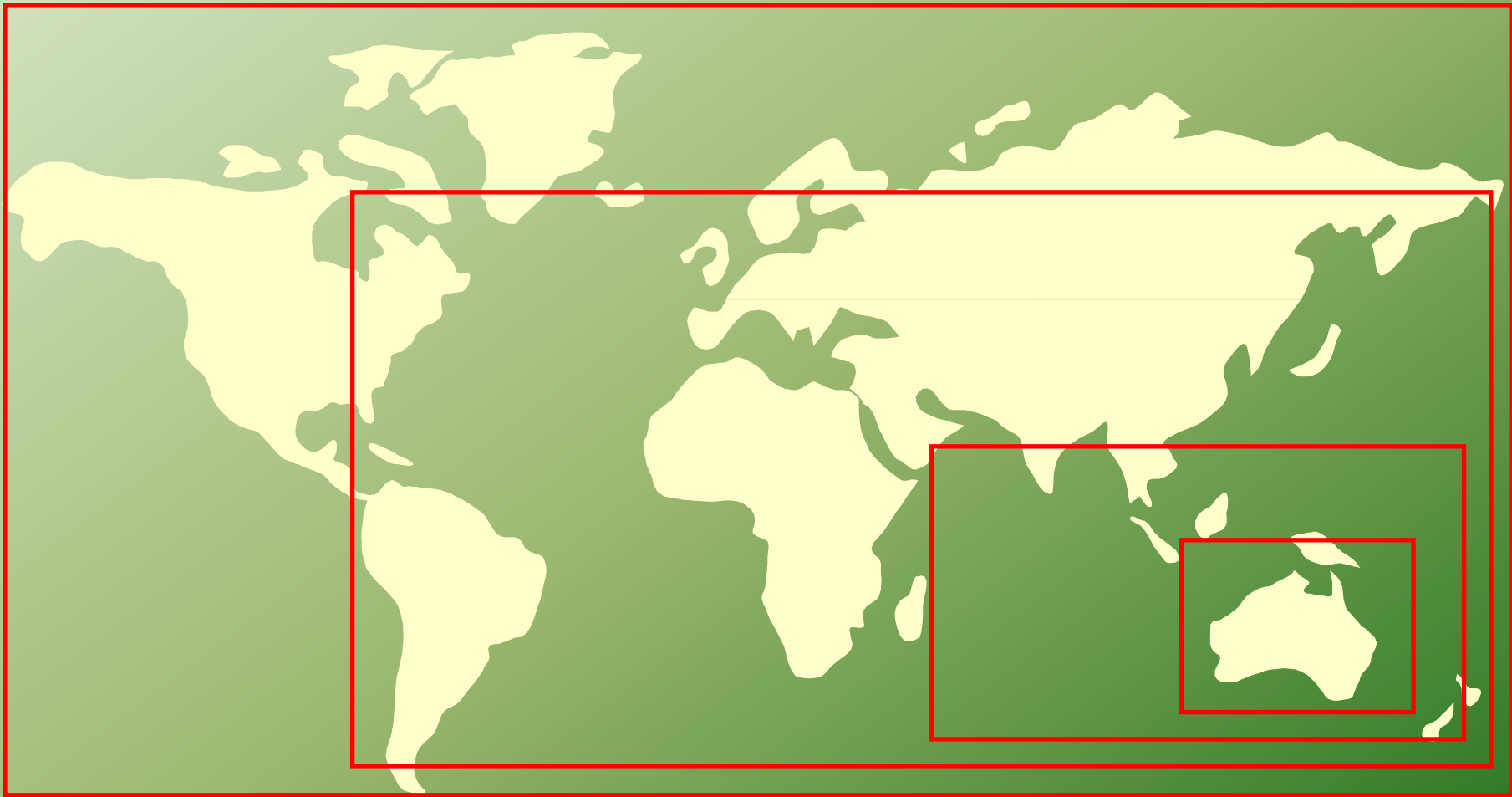
by

**Dr Syd Shea
Executive Director**

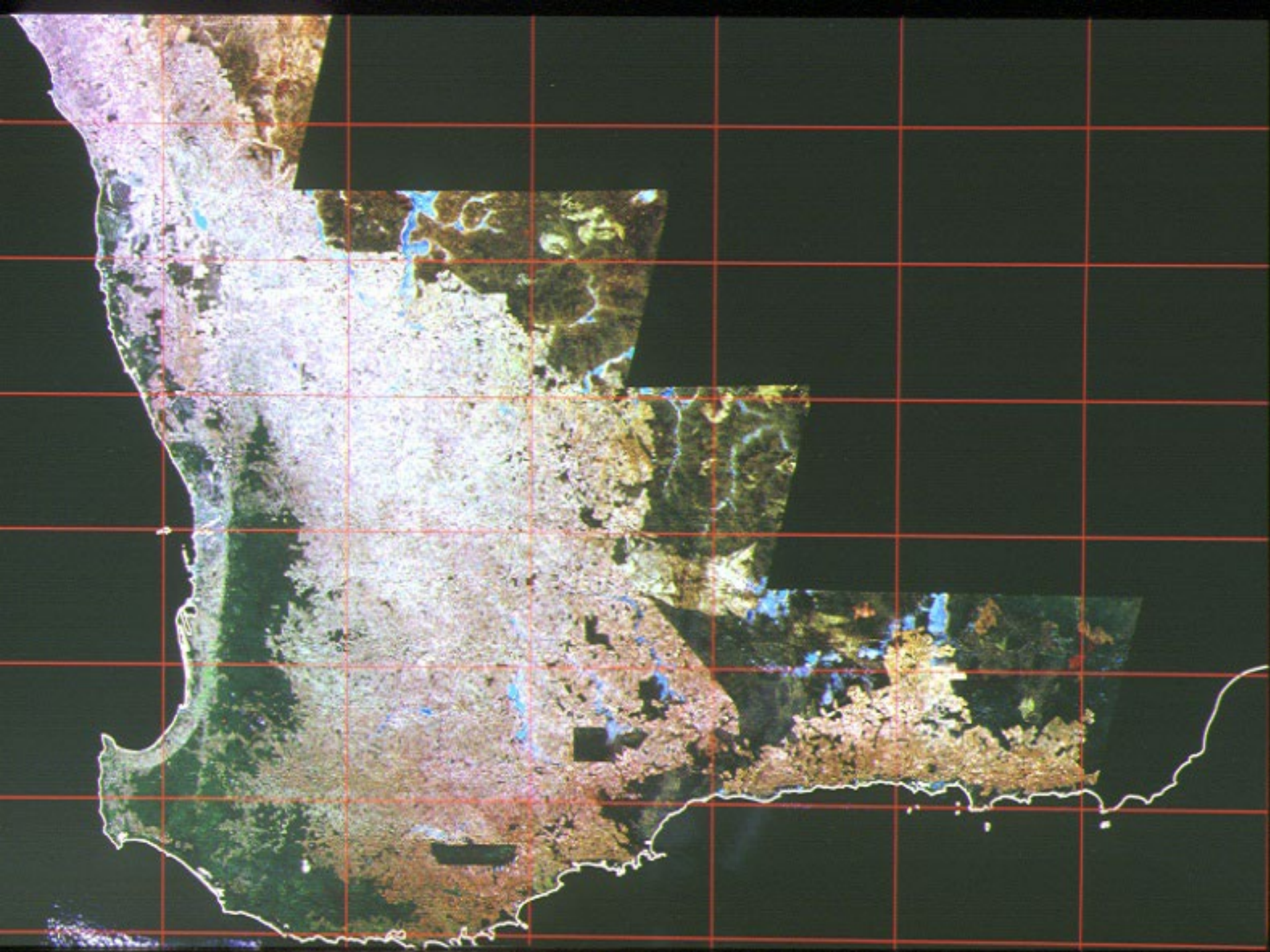
Department of Conservation and Land Management,
Western Australia

“Visions of Future Landscapes”

