



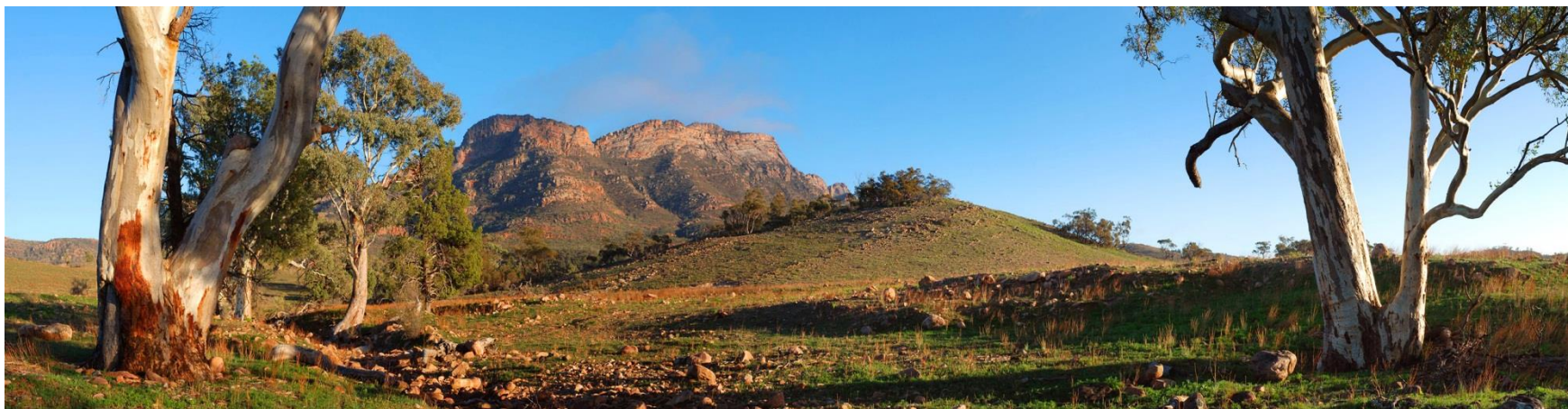
Australian Government
Geoscience Australia



The Importance of National Scale Geological Map Data for Land Use Assessment in Australia

Ollie Raymond

Continental Geology Section, Geoscience Australia



Australia has a problem...

Coal Seam Gas

(a.k.a. CSG, Coal Seam Methane, Coal Bed Methane)

- It is a geological problem and an environmental problem...
- ... but mostly it is a political and social problem.

Australia has a problem...

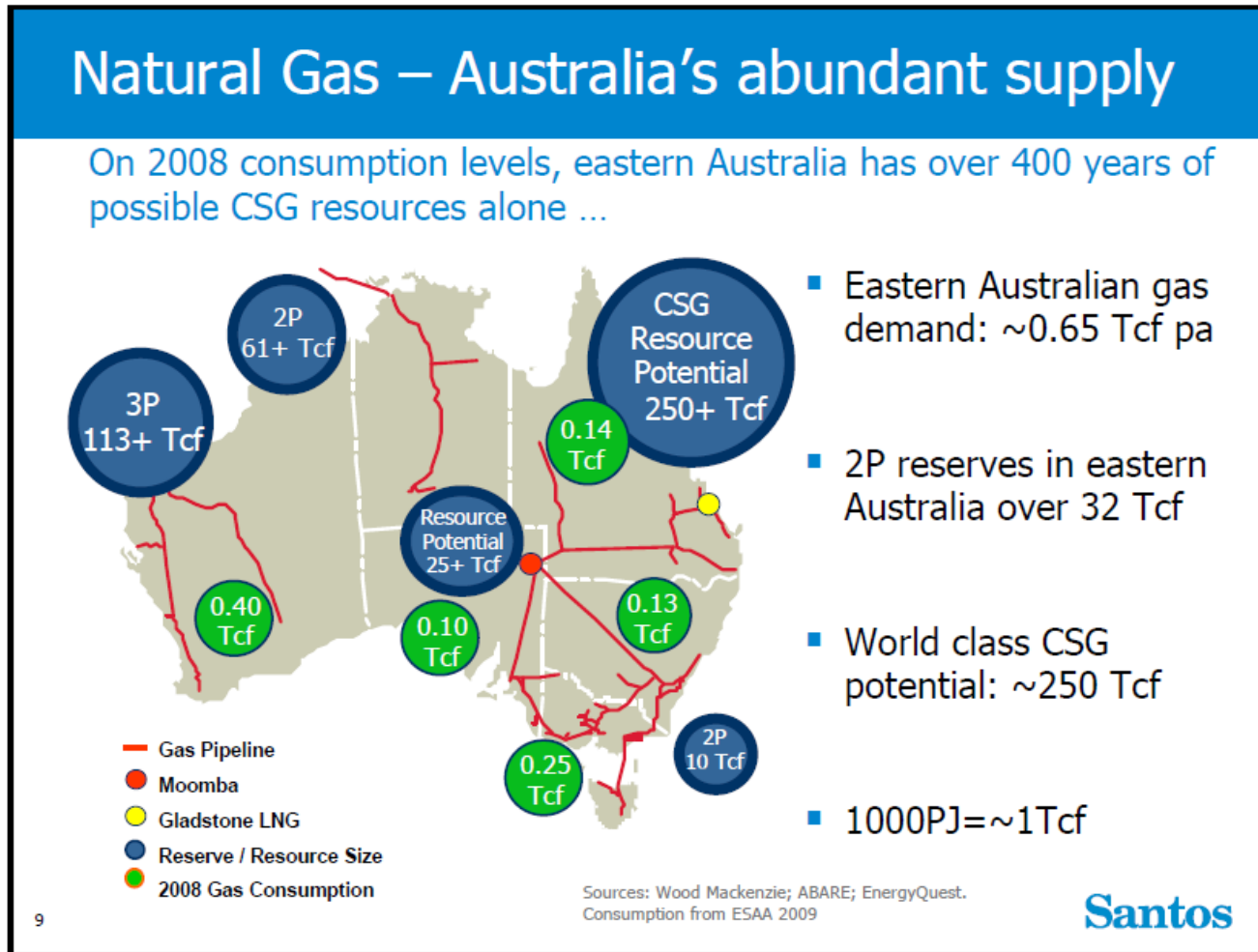
- Coal Seam Gas has received such bad press that some politicians are spooked by even the mention of “CSG”

