Forests and woodlands

Theme - Natural resources for an expanding population”

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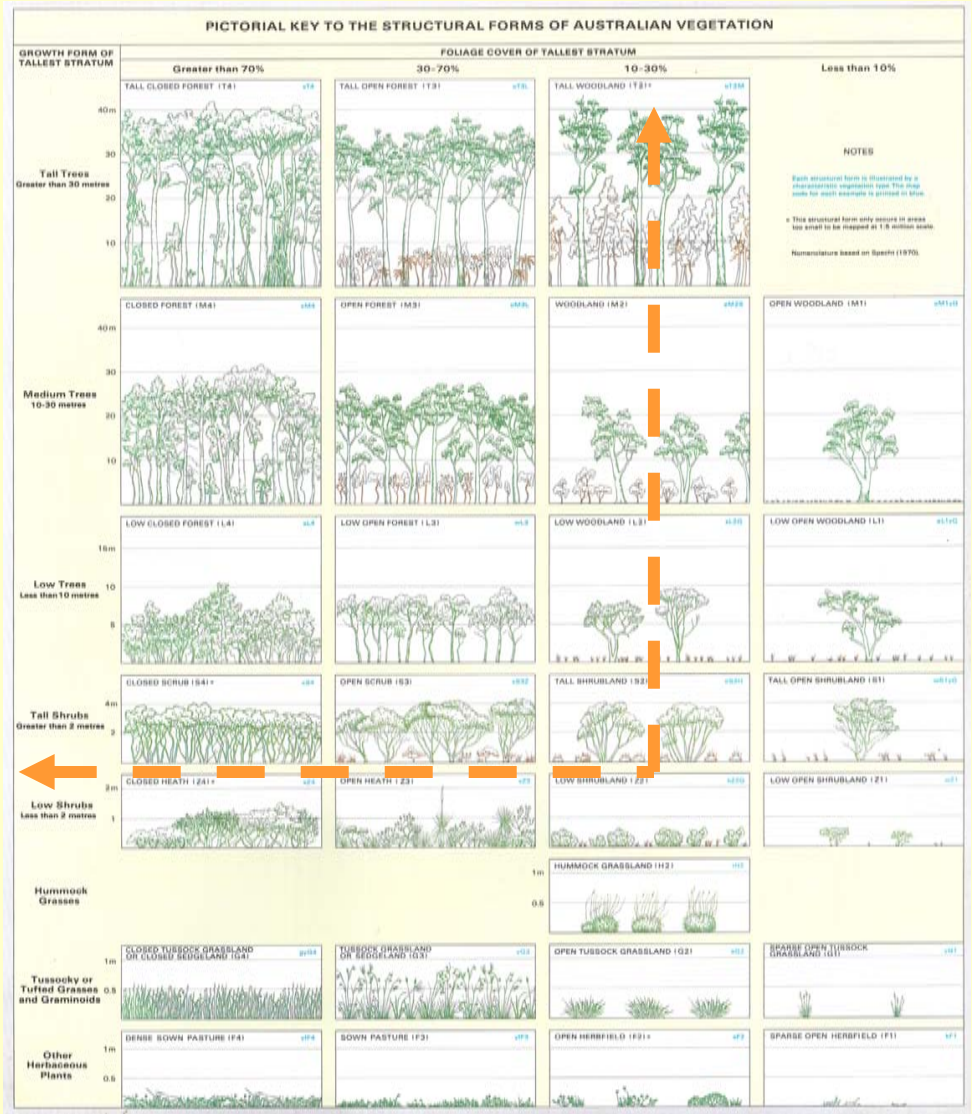
Outline

- Definition of forest and plantation
- Global, national, regional, local contexts
- Ecologically sustainable forest management
- Scales for forest management
- Human uses of forests
- Case studies
- Science, society and politics

What is a forest?



- *"An area incorporating all living and non-living components that is dominated by trees having a single stem and a mature or <u>potential</u> mature stand height exceeding 2 m and existing or <u>potential</u> crown cover of overstorey >20%"*
  (Australia's State of Forest Report 2008)
- *Definition encompasses woodland, mallee and savanna ecosystems*
- *Recognises dynamic nature of forests and role of natural and human disturbance*

Early stages of development following disturbance

Regeneration following bushfire
Parker Range, Marvel Loch

Regeneration following timber harvest
Carter block, Manjimup

Old trees & forests

Karri, Shannon River
1200 mm annual rainfall

Old trees & forests

Callitris, Great Victoria Desert
200 mm annual rainfall

Old trees & forests

- Which is the oldest tree?

- How old is it?

100 years

350 years

700 years

1400 years

Plantations

- *"Plantations are intensively managed stands of trees of either native or exotic species created by the regular placement of seedlings or seeds"*

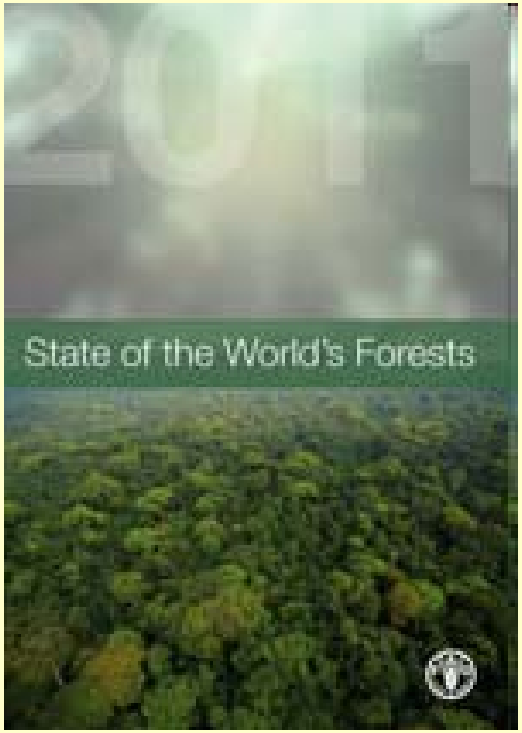
- *In 2008 Australia had 1.97 M ha of plantations*
  hardwood 950 000 ha (48%)
  softwood 1 015 000 ha (52%)

- *Ownership*

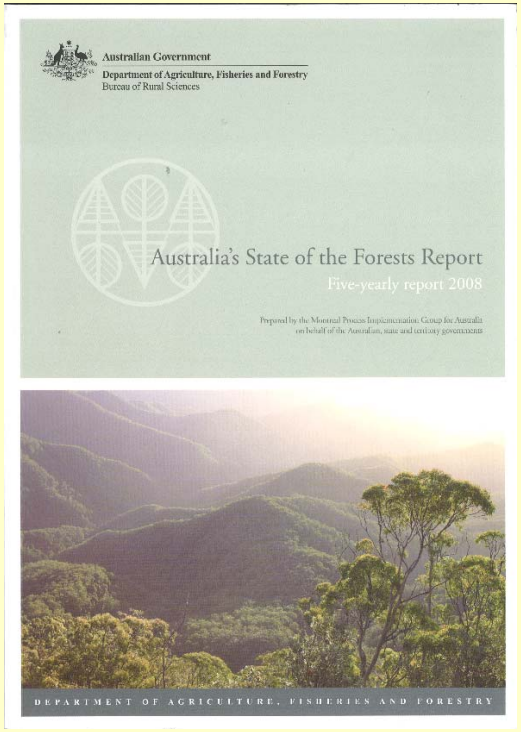
State governments	*36%*
Managed investment	*34%*
Superannuation funds	*11%*
Timber industry	*9%*
Private growers	*9%*

(Australia's State of Forest Report 2008)