Monday 3 May 1999





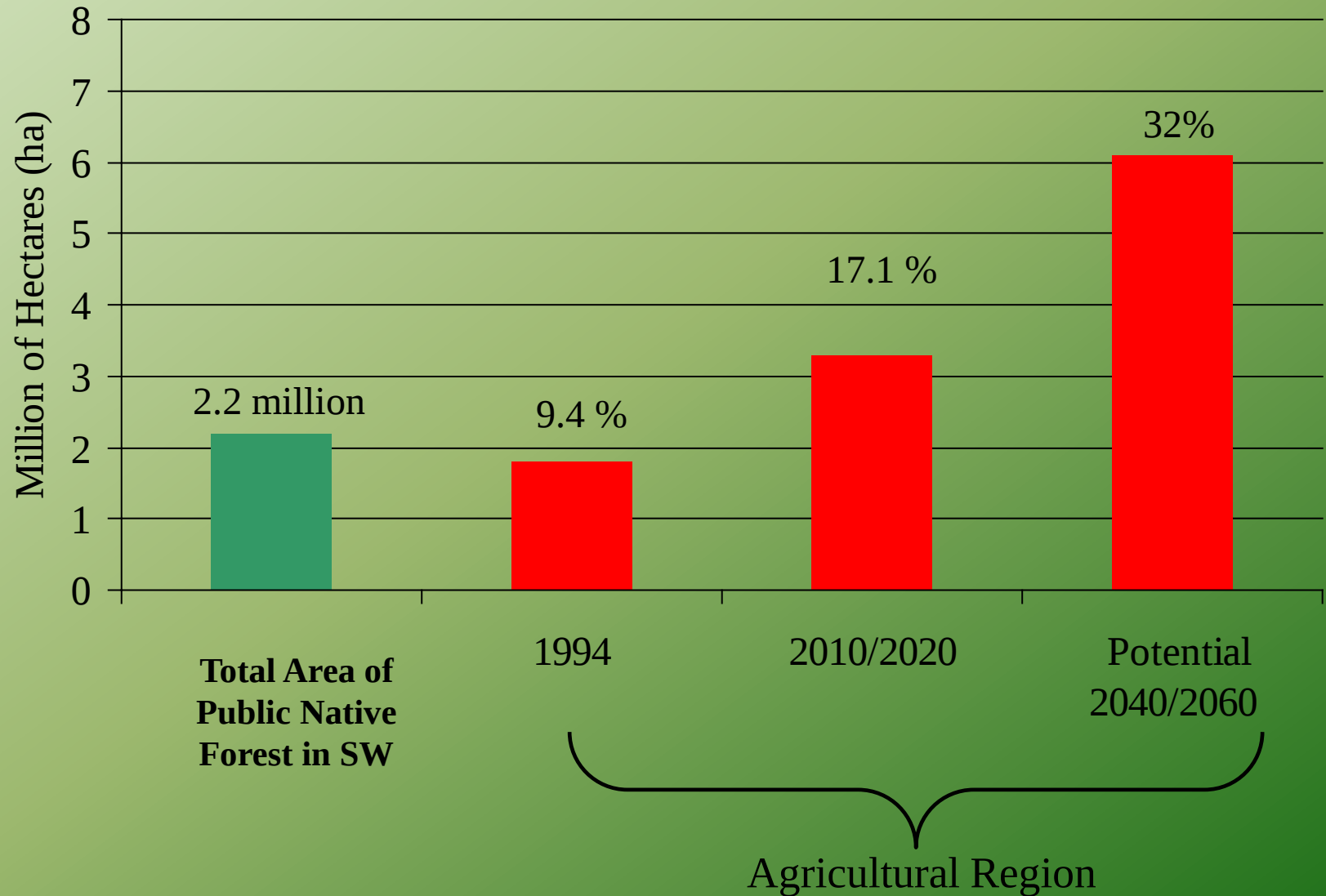








Areas of Land Effectuated by Secondary Salinity

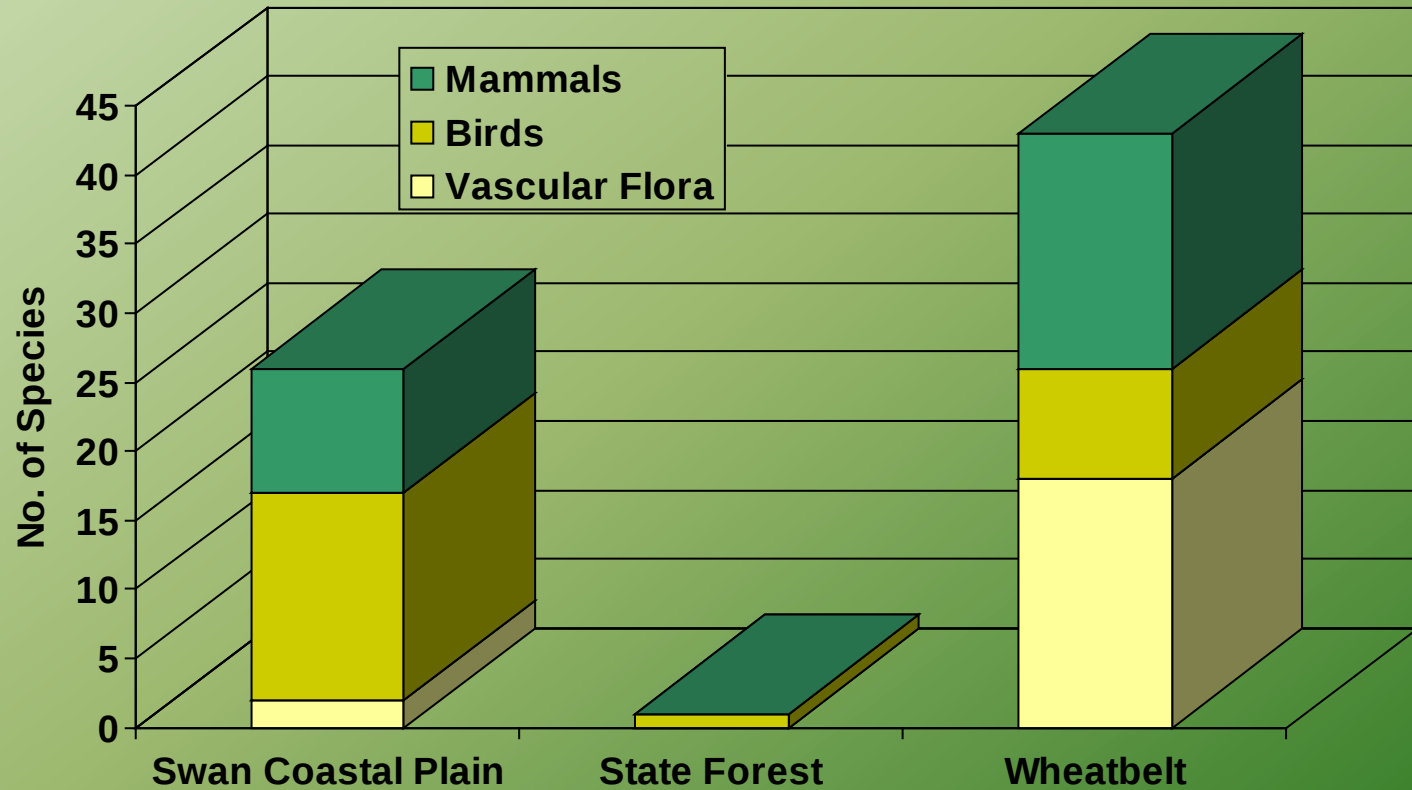






Species extinctions since European settlement in 1829

(After Armstrong and Abbott, 1995)







Winter's come the hills are brown
Shops are closed the blinds are down
Everybody's leavin' town
They can't go on

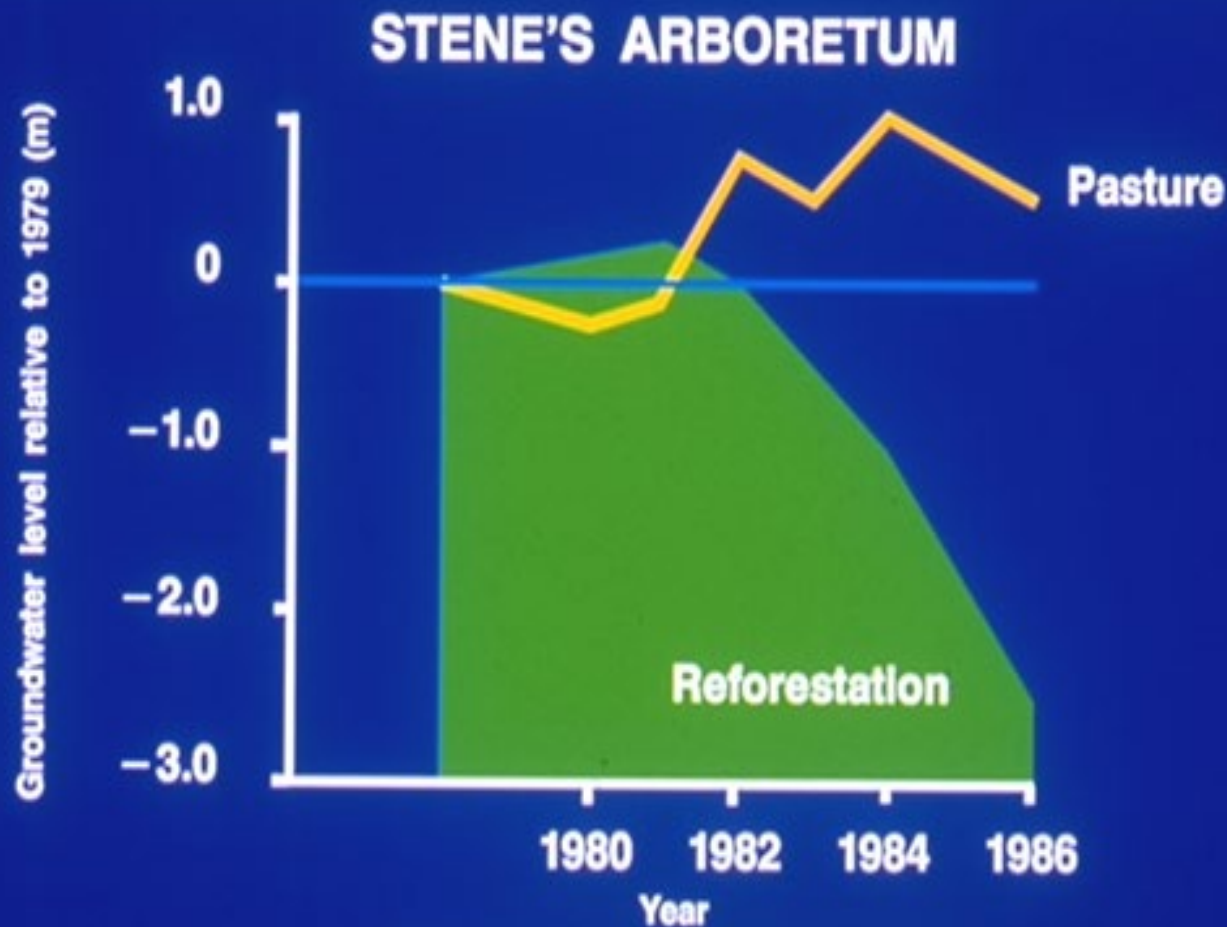
Galleries of Pink Galahs
John Williamson