“A leaked briefing note prepared for NSW energy and resources minister ... recommends the phrase and its acronym CSG be replaced with the standard term “natural gas from coal seams” ”.

- Sydney Morning Herald, 16 Sept 2013

Why all the fuss?

- Australia has huge reserves of Coal Seam Gas



David Knox, 2009
CEO, Santos Ltd

CSG resources

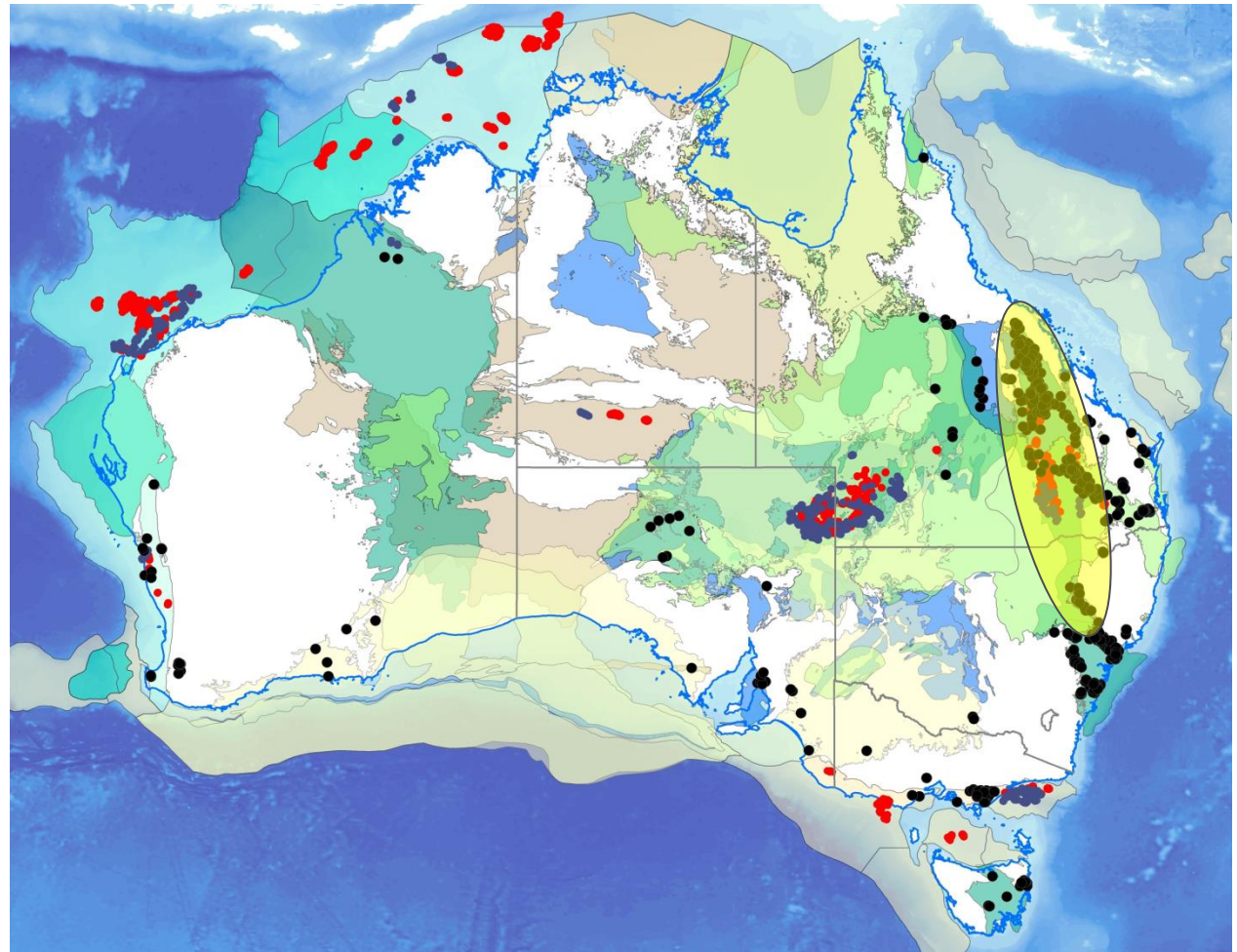
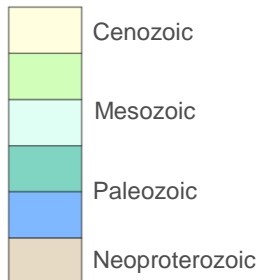
- Coal-bearing basins and strata which were previously discarded by the mining industry as too deeply buried or too low-grade to mine for coal are now prospective for CSG
- Most states and territories of Australia contain coal- and coal seam gas-bearing basins
 - most significantly in the eastern, fertile, and populous states of Queensland, New South Wales and Victoria