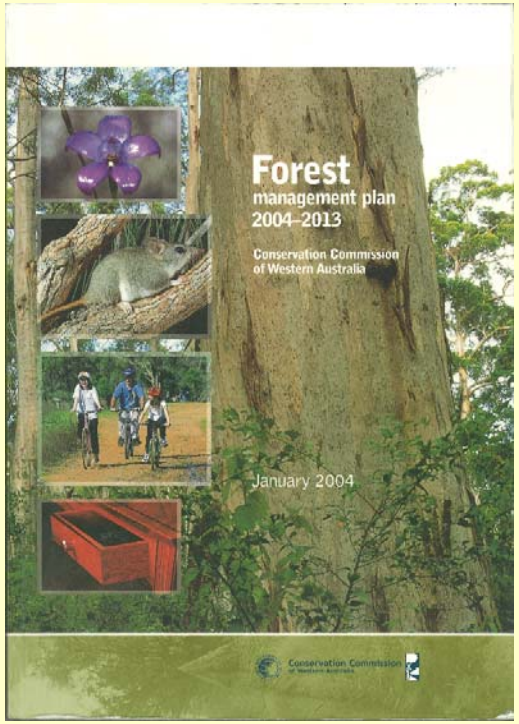
Information about forests



Global
State of the Worlds Forests
Food & Agriculture Organisation
United Nations
www.fao.org



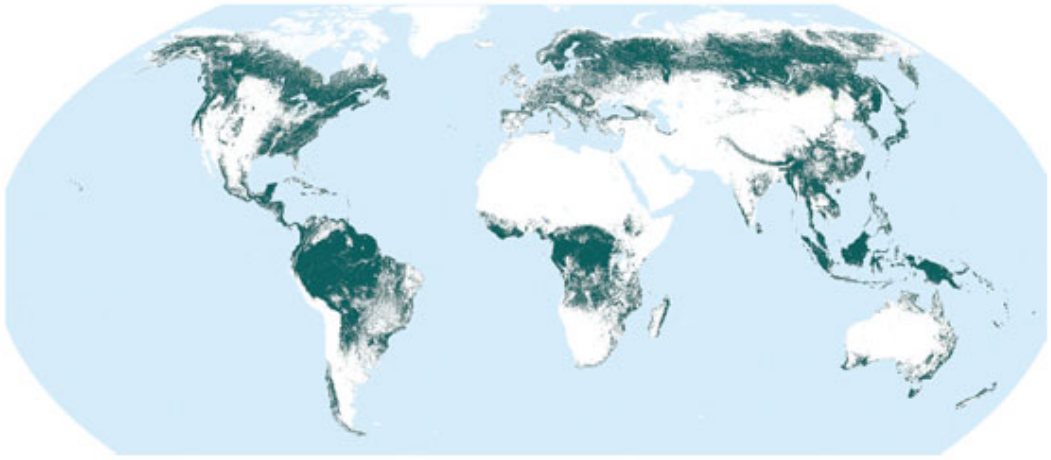
National
Australia's State of the Forests Report 2008
DAFF
www.daff.gov.au/abares



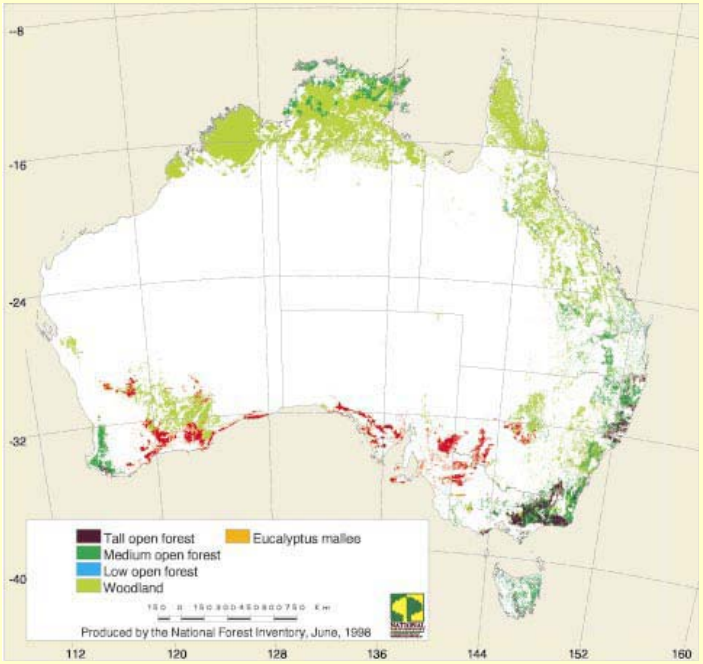
Regional/local
Forest Management Plan 2004-13
Conservation Commission WA
www.conservation.wa.gov.au

Forest area: global & continental

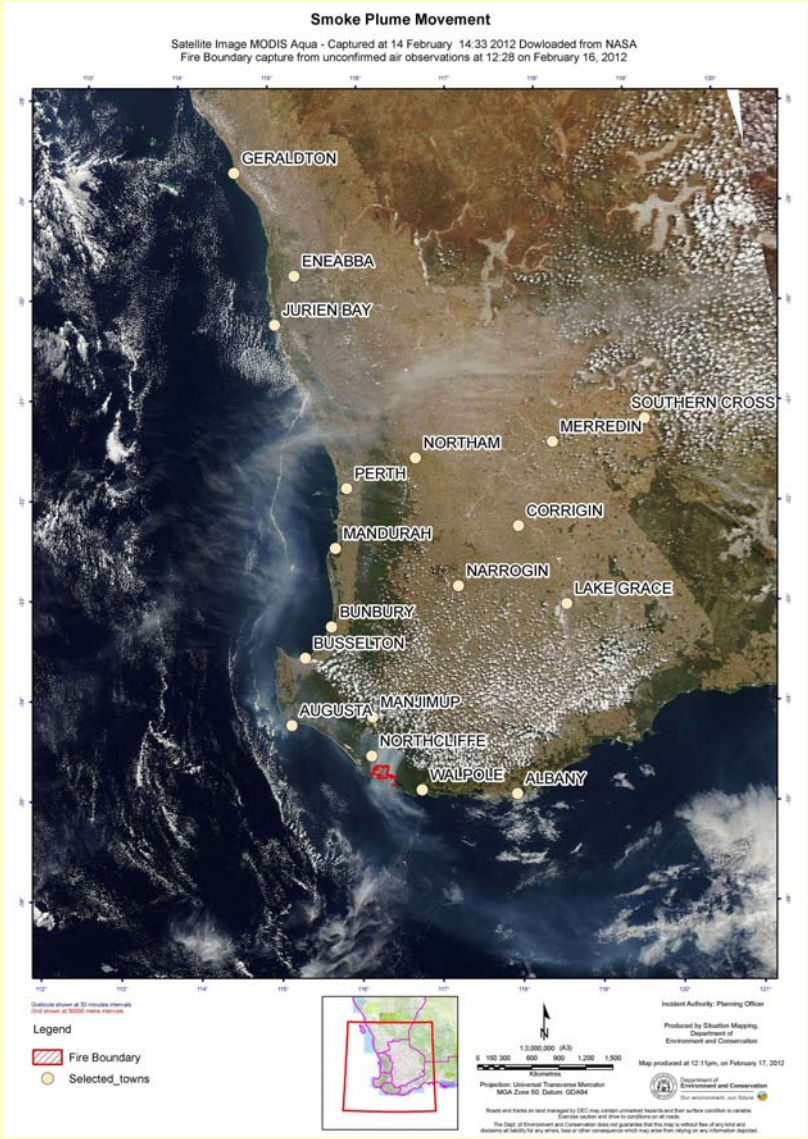
FIGURE 1
The world's forests



Note: Tree cover derived from MODIS VCF* 250 meter pixels for year 2005.
* Moderate-resolution Imaging Spectroradiometer Vegetation Continous Fields (Hansen *et al.* 2010).