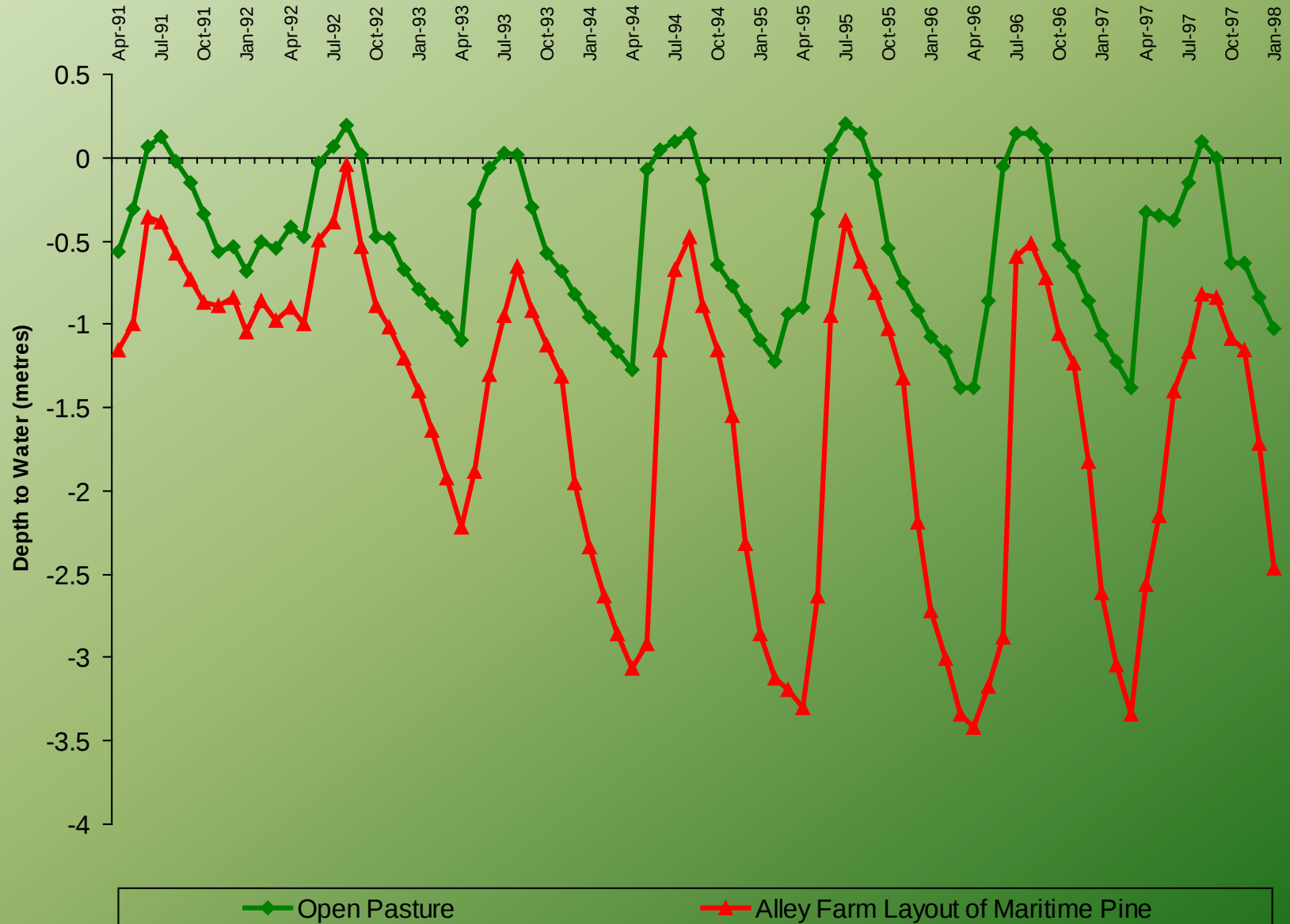


THE EFFECT OF TREE CROPS ON WATER TABLE LEVELS

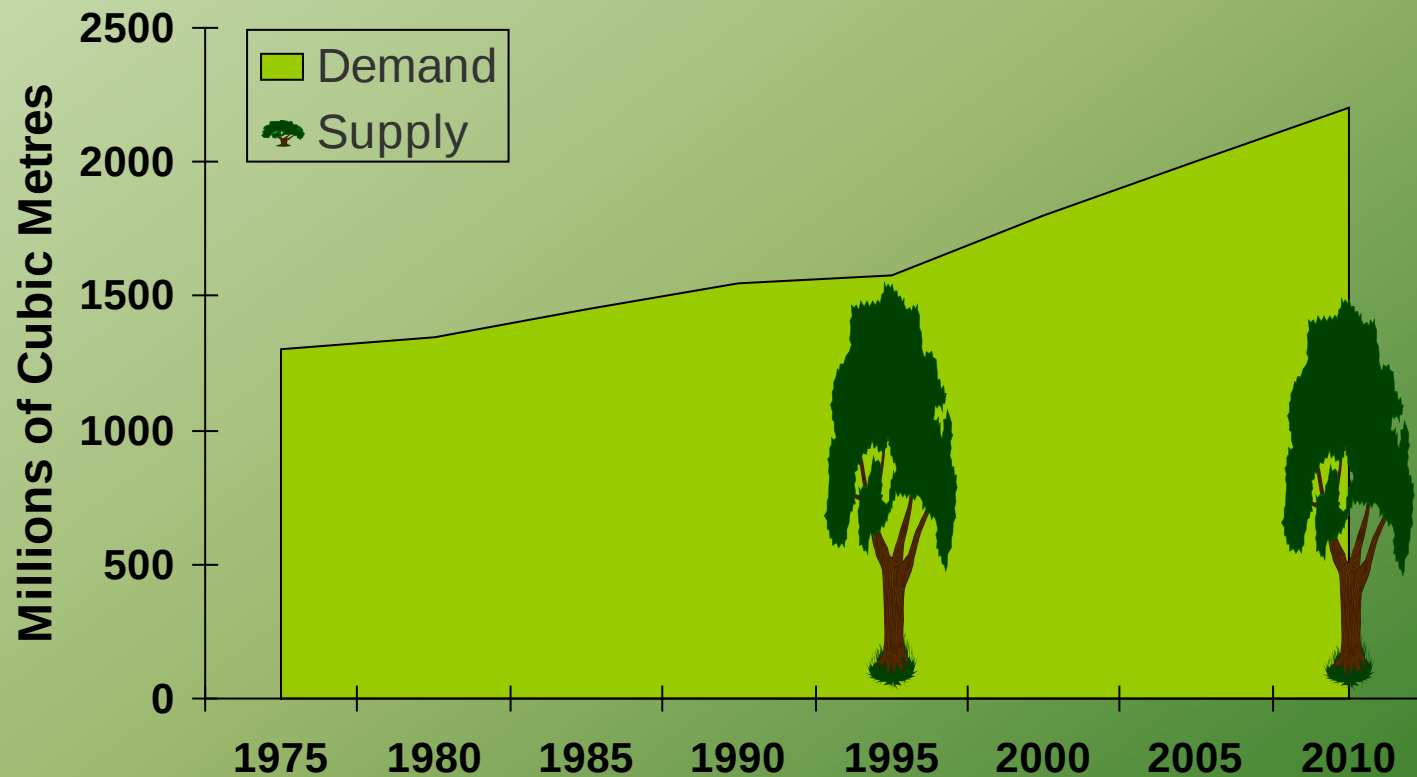


Water Authority of Western Australia
July 1989
Report No. WS 33

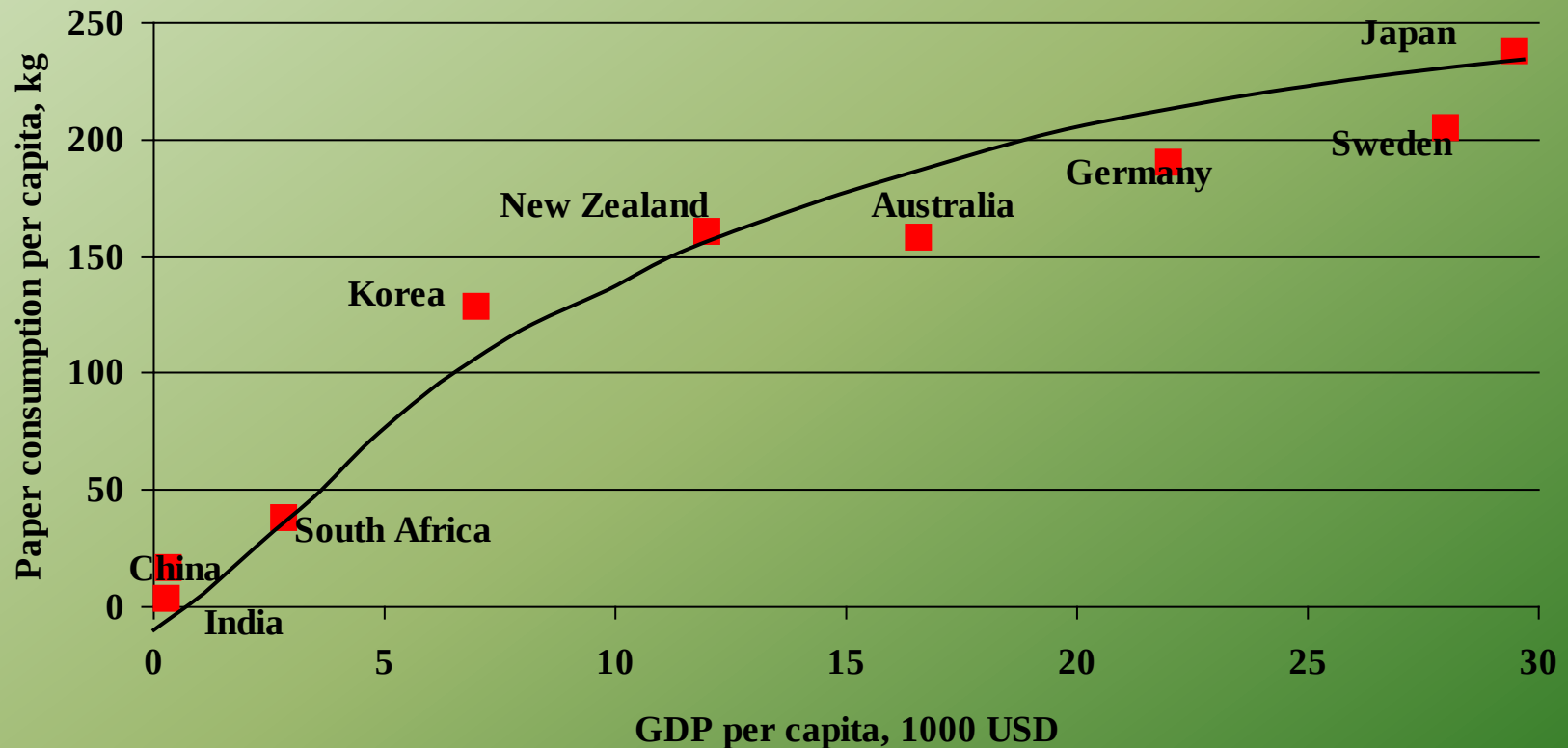
Groundwater Drawdown Under Maritime Pine (Bibby Springs)(Source: Tom Mitchell (AgWA), 1998)



Global wood demand rises as supply falls



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





How the early swallow proves global warming

BY JOHN INGHAM
ENVIRONMENT CORRESPONDENT

ONE swallow may not make a summer but it could help prove that global warming is taking place.

Ministers are considering using the arrival date of the summer's first swallow as a yardstick for climate change. The proposal is included in a report commissioned by the Department of the Environment as part of its quest to find "environmental indicators" — measures by which the Government and public can test Britain's green performance.

The latest research shows that swallows are arriving on average nearly two weeks earlier than in the 1980s. But the real acceleration has come in the 1990s with the birds being spotted a week earlier than ten years ago.

This coincides with a dramatic increase in temperatures worldwide. The seven warmest years since records began 150 years ago have all occurred in the past decade. Earlier this week scientists confirmed that 1996 will be the hottest year in the past 1,000 years, easily surpassing the previous record holder, 1997.

The man behind the swallow research, Tim Sparks of the Institute of Terrestrial Ecology, said: "Summer migrants are getting here earlier. Research in Surrey also shows that trees are coming into leaf 11 days earlier on average than in the 1980s."

"Global warming is playing a major role in this. These birds and trees are sensitive to temperature and this decade has been the warmest on record. For every one degree increase in spring temperatures, swallows arrive two to three days earlier. If we see the expected four degree increase by the year 2100, swallows could be regularly getting here by mid-March."

Mr Sparks was backed by the authoritative British Trust for Ornithology whose newly-

Birds are yardstick for changes in climate

released Garden BirdWatch Handbook declares: "Our summer visitors do seem to be arriving earlier in many areas than they did in the 1980s and 1990s."

Details emerged as officials from 180 countries continued negotiations in Buenos Aires to tackle global warming by finding ways to reduce emissions of greenhouse gases such as carbon dioxide.

British ministers want a series of indicators to help them assess how rapidly global warming is advancing.

They commissioned a report which proposes 35 "barometers" from the natural world. Mr Sparks said: "Swallows are a good indicator because their arrival is sensitive to temperature."

Other indicators include temperatures, river flows, potato yields, the health of beech trees, breeding success of garden birds such as robins as well as wren populations because the tiny bird is vulnerable to cold winters.

Deadly tropical diseases such as dengue fever, malaria and cholera could spread to the West as a result of global warming. Harvard scientist Dr Paul Epstein warned yesterday in a report for the World Wide Fund for Nature.