- Australia's largest CSG reserves are in the Late Paleozoic to Mesozoic sediments of the Bowen and Surat Basins of Queensland and New South Wales

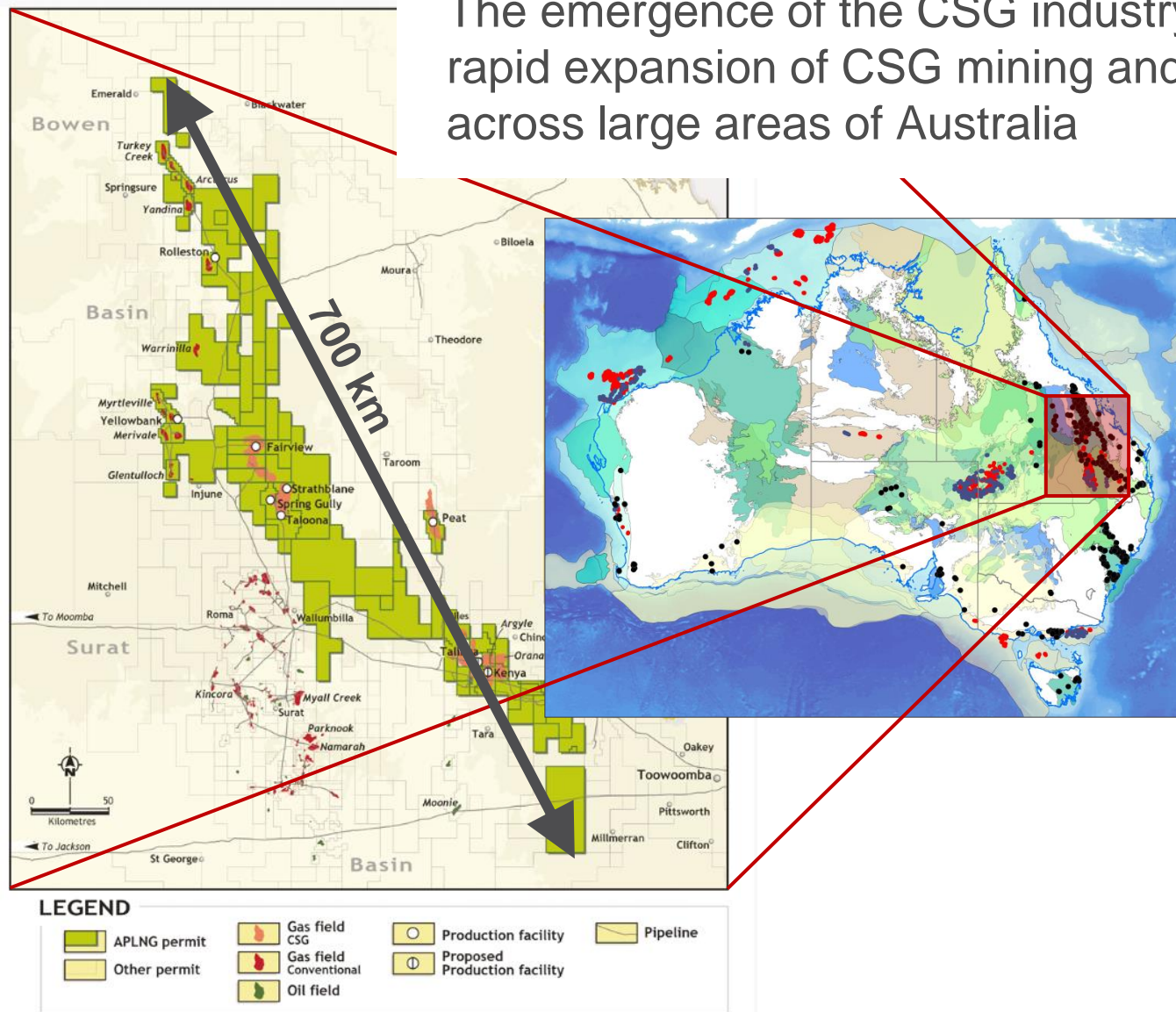
Conventional energy resources

- Coal
- Oil
- Gas

Selected sedimentary basins



The emergence of the CSG industry has seen rapid expansion of CSG mining and exploration across large areas of Australia



Source: Australia Pacific LNG, 17 Oct 2013

The problem for government

- Australian governments were caught off guard by the rapid expansion of CSG exploration and mining
- A consistent environmental and mining regulatory framework was lacking
 - a national issue, but with a mixed State and Federal regulatory framework for mining and environmental controls
- Politically, governments had to react quickly to the mobilisation of farmers, environmental groups and regional populations, particularly after adverse media reports from USA
 - eg, NSW government moratorium on CSG developments near residential areas

Farmers' action groups

One example, the “Lock The Gate” Alliance, has 173 member associations of farmers across Australia, dedicated to denying mining and exploration companies access to land



<http://www.lockthegate.org.au/>

Emotions run high



Daniel Munoz/Reuters

Coal Seam Gas is the greatest threat to land, life and well being Australia has ever experienced.



Dr Chris James

- “writer, researcher, critical theorist & transpersonal psychotherapist”
- 2012 presentation to “Lock The Gate Gippsland”

The media stories are contrasting...

