Australia's National Carbon Accounting System

A Case Study of *Spatially Explicit* National Monitoring

National Carbon Accounting System

Aim: complete accounting and forecasting for human-induced sources and sinks from land-based systems … an optimum response to the UNFCCC and its instruments.

- The Australian Government has invested approximately $4M AUD per year since 1998 to develop a National Carbon Accounting System.

Key issues from the 'Aim'

- *Complete* – all lands, carbon pools gases and activities at all scales
- *Accounting and forecasting* – retrospective and predictive
- *UNFCCC and instruments* – designed specifically for this purpose

Key design decisions

- Spatially explicit, through time-series remote sensing (wall-to-wall)
- Underpinned by a single ‘process’, mass balance, full cycle, C:N, ecosystems model
- Integrated – one model application only for all purposes and scales
- Progressive ‘build’ by policy priority – over several 4 year phases – deforestation 1st

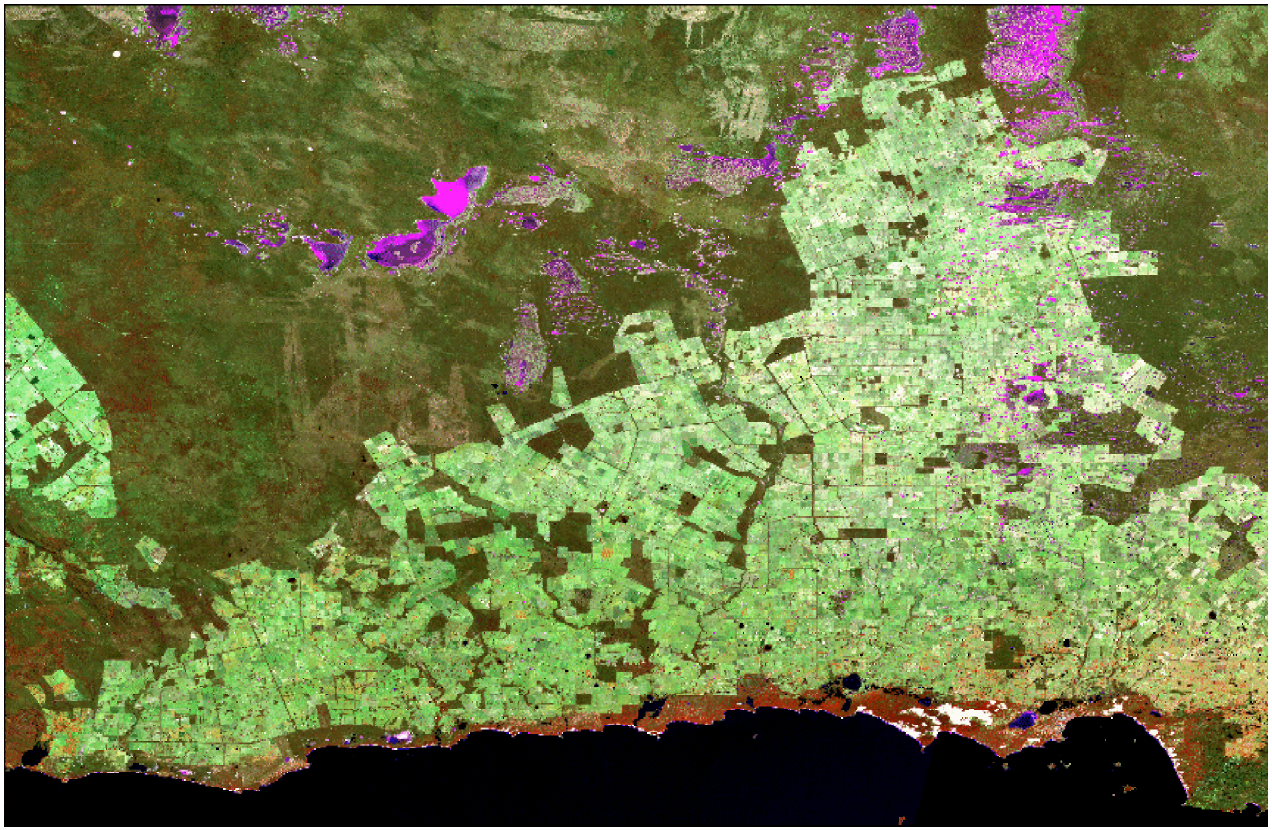
Key features of implementation

- Informs and monitors policy formulation and implementation, does not attempt to ‘make’ policy
- Transparent - publication and availability of data, tools and results
- Scientifically validated – QA, QC, CIVP and peer review
- A research adopter, not researcher
- Outsourced – private sector, institutions, governments
- Any secondary benefits not to compromise primary goals

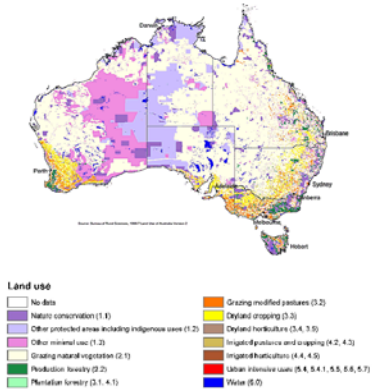
Land Representation

- Land cover change (wall-to-wall national time series of remote sensing at 25m)
- Bio-physical inventory mapping, e.g., soil
- Climate – surfaces developed from weather station data
- Land use and management from remote sensing and survey