The average arrival date of the first swallow at four UK sites has been getting earlier for decades. The biggest leap has been in the 1990s — a decade of record temperatures worldwide



AVERAGE ARRIVAL DATES OF MIGRATING BIRDS IN HERTFORDSHIRE

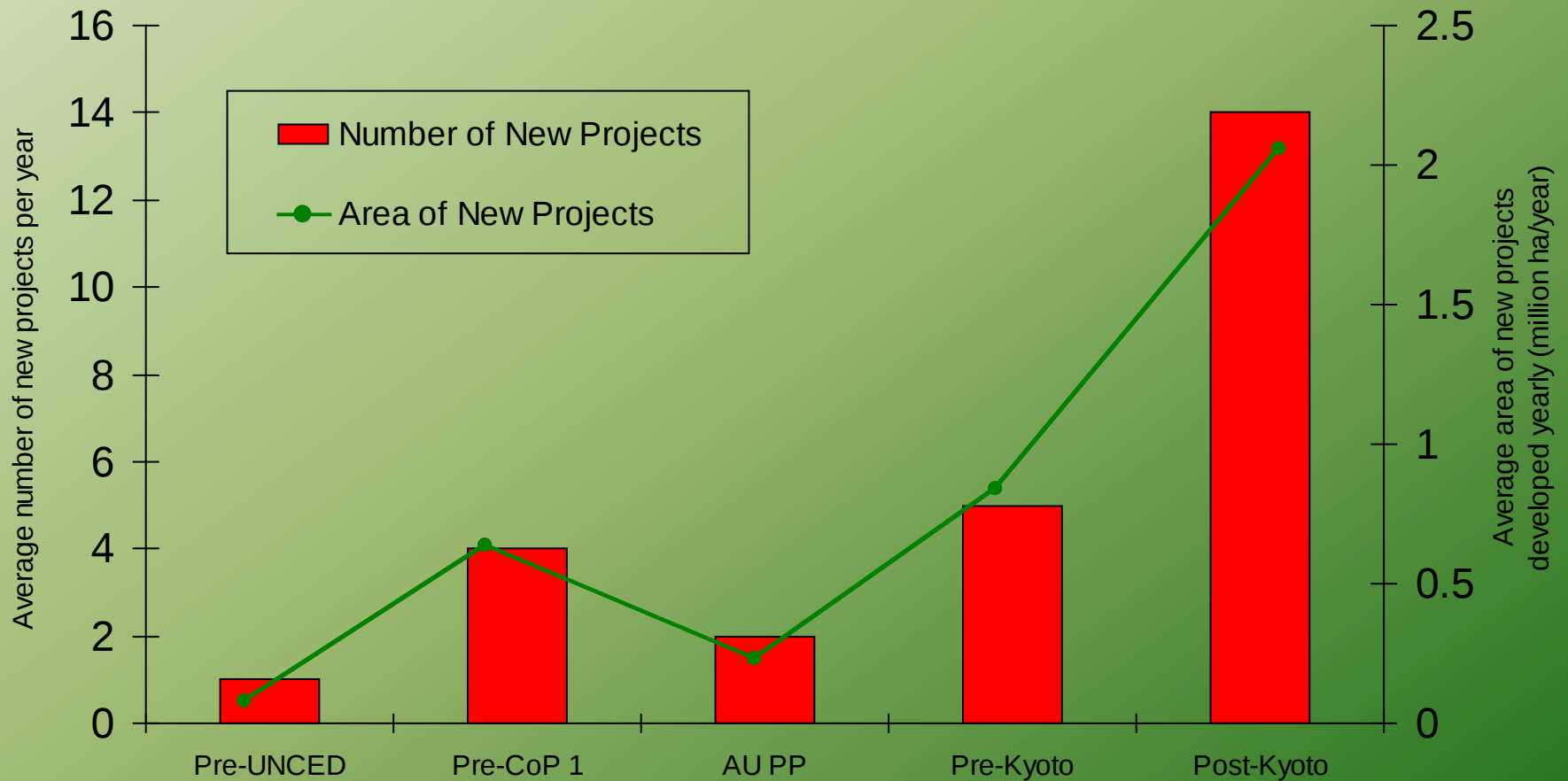
	1890s	1990s
Swallow	April 8	March 26
Willow Warbler	April 9	March 28
Chiff Chaff	March 25	March 19
Garden Warbler	April 28	April 17
Blackcap	April 19	Overwinter
Swift	May 3	April 20

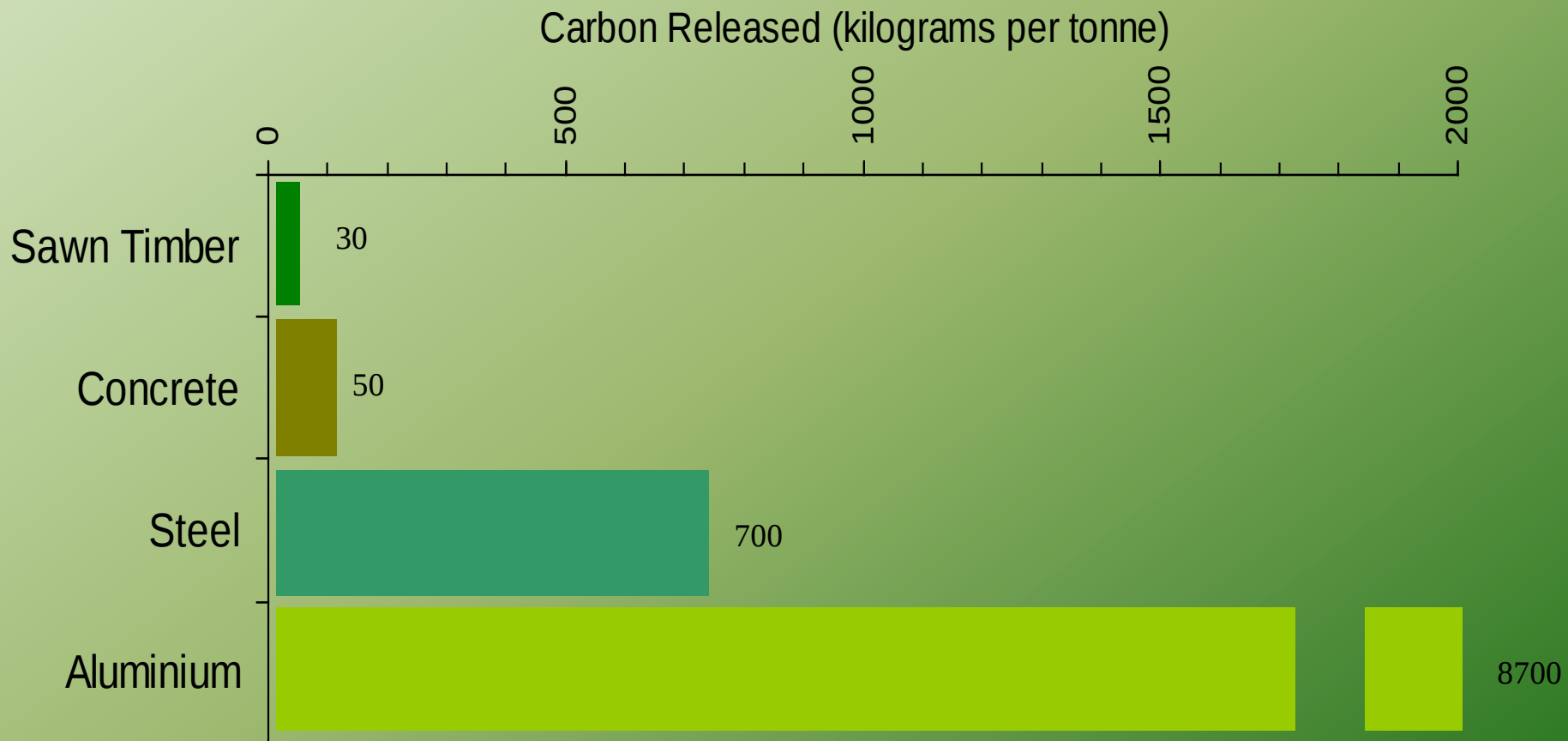
WHY THE BIRDS MIGRATE



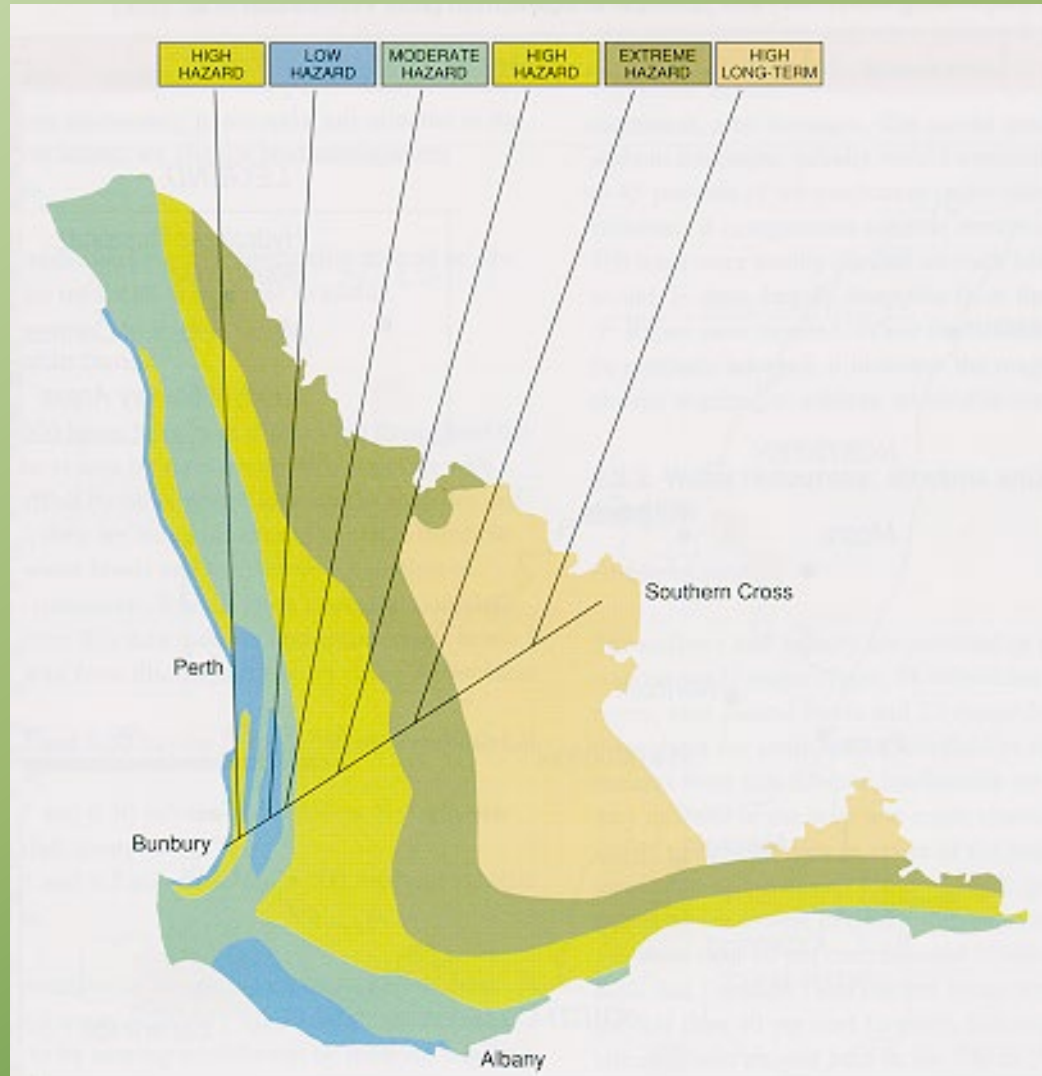
Swallows winter in southern Africa, timing their return to Britain for our spring when temperatures rise and insects become available