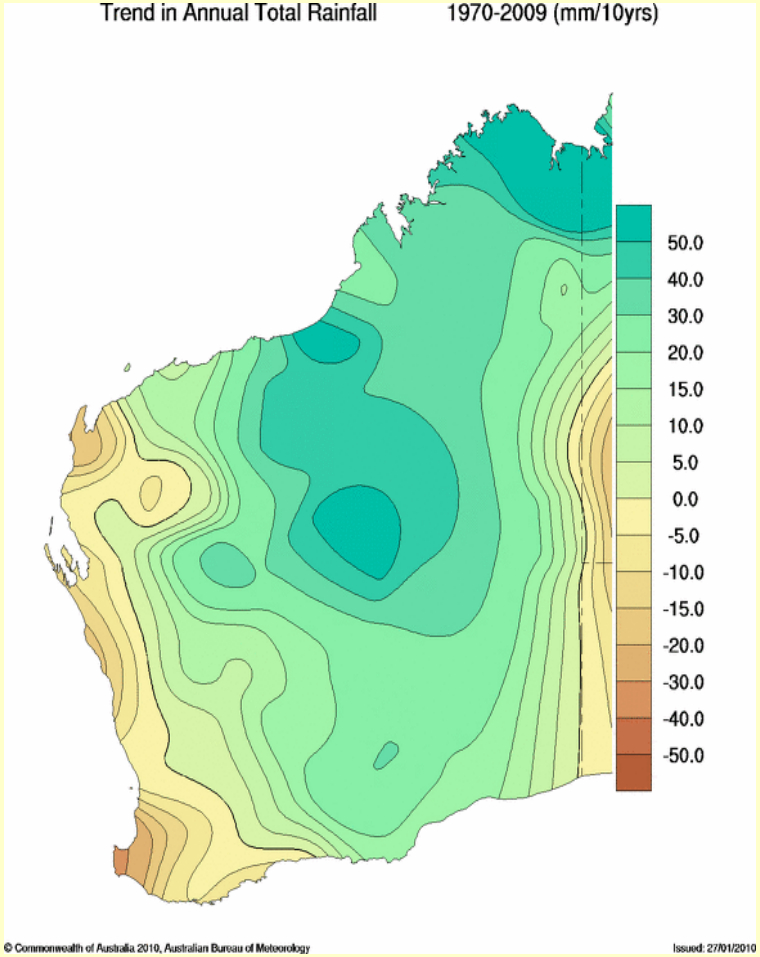
Forests: southern WA



- Geographic isolation
- Fragmentation
  (heavily cleared agricultural zone)
  (barrier fence boundary)
- Ancient landscape
  (geologically stable)
- Mediterranean climate
  (Indian and Southern ocean convergence)

Climate trends and projections

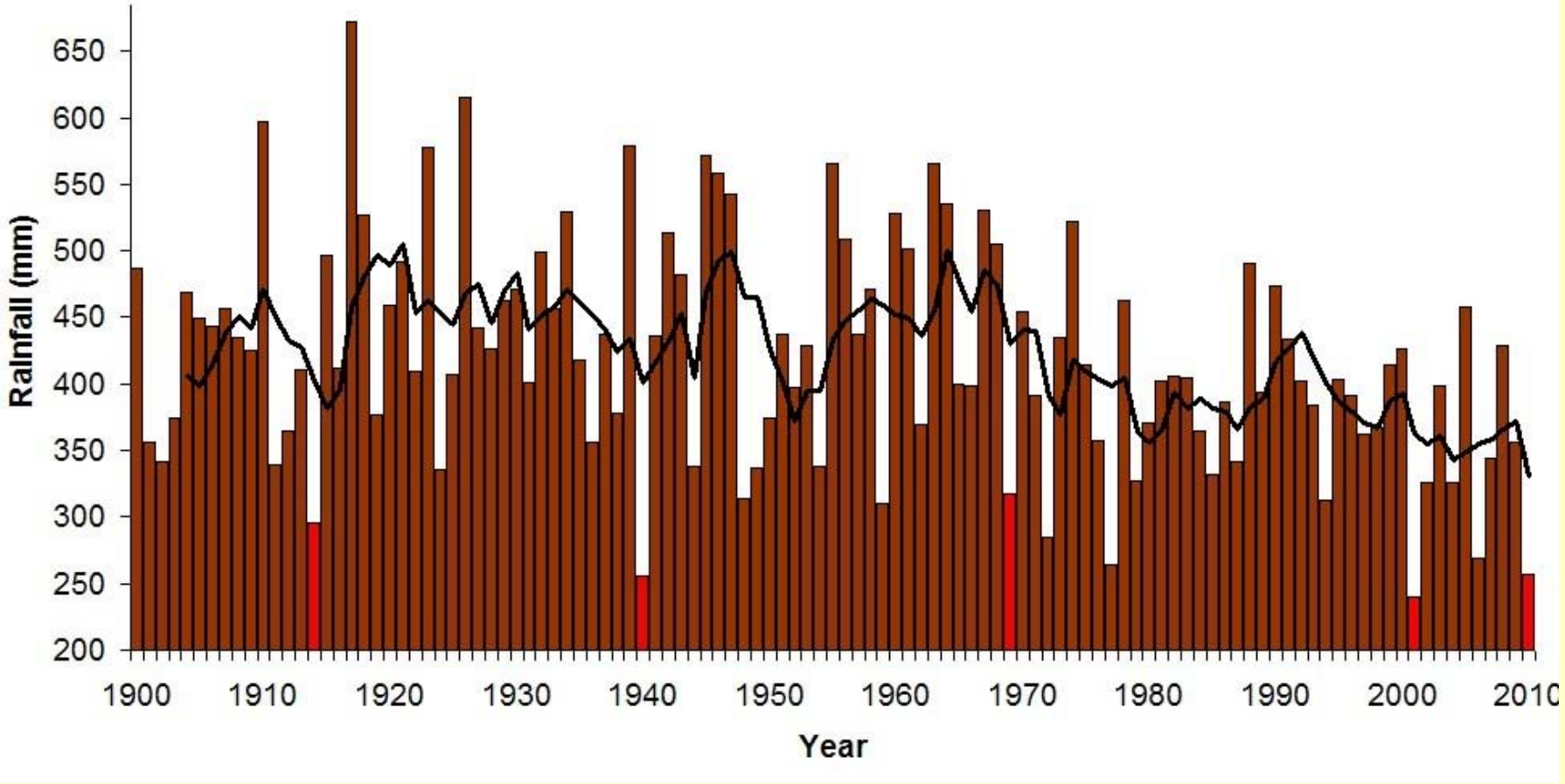
- Sustained decline in rainfall over past 3 decades, particularly autumn rain
- Trend of increasing temperature
- Understanding of natural variability at multi-decadal time scales limited by a lack of long term observations or proxy records (tree-rings)



Australian Government

Bureau of Meteorology

January to July Rainfall SWWA



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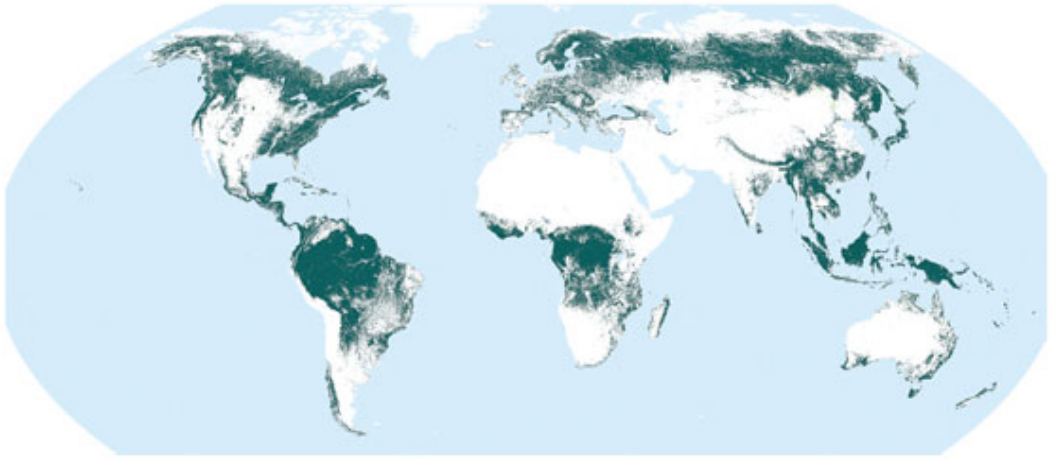