CSG industry



Source: Australia Pacific LNG, 17 Oct 2013



Source: NSW Government, 17 Oct 2013

Government

Contrasting media stories



Singleton Argus, 15 October 2013

Local and national
news agencies

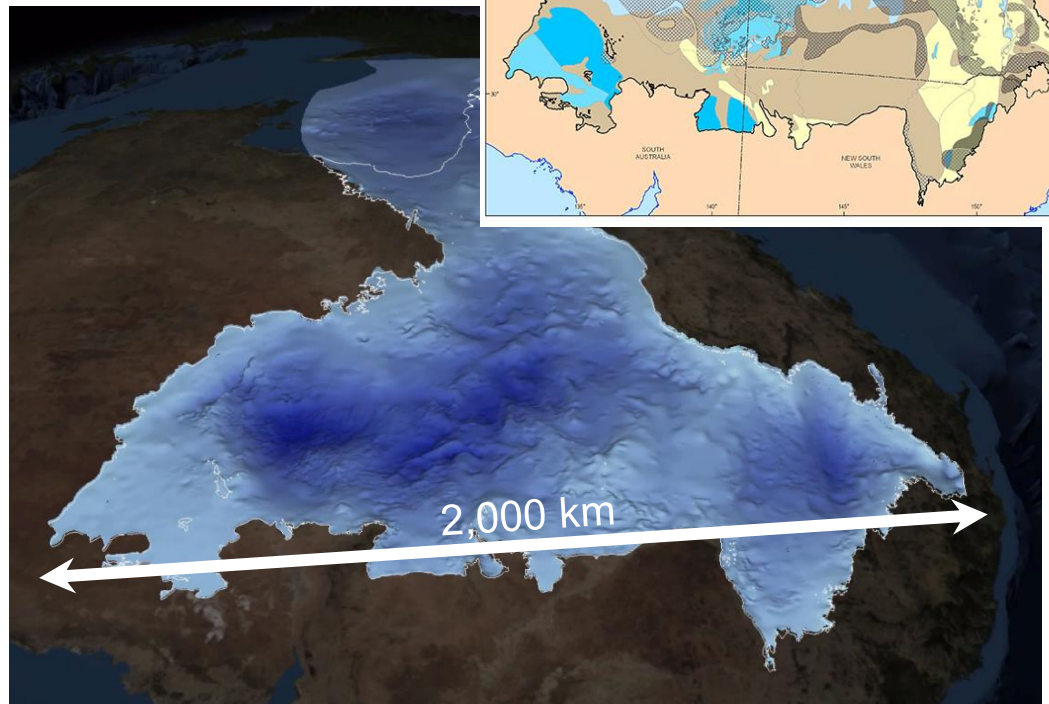


AAP, Australian Broadcasting Commission, 24 April 2013

The groundwater issue

Great Artesian Basin

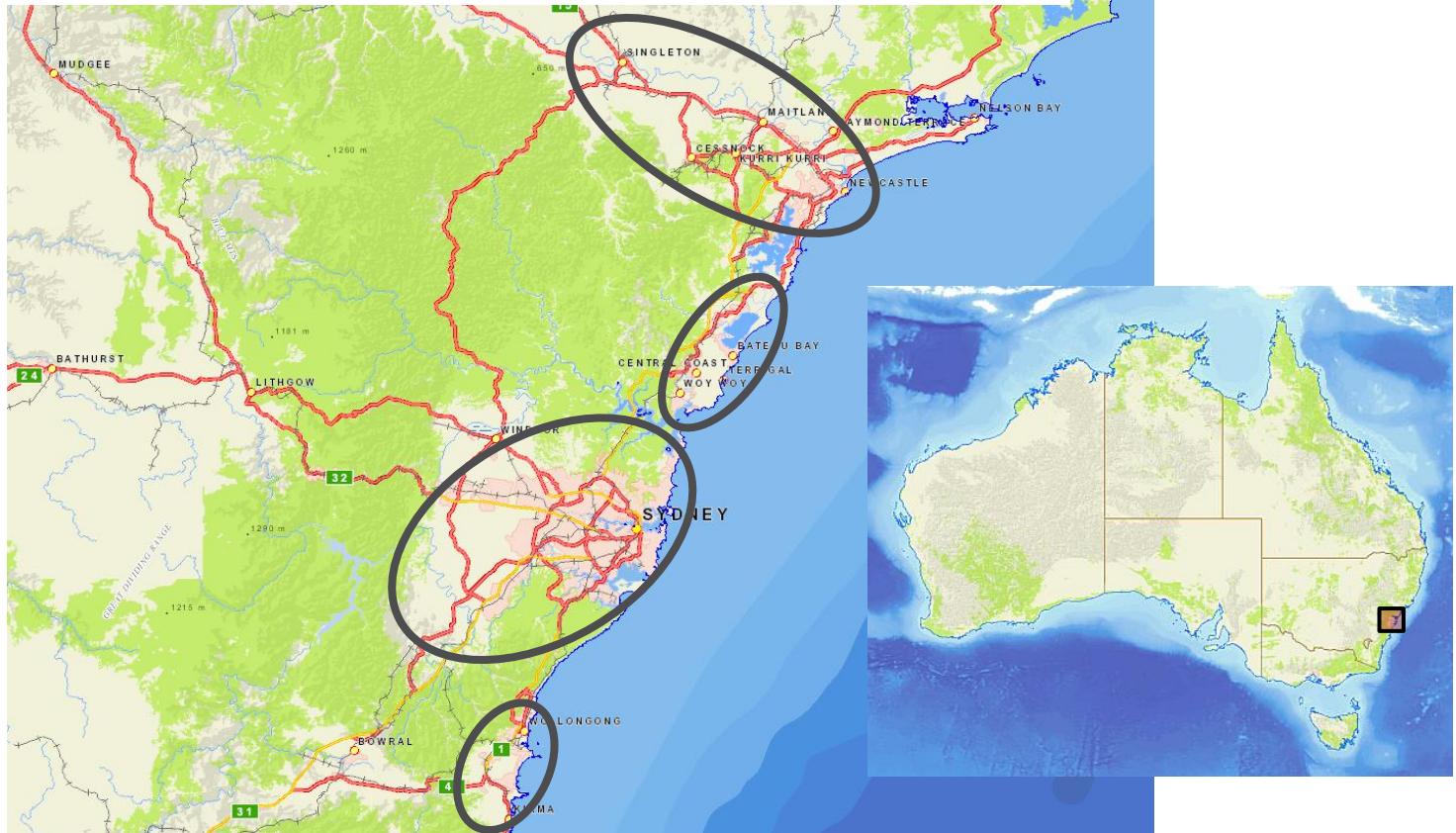
- a vast Mesozoic to Cenozoic superbasin with several component basins and depocentres
- network of aquifers which support agriculture and population of inland Australia
- contains significant coal-bearing strata
- potential for interaction of CSG mining activity and groundwater resources
- extends across four State and Territory jurisdictions
 - a regulatory nightmare