Carbon Sequestration Projects





Salinity hazard zones in the South-West











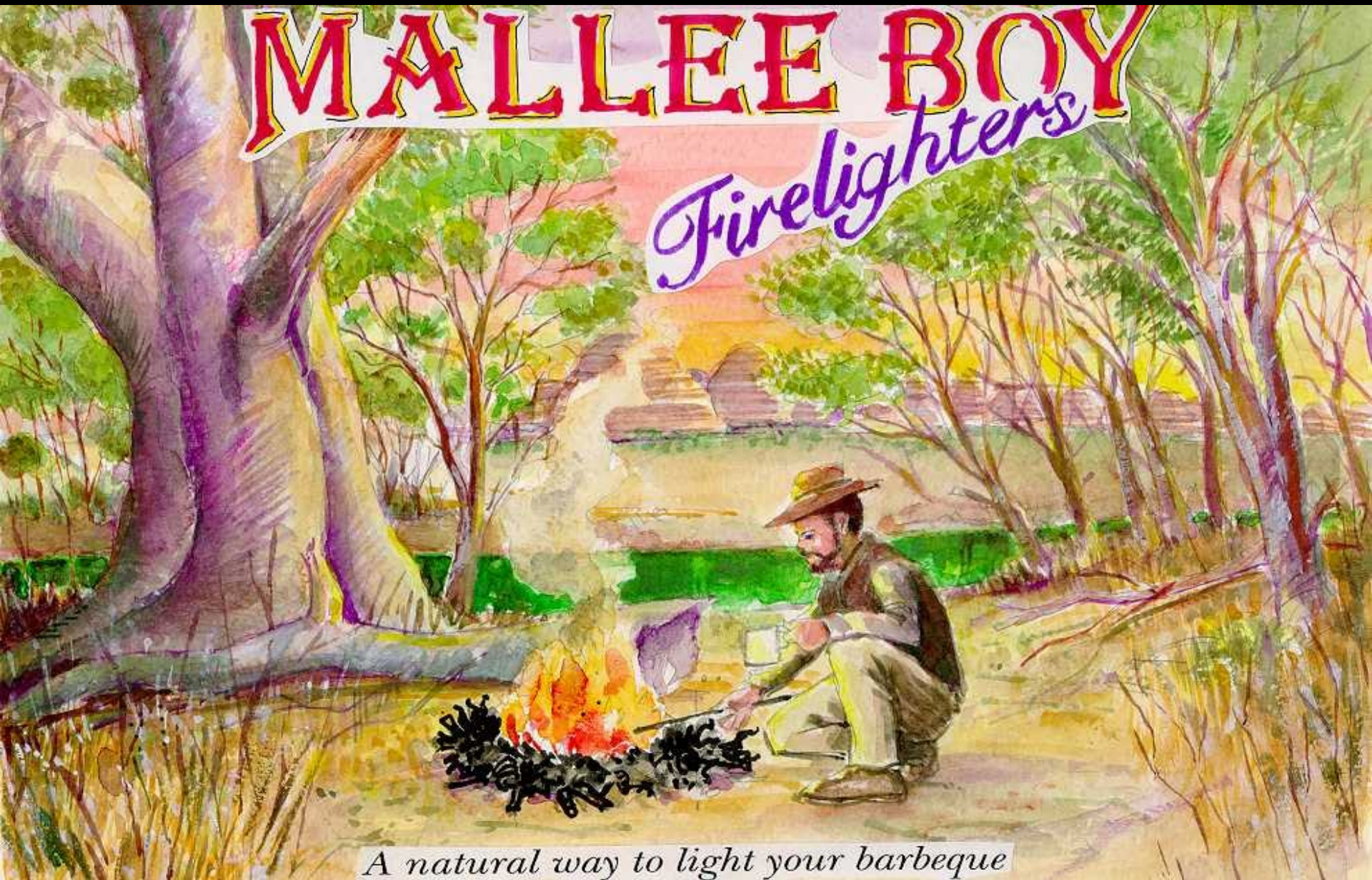
EUCASOL



Nature's Cleaning Agent

MALLEE BOY

Firelighters



A natural way to light your barbeque







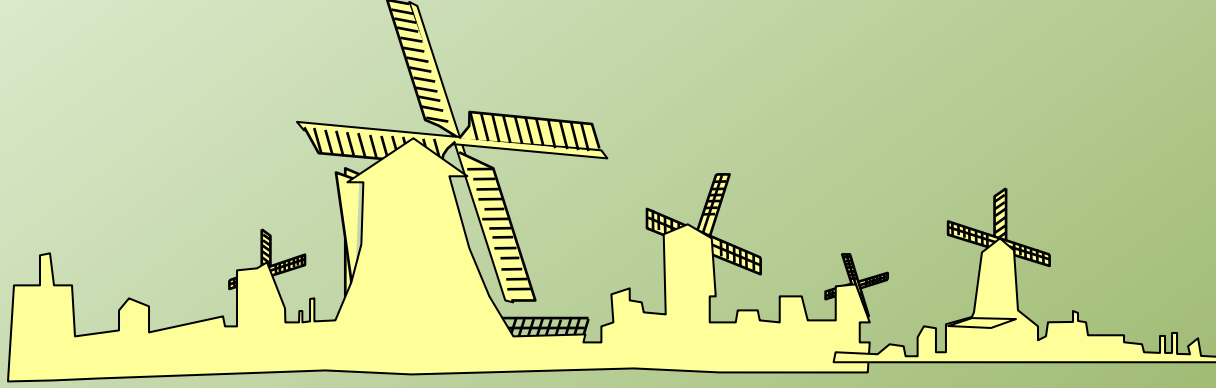


Western Bluegum

Tasmanian Bluegum



Trees are 2 years 8 months old



La Mancha

Maritime Pine





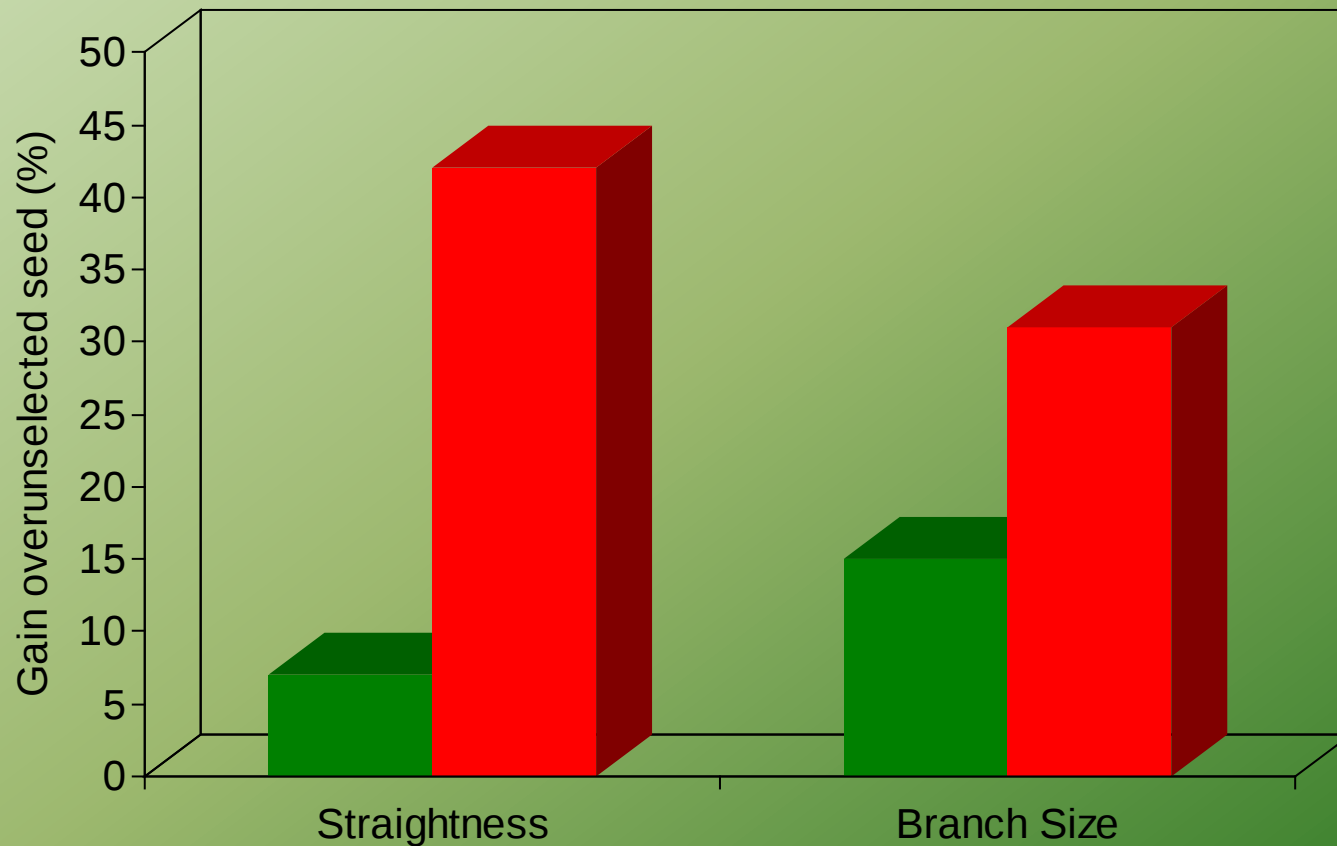
CALM's Genetic Resource:

Pinus pinaster

(Program commenced in 1957)