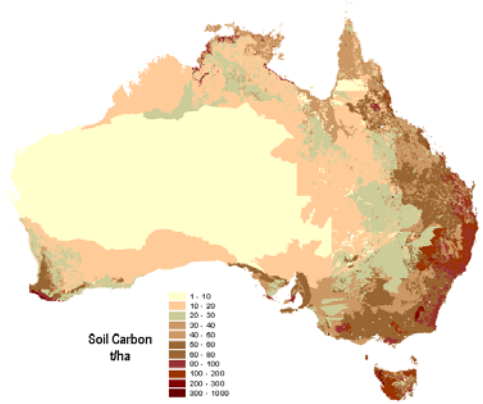
Deforestation over time



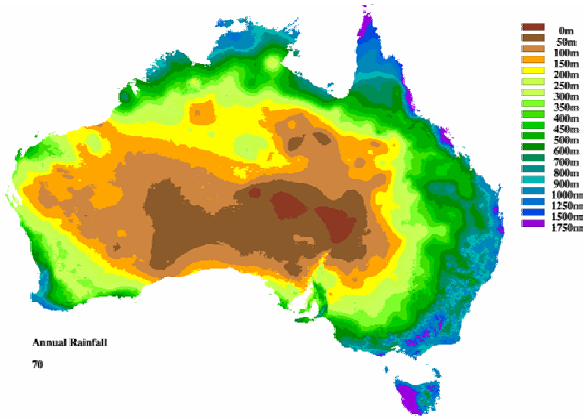
Deforestation over 30 years in 14 ‘snapshots’ for an area of about 20 million hectares



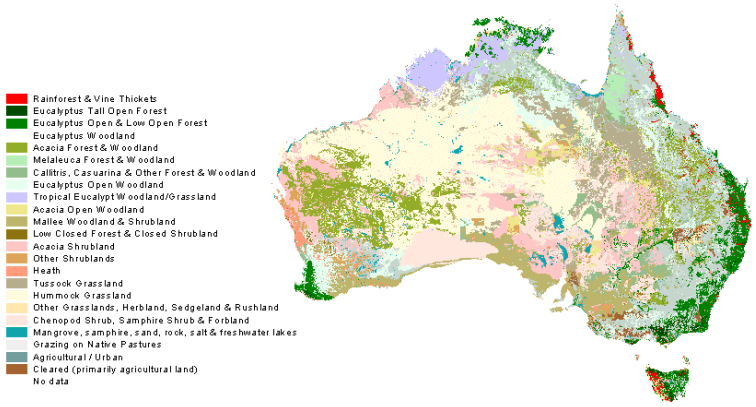
Land use



Soil



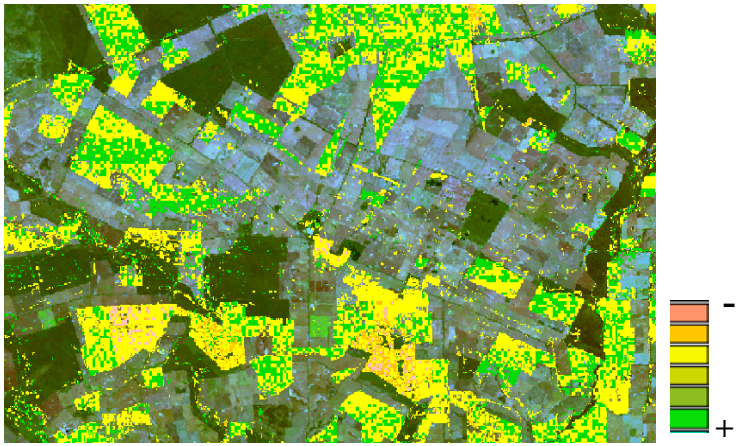
Climate



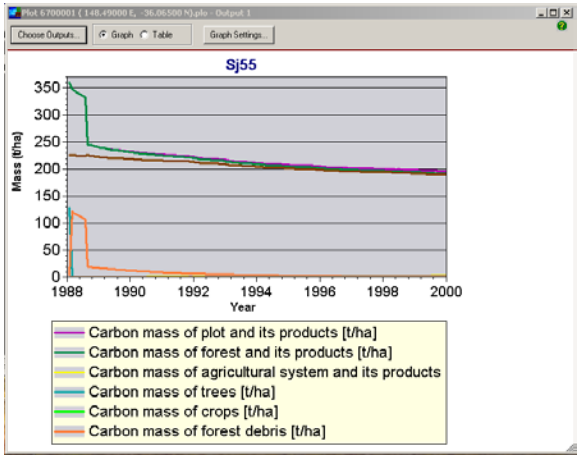
Vegetation

Emissions estimation

- Spatial by grid analysis using model
- Project by wizard to project results



Across a landscape/country



For a project

Benefits

- a single system reconciles ‘project’ and ‘national’ accounts
- removes potential for sampling uncertainty in monitoring of land use change
- predictive and spatially explicit to assess possible consequence of particular actions
- transparent and verifiable at all scales

Wider Implementation

- Aust. has a large land area and relatively small population – remote sensing is a cost effective solution
- Monitoring has become easier with new technologies and instruments
- Costs are reducing – for Aust. ~$750,000 per national update
- National time-series monitoring is widely achievable