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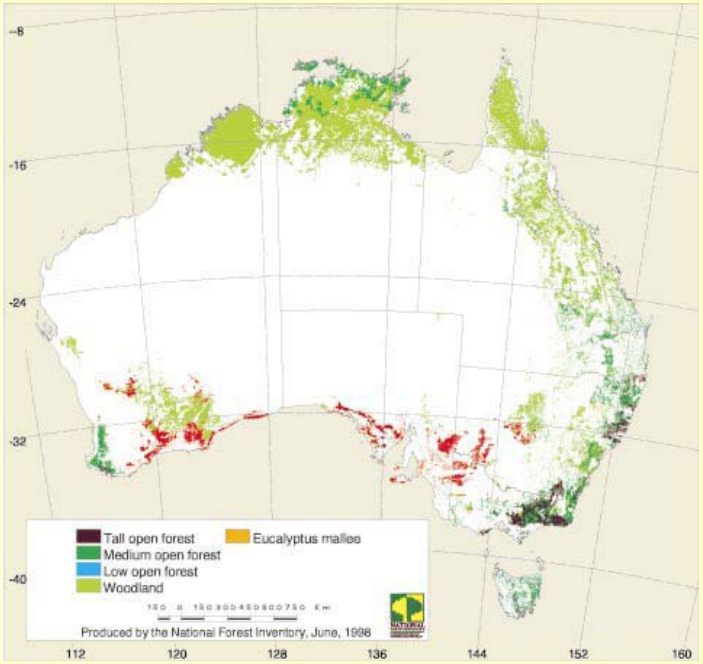


The Montreal Protocol

The **Montréal Process**
12 countries:

- Argentina
- Australia
- Canada
- Chile
- China
- Japan
- Republic of Korea
- Mexico
- New Zealand
- Russian Federation
- United States of America
- Uruguay

Member countries occur in 5 of 7 continents
90 % of the world's temperate and boreal forests, as well as areas of tropical forests
(60% of the world's forests)

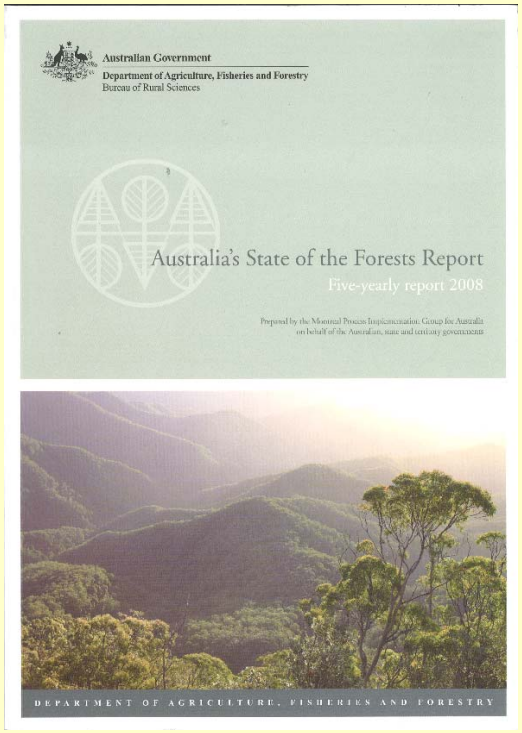
Montreal Criteria

- Conservation of biological diversity
- Maintenance of productive capacity
- Maintenance of ecosystem health and vitality
- Conservation of soil and water
- Contribution of forests to global carbon cycles
- Maintenance of cultural heritage
- Maintenance of socio-economic values
- Legal, institutional and economic frameworks for conservation and sustainable management

Indicators

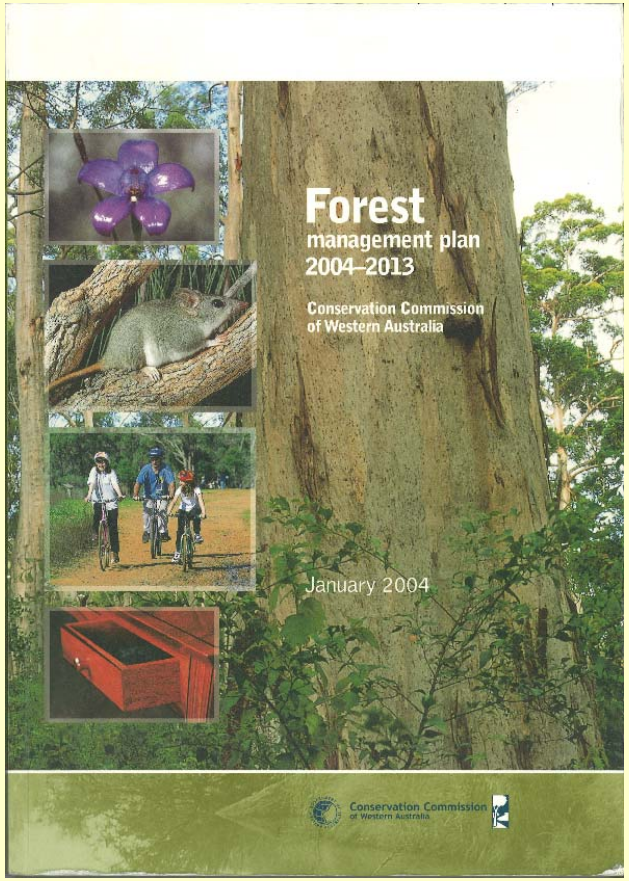
- Measurable
- Show trends in condition and performance

Australia's State of the Forests



- State of the Forests Report (SOFR)
  1998
  2003
  2008
  2013 (in preparation)
- Part of Australia's contribution to the Montreal Process
- 44 indicators reported in SOFR 2008
- Rich source of data and case studies

Forest Management Plan for WA



- Prepared by WA Conservation Commission with substantial input from DEC and Forest Products Commission, approved by Minister for Environment
- State forest, reserves and some freehold land (plantation) within south-west forest area
- 10 year planning period
- Structure follows Montreal Process criteria with specific actions identified for each
- Key performance indicators (33) for most criteria
- Mid-term and end of term audit by Environment Protection Authority WA

Ecologically Sustainable Forest Management

CAR reserve system
Comprehensive
Adequate
Representative

ESFM
Ecologically **S**ustainable
Forest **M**anagement

- From 1990s onwards forest policy and planning from has incorporated these 2 fundamental and complementary approaches
- Forms the basis of the Forest Management Plan 2004-2013 for WA
- Principles

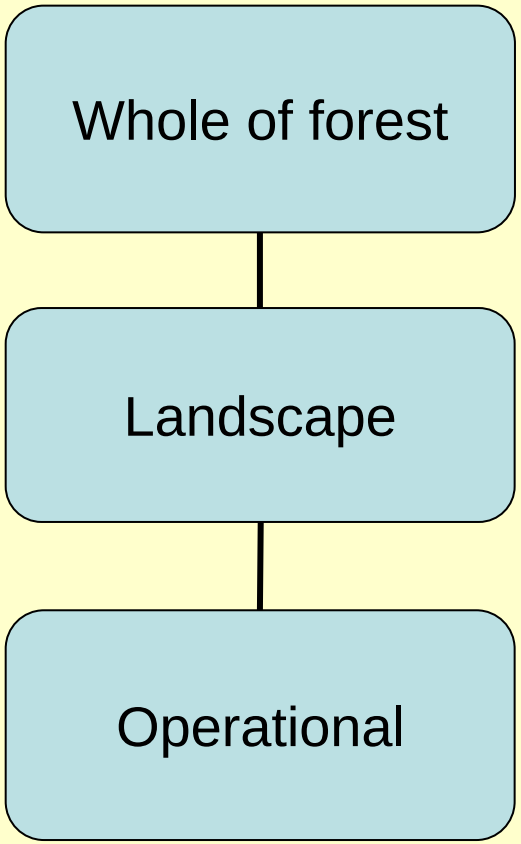
  Sustainability: environmental, social, economic

  Precautionary: lack of certainty is not a reason for postponing measures to prevent degradation

  Inter-generational equity: environment maintained or enhanced for future generations