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

Maritime Pine Breeding Improvement

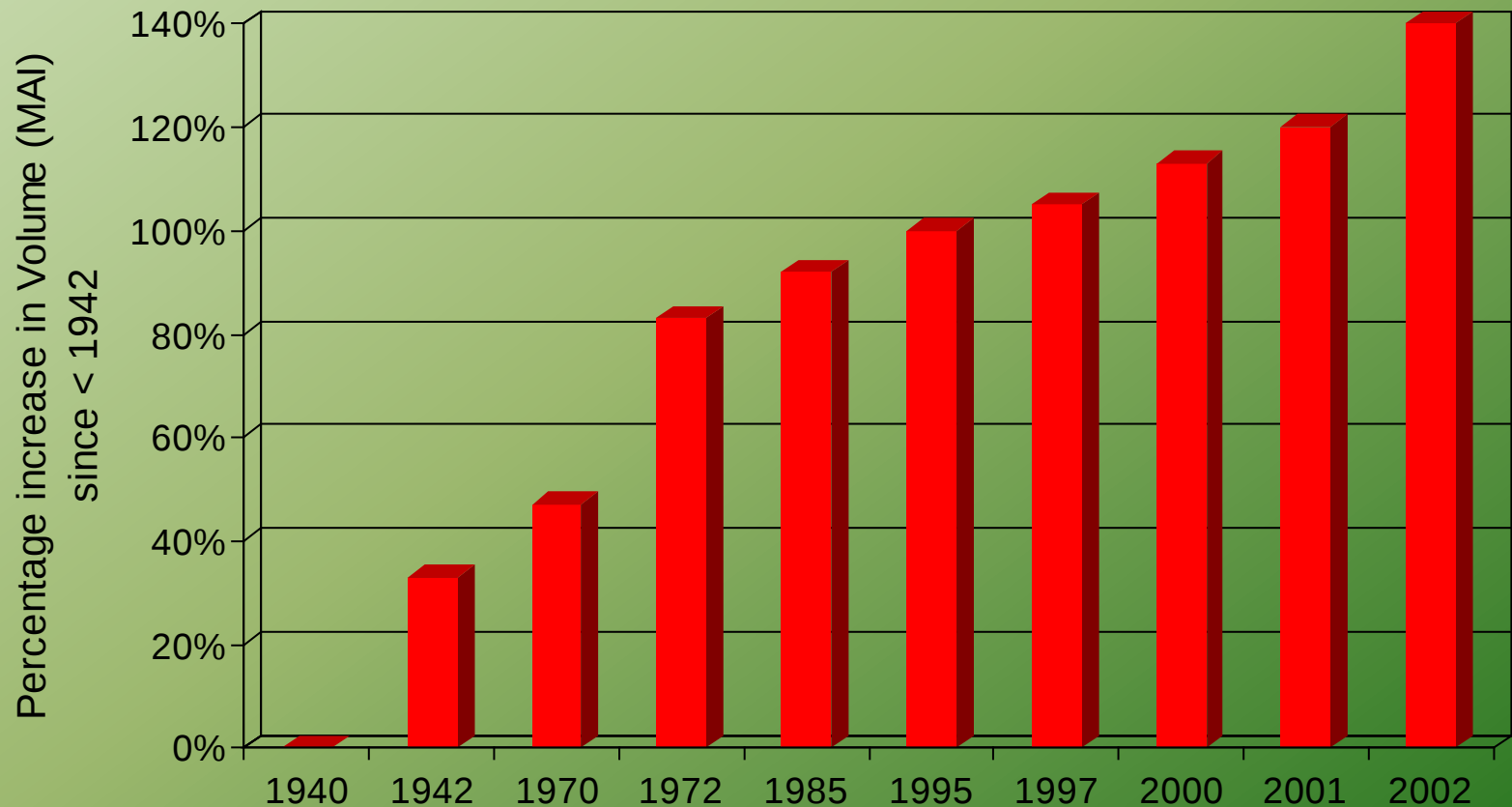


■ Plantation Grown From Unselected Seed

■ Stand Grown From Selected Seed



Volume gains from the tree improvement program for Maritime Pine













462 499.25 mE
6 270 190.87 mN

467 009.25 mE
6 270 190.87 mN



6 285 150.87 mE
462 499.25 mE

467 009.25 mE
6 270 190.87 mN

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 HUSH 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
TOTAL AREA	372.5

SHIRE: BOYUP BROOK
MAIN ACCESS ROAD: CRAIGIE ROAD
FIRE CONTROL DETAILS
OWNER:
CONTACT:
FIRE CONTROL CONTACTS:
1.
2.
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 MRS.

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 $\pm 3.5m$.

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

SCALE 1:25 000

1000 800 600 400 200 0 500 1000 metres



PROJECTION: TRANSVERSE MERCATOR C.M. 111 E

HORIZONTAL DATUM: AUSTRALIAN GEODETIC DATUM 1984

VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM 1971.



PREPARED BY: FOREST MANAGEMENT BRANCH UNDER THE DIRECTION OF
THE INFO AREA, EXECUTIVE DIRECTOR OF THE DEPARTMENT
OF CONSERVATION AND LAND MANAGEMENT, WESTERN AUSTRALIA
THIS MAP IS CONFIDENTIAL - ANY DISCLOSURE MAY BE IN BREACH OF THE
COPYRIGHT ACT. NO PART MAY BE REPRODUCED BY ANY PROCESS
WITHOUT THE PERMISSION OF CALM.

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)

EXECUTIVE DIRECTOR OF THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT 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.

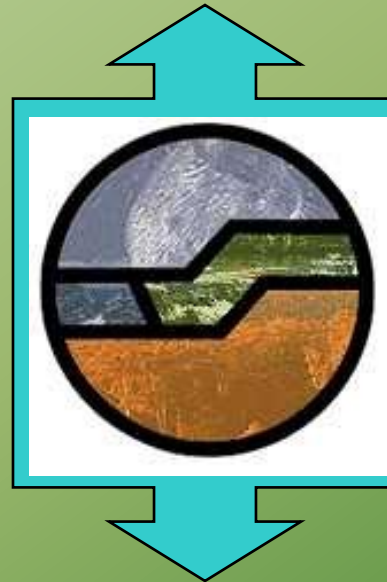
TERM OF PROFIT A PRENDRE (Note 6)

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 has joint ventures with 1500 farmers