A case study in competing interests - Sydney Basin

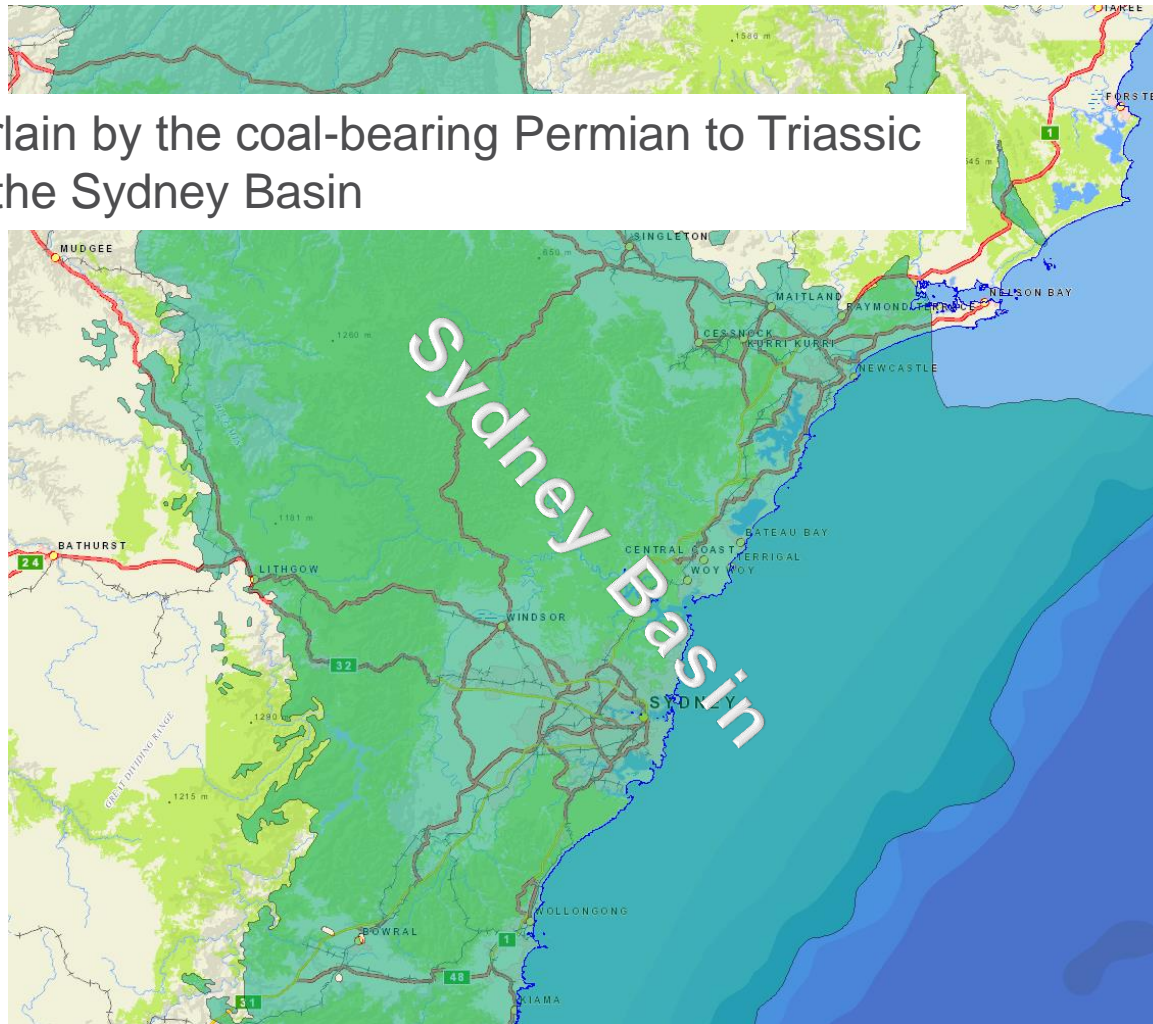


Several of Australia's largest cities and regional populations...