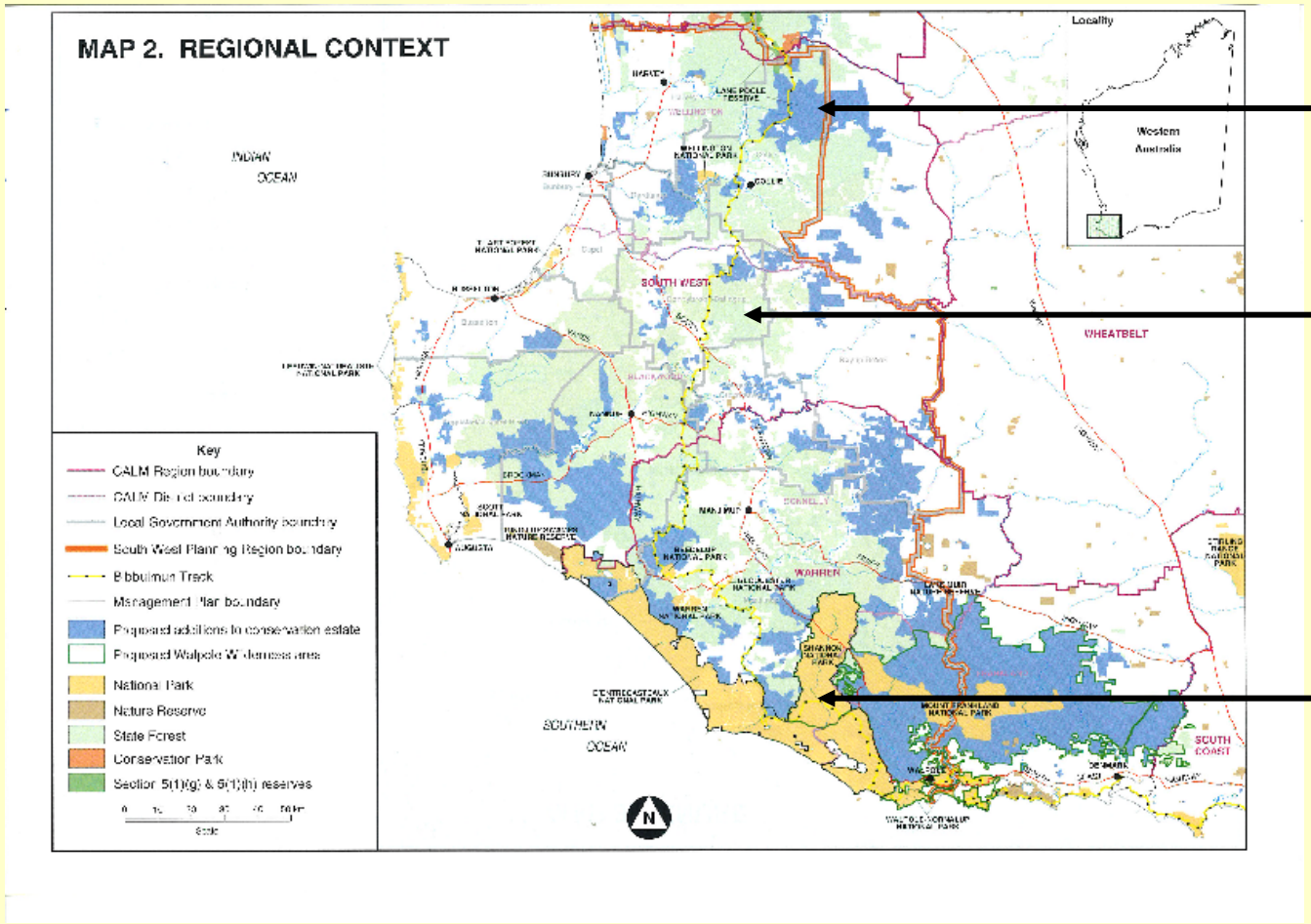
  Conservation of biological and ecological integrity

FMP scales of management



Scale	Action
ha x 10^6	Large reserves (CAR)
ha x 10^3	Linear reserves on rivers and streams
ha x 10^1	Retained habitat elements within harvested forest eg. habitat trees, woody debris

Whole of forest scale

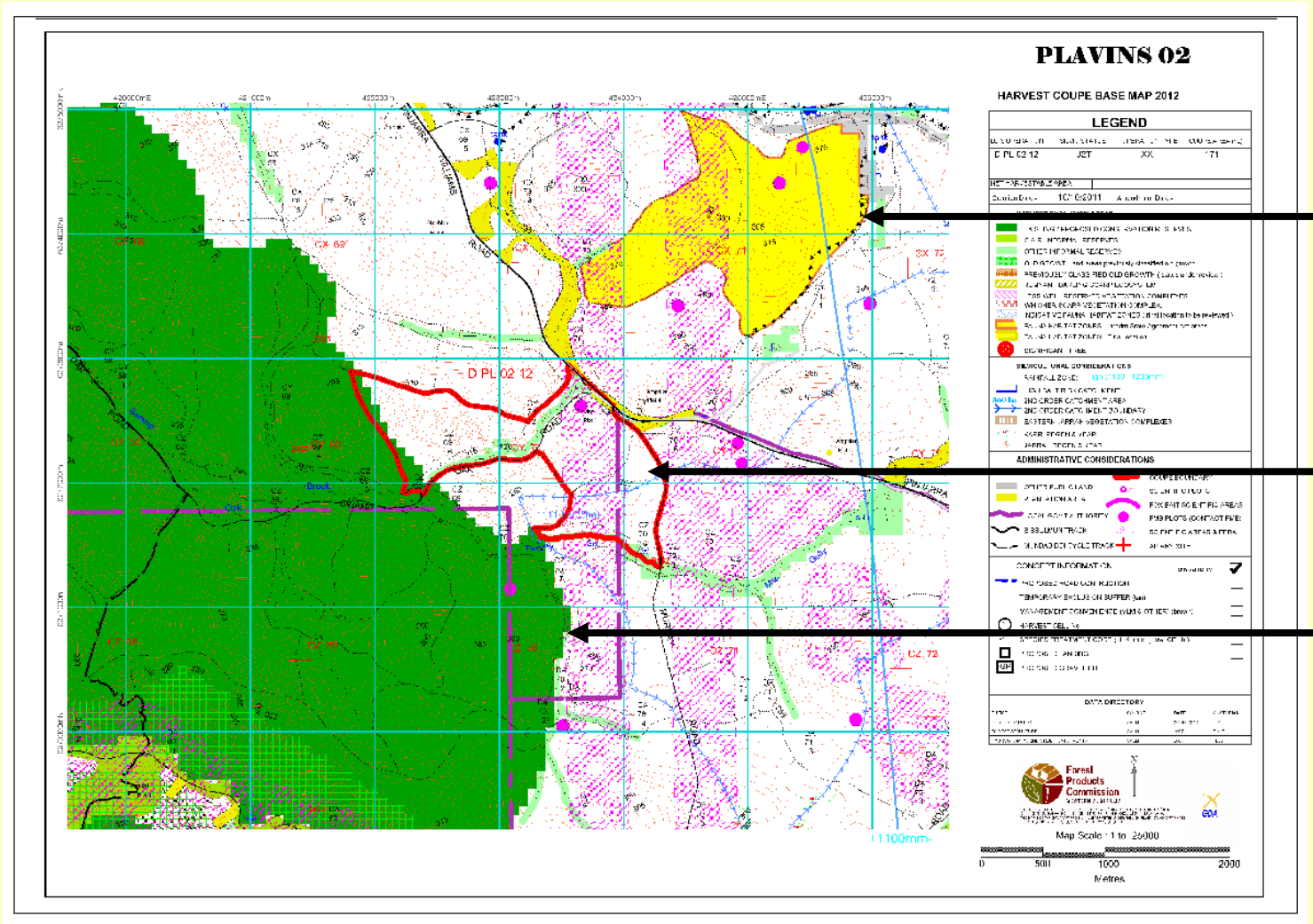


Conservation reserve Proposed (blue)

State forest (green)

Conservation reserve Existing (brown)