CALM has contracts with 84 land management contractors

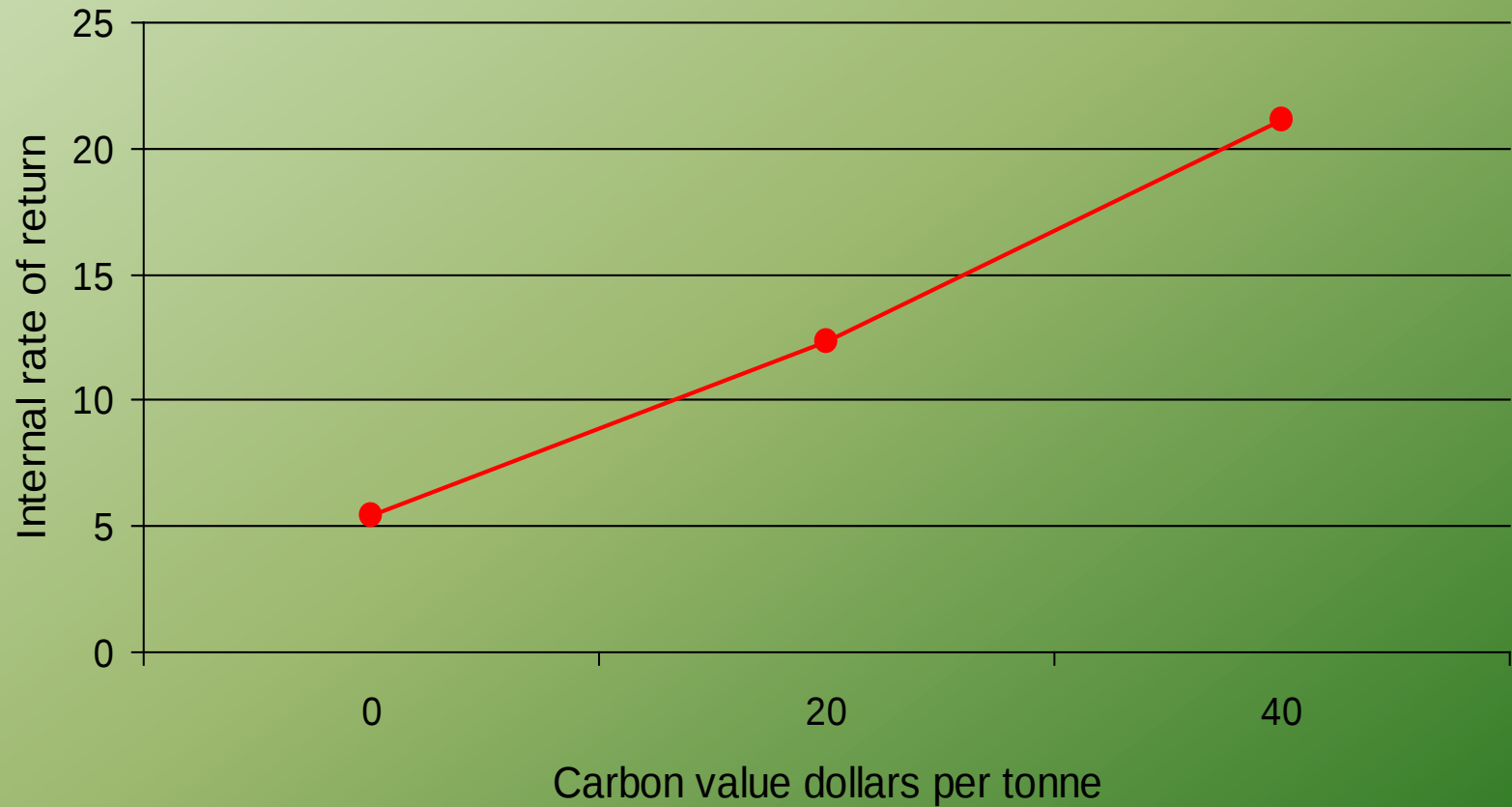




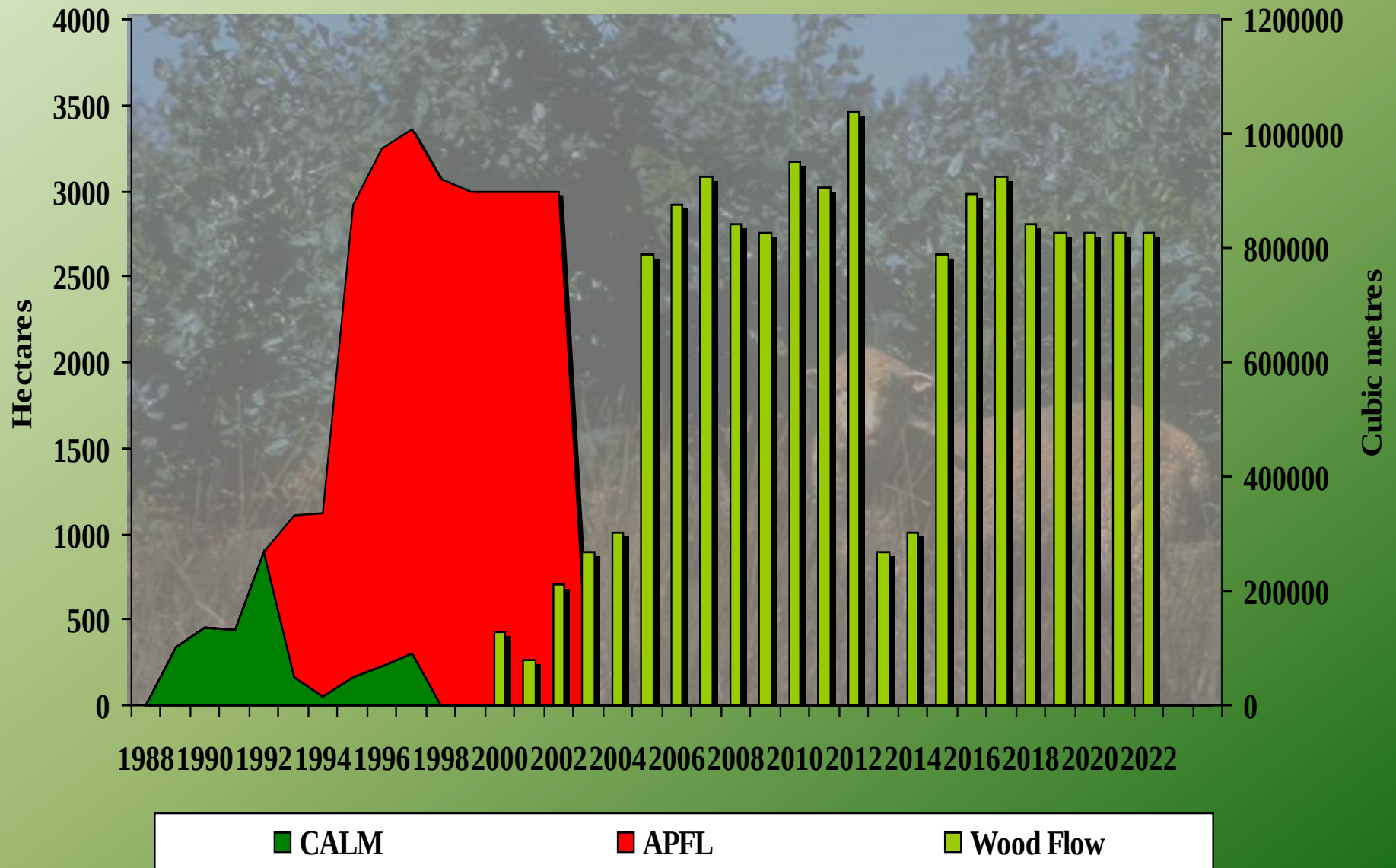
Effect of growth rate on the timber rate of return
from a conventional regime of 30 years

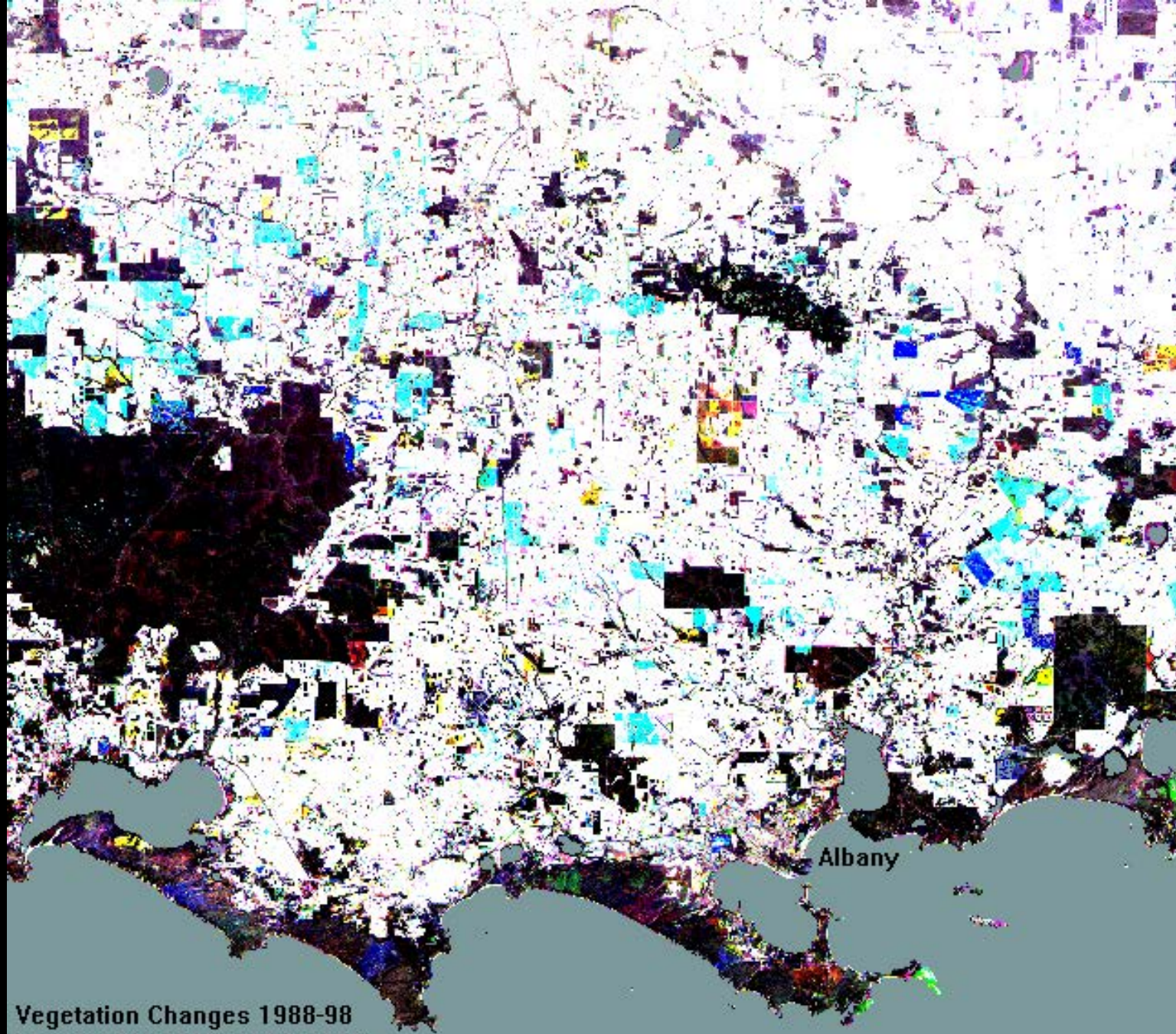
<i>Increase in stumpage over current</i>	<i>Growth rate</i>	
	<i>12m³/ha/yr</i>	<i>16m³/ha/yr</i>
Current	5.1%	6.7%
20%	6.2%	7.8%
40%	6.8%	8.4%

Return from Maritime Pine at Different Carbon Prices



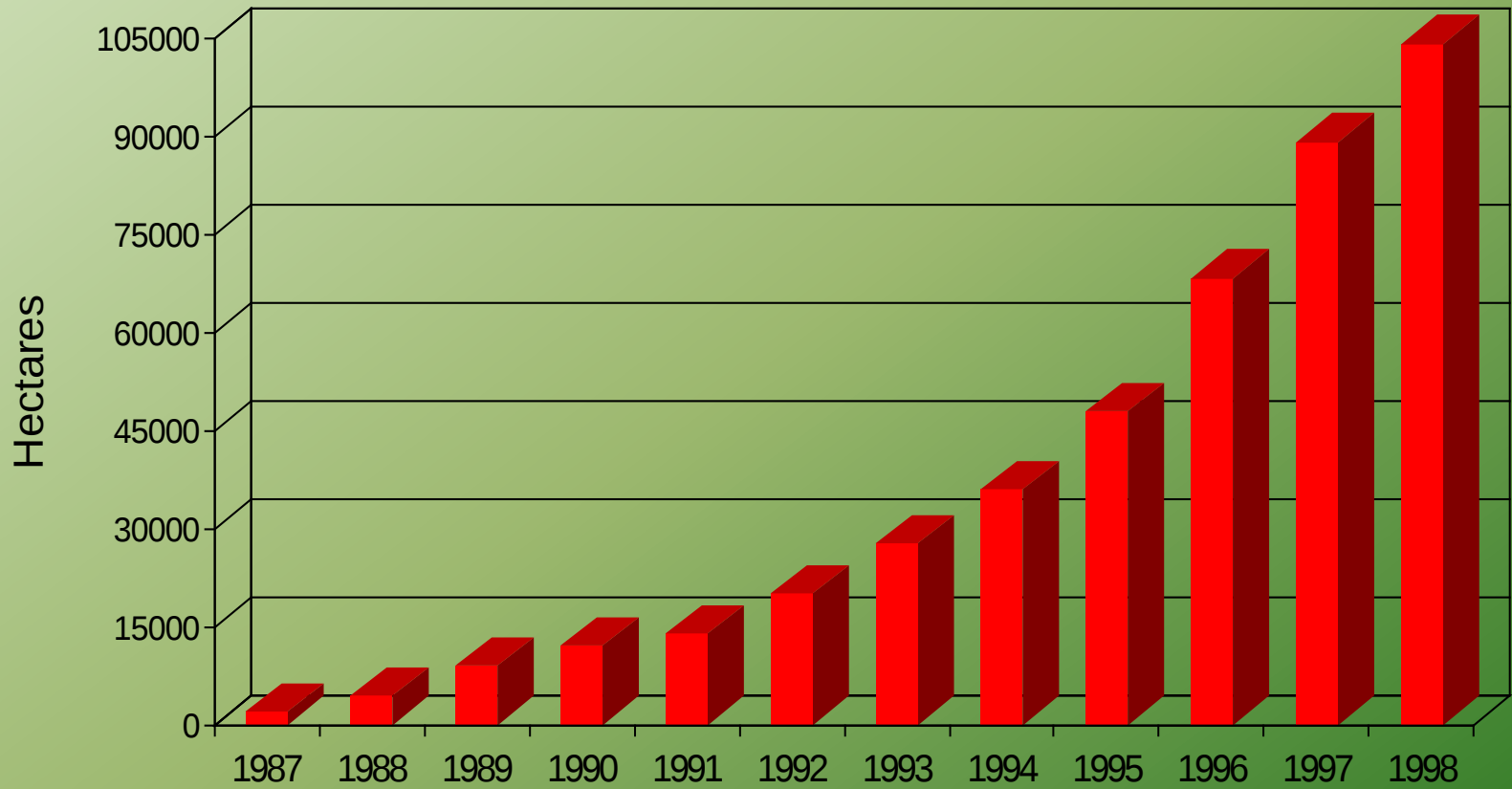
Area of bluegums planted each year (CALM and APFL) and predicted wood flows