A case study in competing interests - Sydney Basin

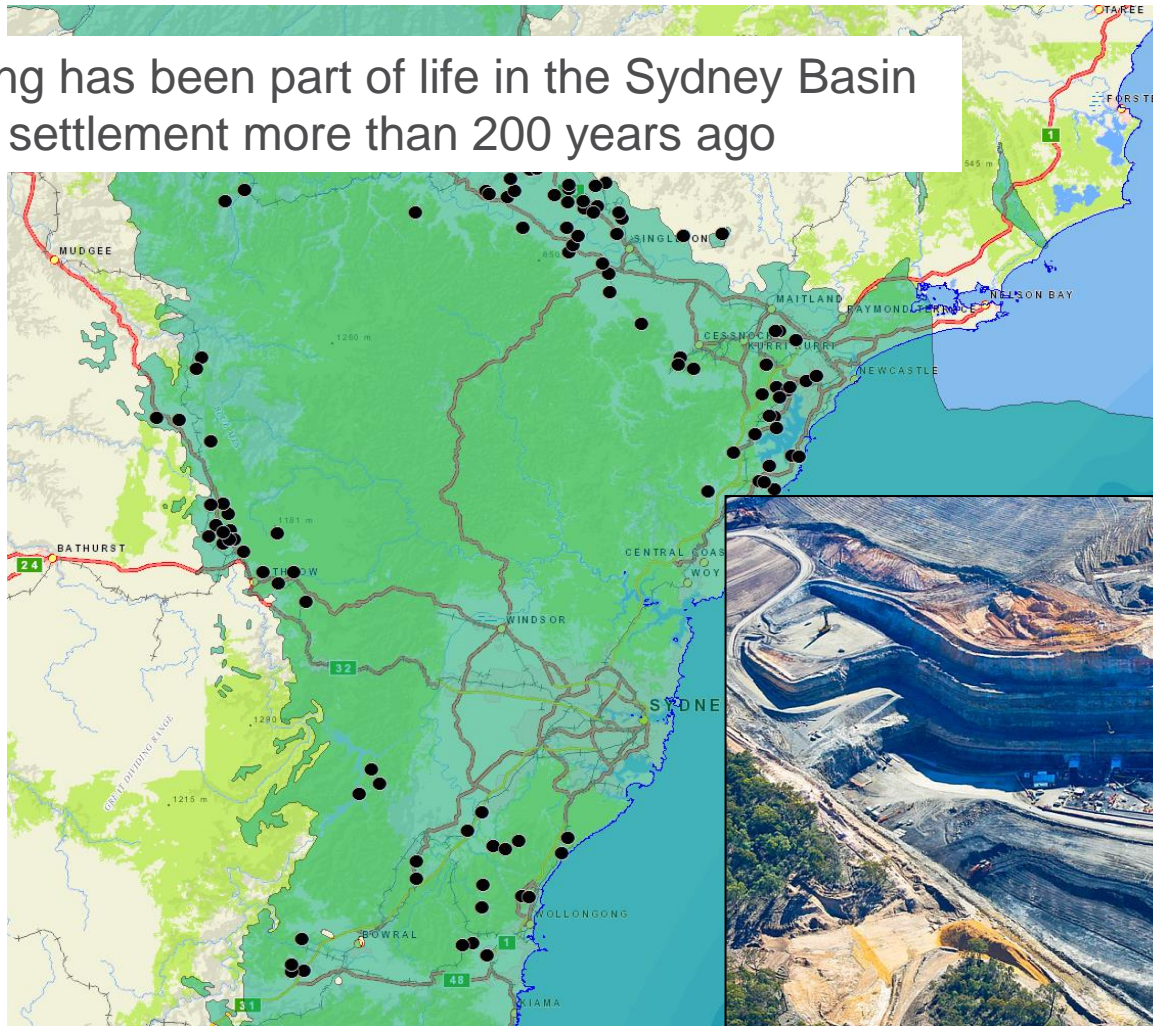
... are underlain by the coal-bearing Permian to Triassic strata of the Sydney Basin



A case study in competing interests - Sydney Basin

Coal mining has been part of life in the Sydney Basin since first settlement more than 200 years ago