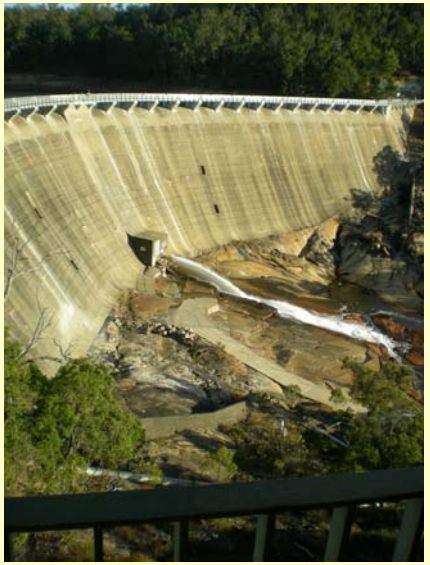
Landscape scale



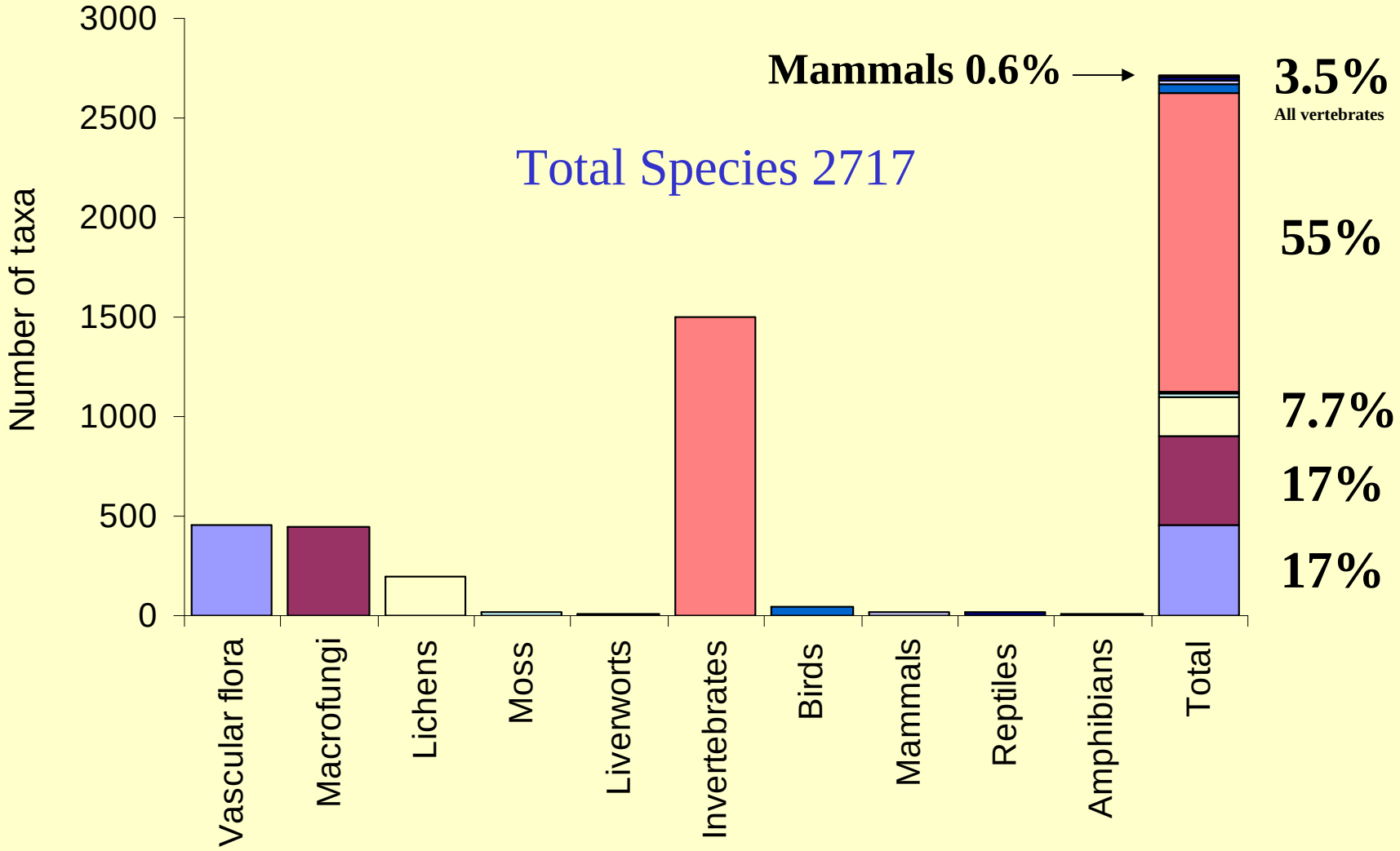
Operational scale

Mature trees retained as habitat in logged jarrah forest

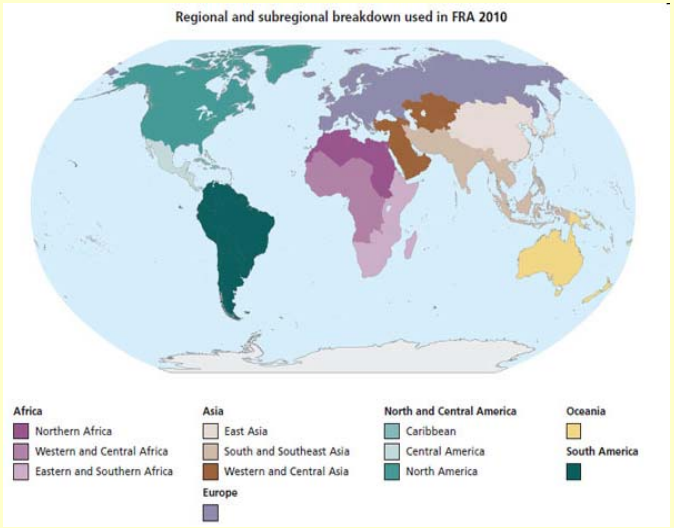
Human uses of forests



Biological diversity:
Results from first 5 years of monitoring

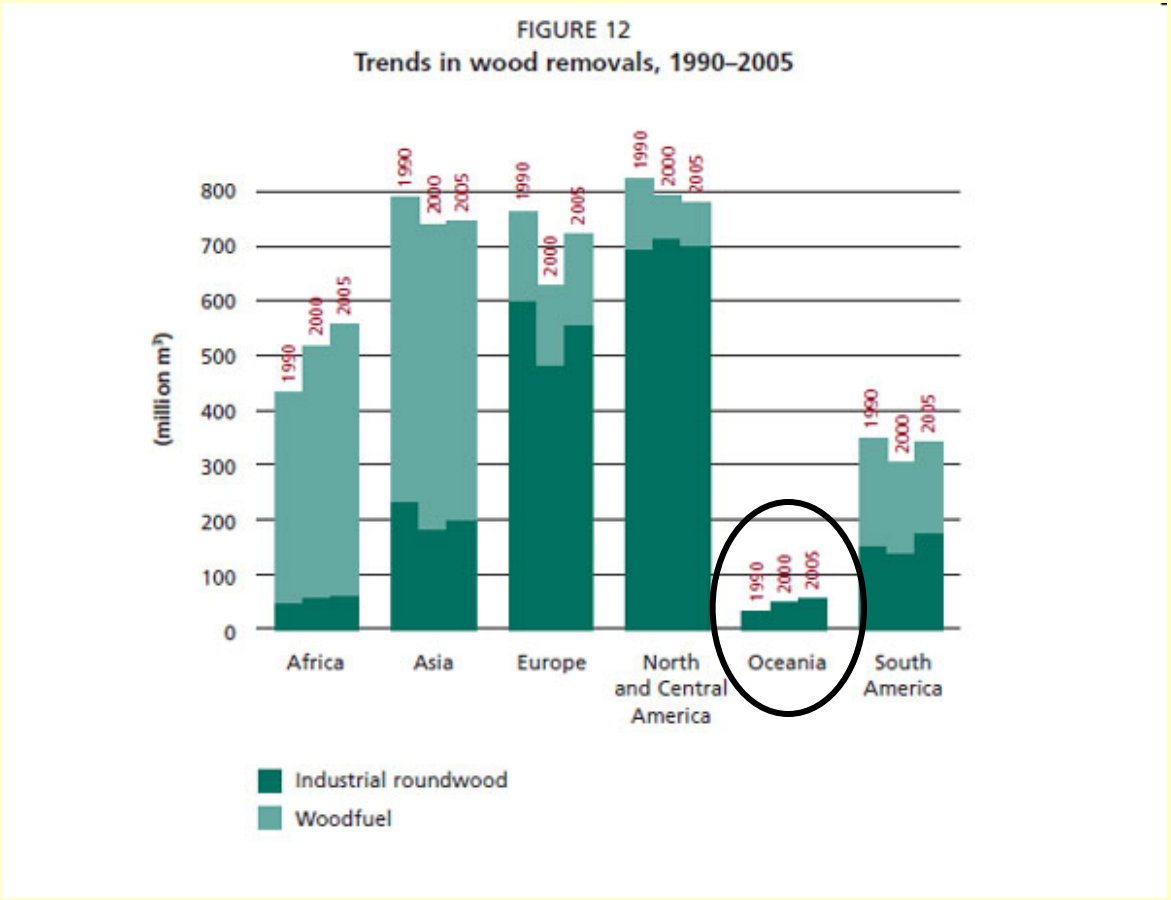


Productive capacity: Global context for wood products

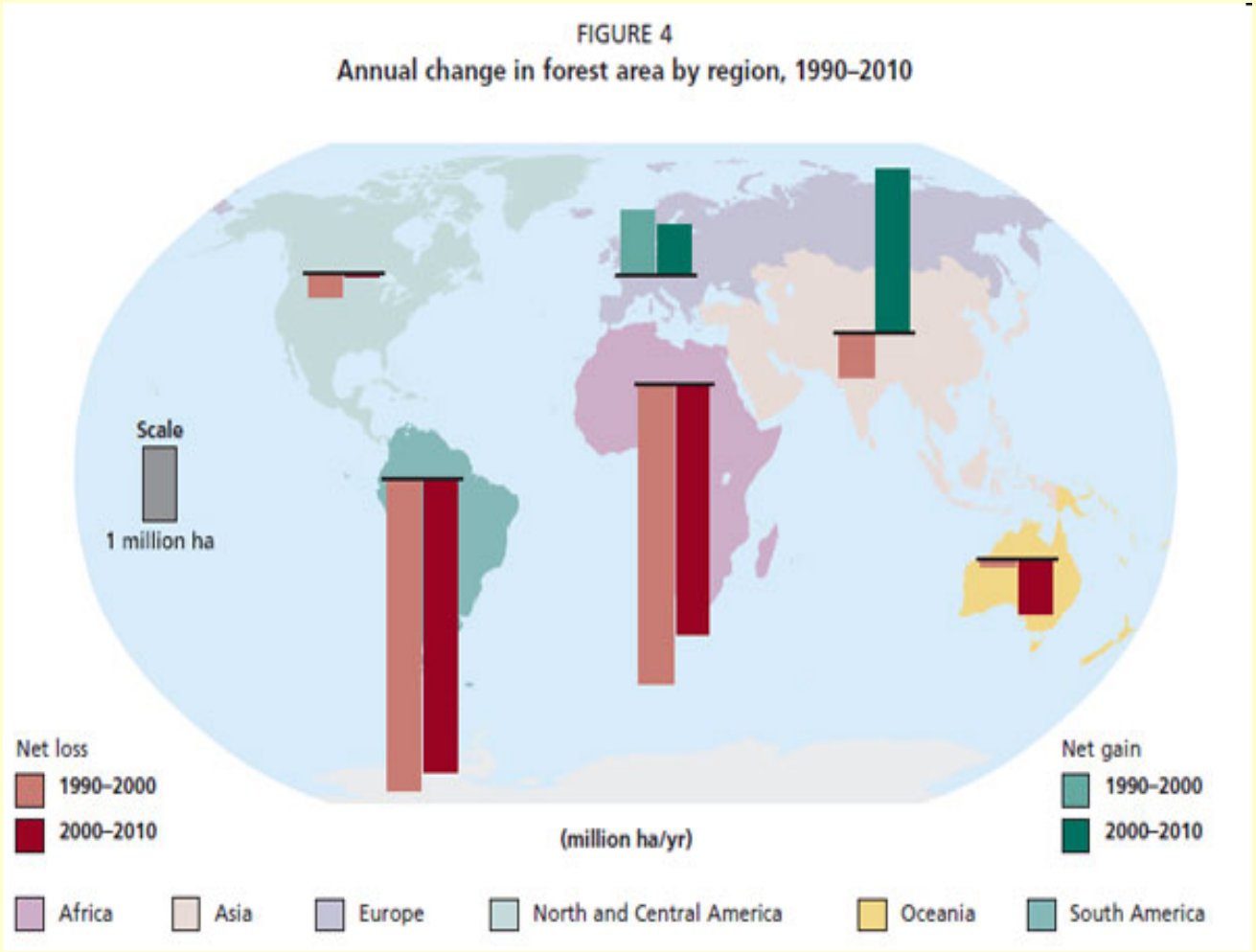


Australia is grouped with New Zealand, PNG and Pacific Island for global reporting (Oceania)

Source: FAO



Productive capacity: Global trends in forest area



- *United Nations FAO data show forest cover declining substantially in Africa and South America post 1990*
- *Forest cover in Oceania also shown as declining*
- *Broadscale land clearing ceased in the 1970s in WA and in 1990s in QLD*
- *Hardwood plantation area in Australia has increased by 1 M ha since 1990*