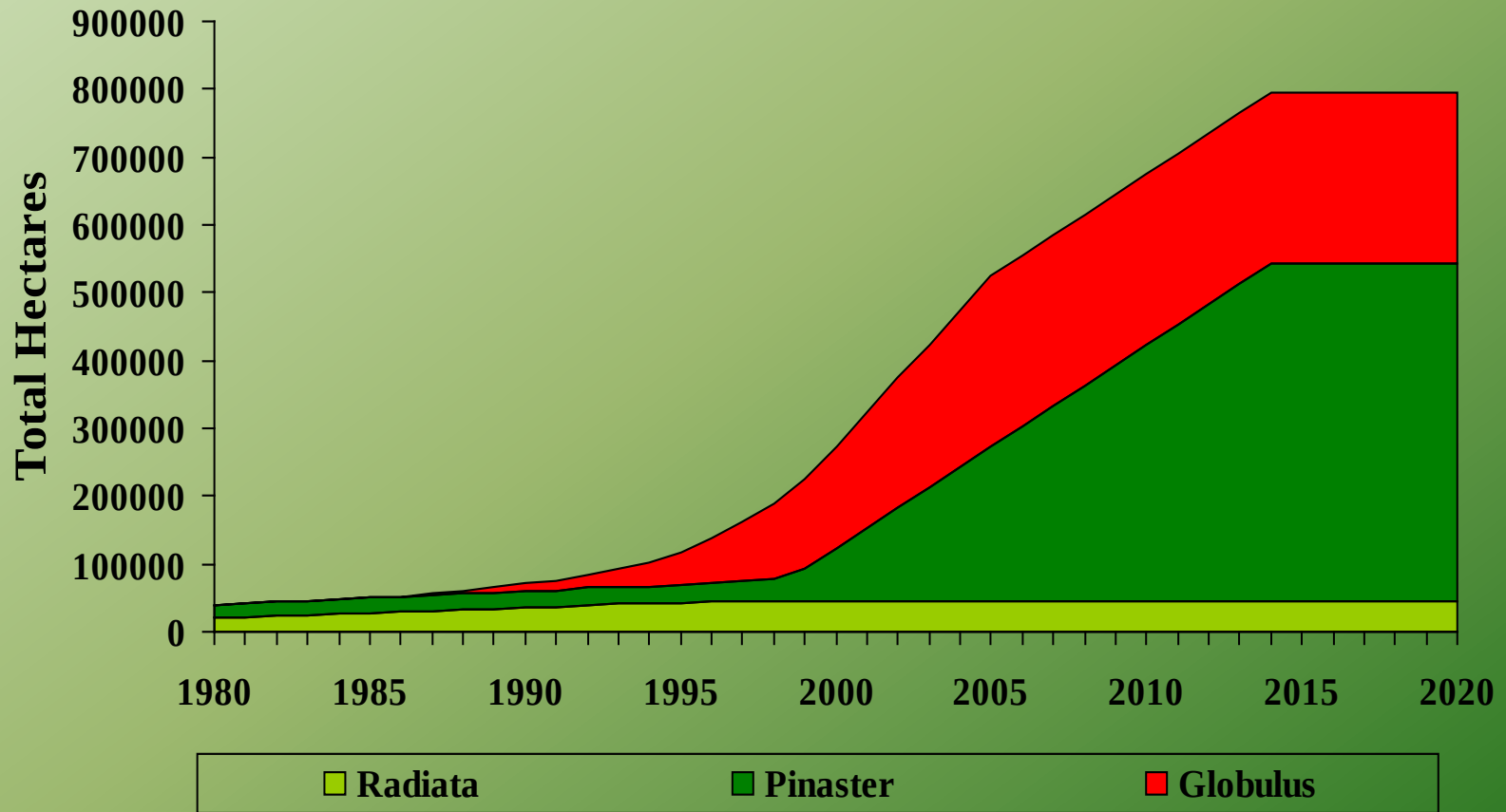


Vegetation Changes 1988-98
Landsat TM 1988, 1994, 1998

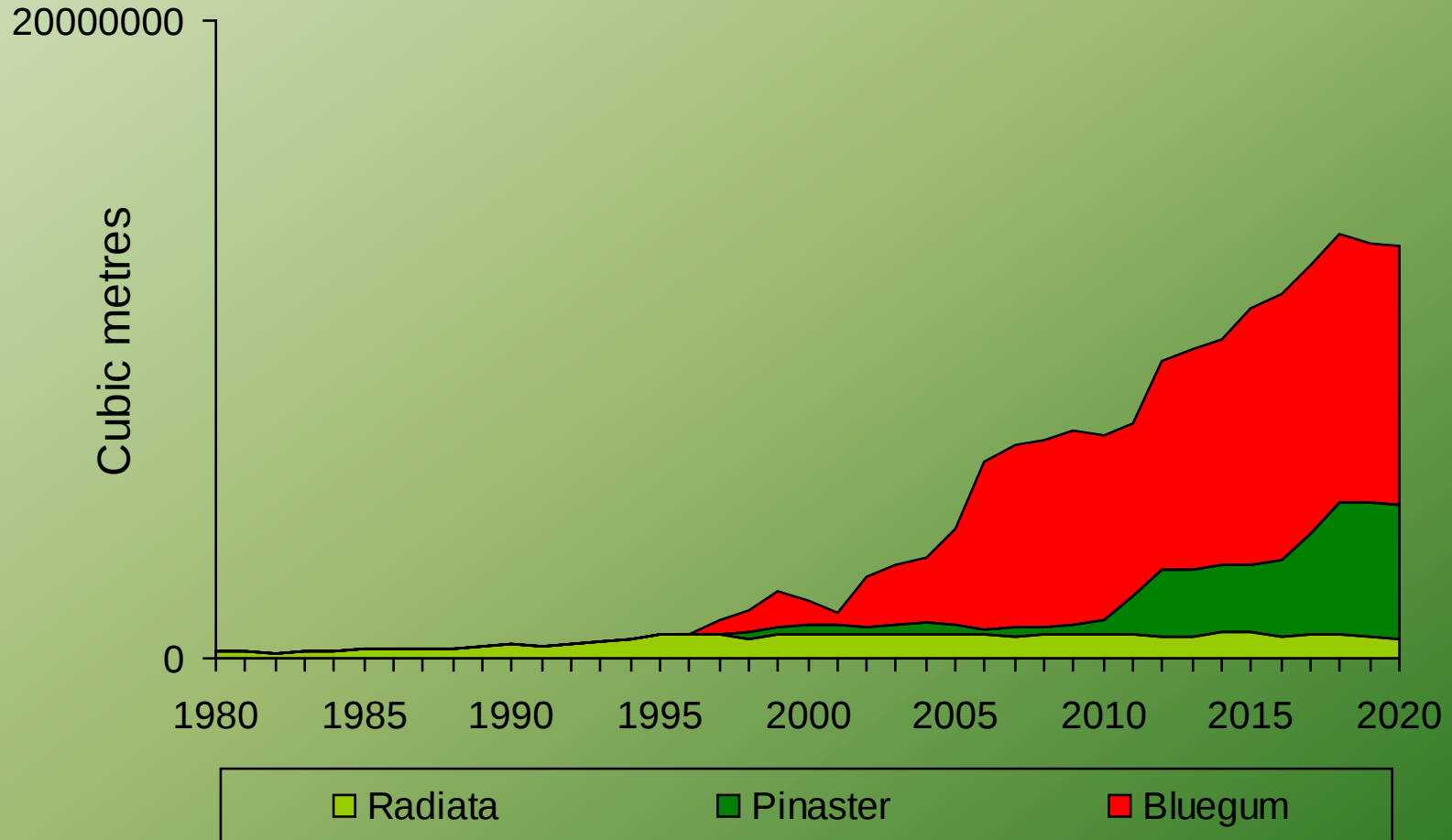
Total area of *E. globulus* in WA



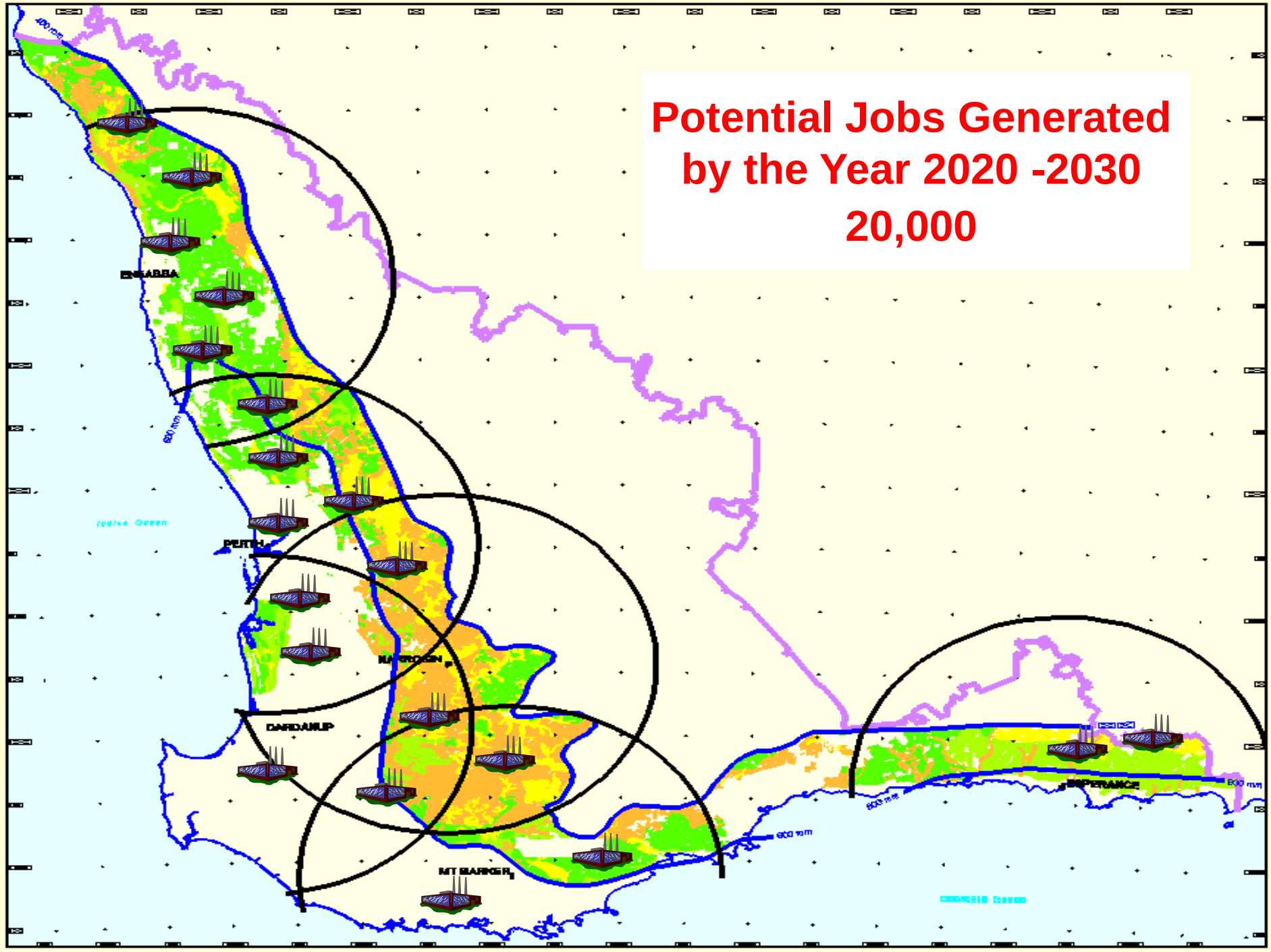
Predicted Growth of Tree Crop Plantings in Western Australia



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



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



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