- *Issues for Australia:*
  - grouped with PNG and Pacific islands
  - cover of semi-arid forest reduced by decadal drought

Ecosystem health and vitality

Gum leaf skeletoniser, Manjimup Feb 2010

- Impacted by:
  Disease
  Pest insects and animals
  Drought
  Bushfire
- How can management maintain and enhance resilience of forest ecosystems?

Black Saturday, Victoria, Feb 2009

Ecosystem health and vitality: climate-induced impacts

- ***Case study***
  Mountain Pine Beetle in British Columbia

- *MPB is a native insect*
- *Warmer winters lead to increased beetle populations*
- *Tree death over millions of ha*
- *Impacts on wildlife, timber industry, forest fire activity*
- *Major socio-economic impacts on rural communities in BC*

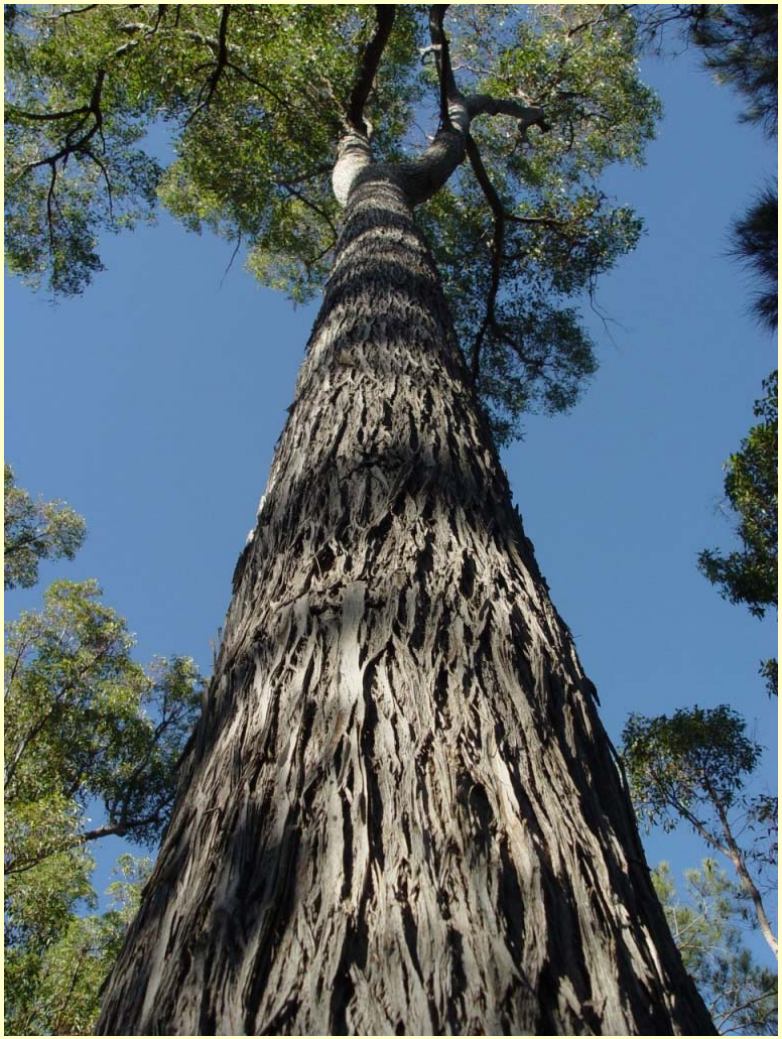
Soil and water

- Forests for catchment protection from:
  salinity
  soil erosion
  sediment & pollutants

- Protection of aquatic and groundwater dependent ecosystems

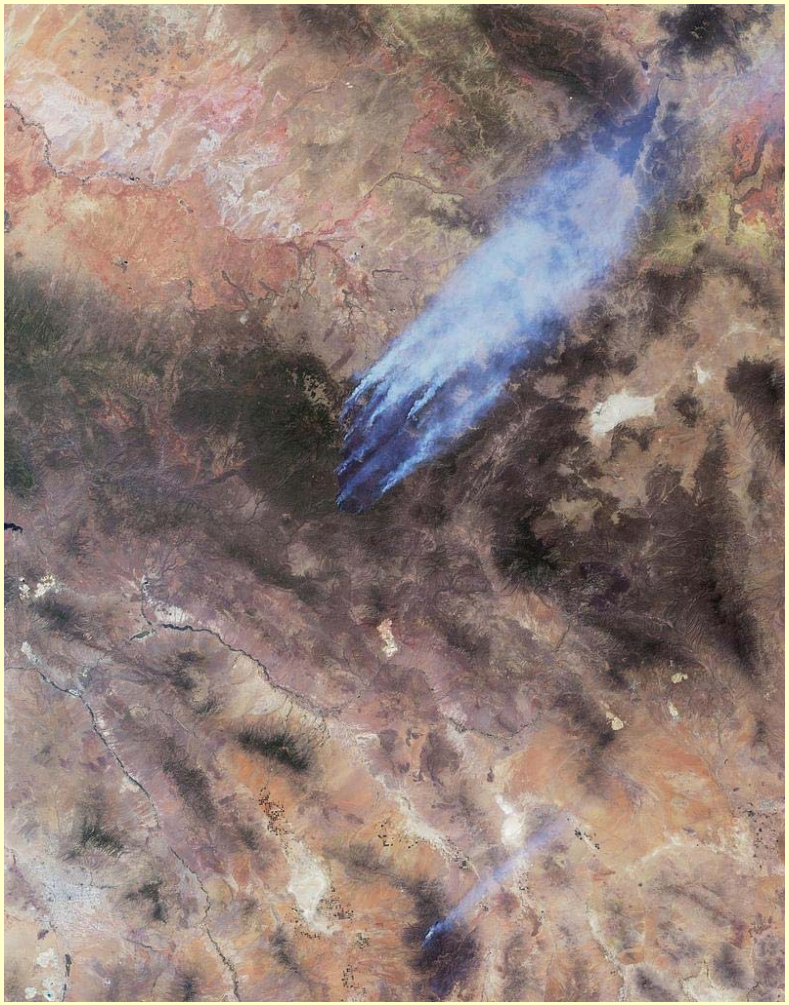
- South-west WA
  - limited fresh surface water
  - Goldfields and Great Southern water supply via pipeline from forest areas
  - high dependency on groundwater, but levels declining due to climate and extraction

Global carbon cycles



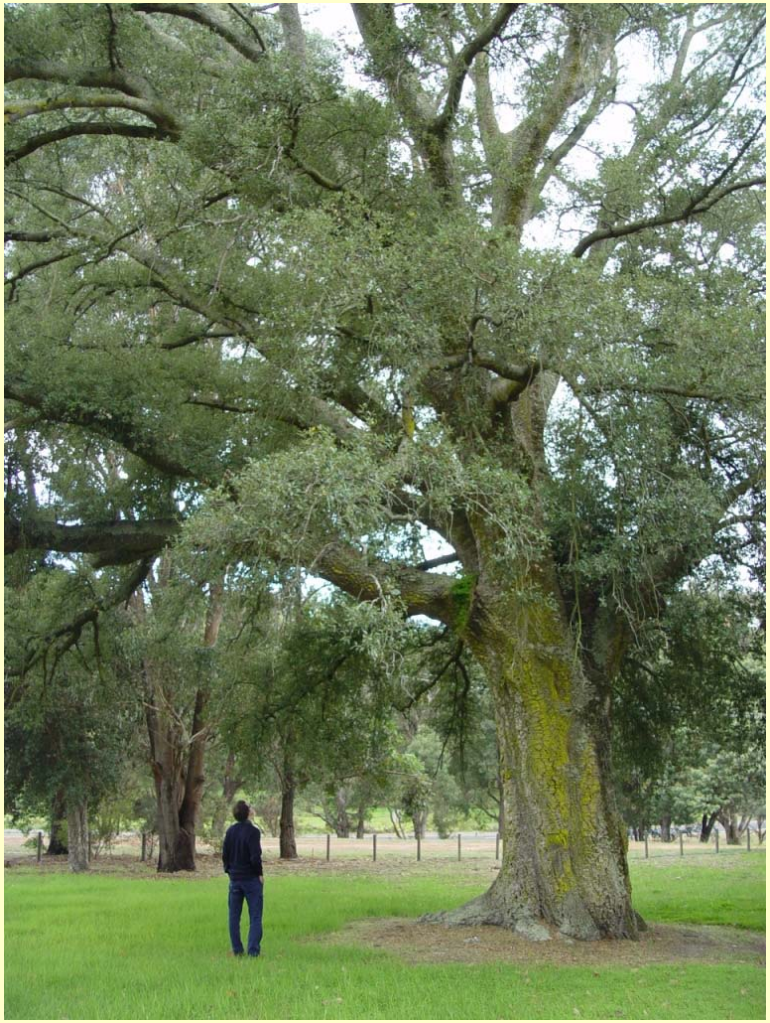
- Photosynthesis removes CO_2 from the atmosphere
- Carbon stored in living vegetation, wood and soil
- Natural forests are long-lived and a very significant stable store of carbon
- New plantations can increase carbon storage

Global carbon cycles



- Carbon stored in forests can be released by fires and land conversion
- Global warming and fire could release huge amounts of carbon stored in boreal forests of Canada and Russia and peat in SE Asia
- Reducing Emissions from Deforestation and Degradation (REDD) developed as a market based incentive for developing nations to retain natural forests

Cultural heritage



- Indigenous & Non-indigenous
- Long period of human occupation in south-west WA
- Archealogical sites often well preserved in forests
- Strong cultural attachments to land

Socio-economic values

- Forest products: wood & non-wood
- Services: recreation, amenity, wellbeing
- Landscape: market-based & intangible
- Extractive industries: minerals, oil & gas
- The Global Economy

Science, society and politics


Manjimup-Bridgetown Times

Axe falls on timber town

Gunns closure ends an era

Shutdown the end of timber industry

SUSTAINABILITY FAILURE


Manjimup-Bridgetown Times

Logging 'cover-up'

- Forests have been an idealogical battleground since the 1970s (jobs versus conservation)
- Key issue in State & Federal elections
- How can science contribute to a debate driven by value systems rather than by data and information?
- Shaping the future:
  - WA's resources 'boom'
  - the carbon economy & bio-energy
  - rural de-population & tree-change
  - climate change

A thought to finish

Many of the older trees in our forests and woodlands became established in the mid 17th century and were already much more than a century old when the first colonists arrived in WA