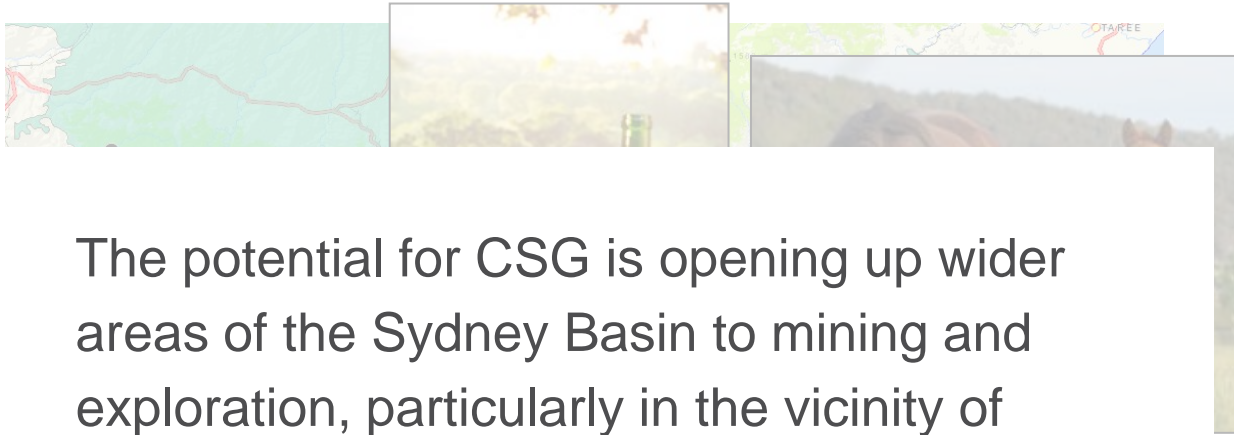
● Coal mines



A case study in competing interests - Sydney Basin



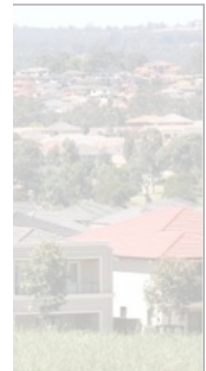
A case study in competing interests - Sydney Basin



The potential for CSG is opening up wider areas of the Sydney Basin to mining and exploration, particularly in the vicinity of existing coal mines.

The clash of interest groups is inevitable.

A proactive and evidence-based government regulatory framework is needed quickly.

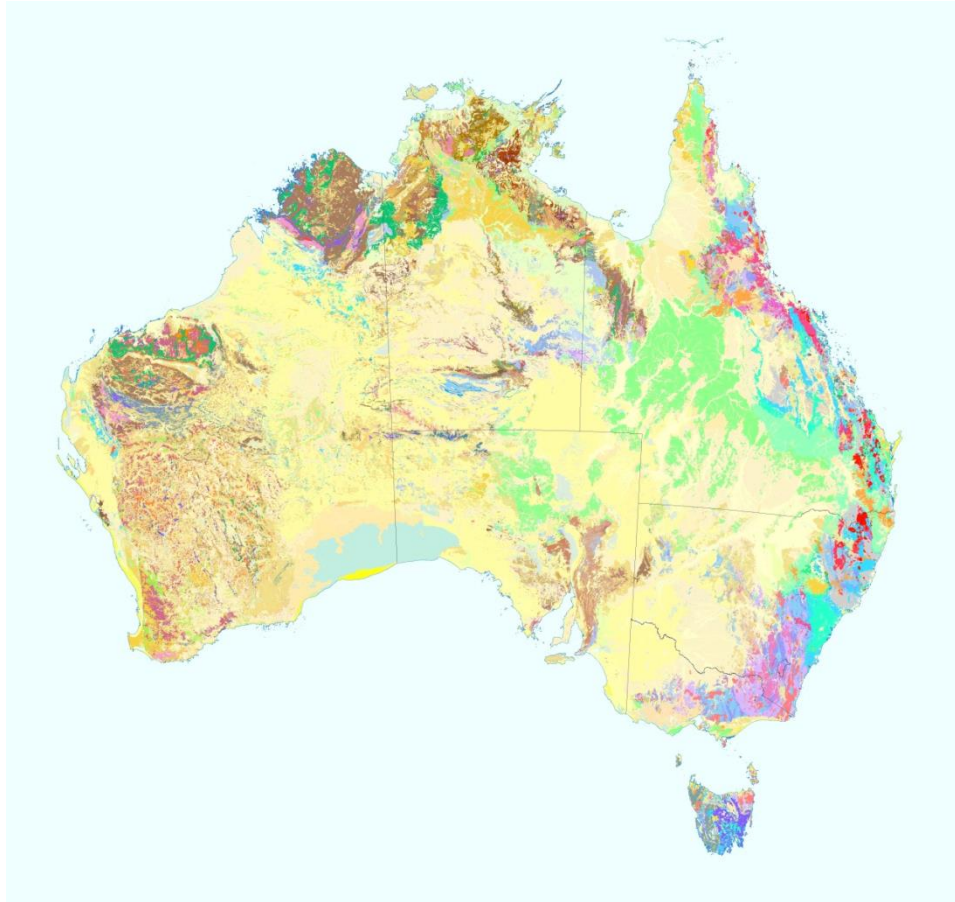


Government response

- State and Federal governments struggled to quickly identify the full spatial extent of potential land use conflicts in the emerging CSG sector
- The Federal government, in cooperation with the States, began a program of regional natural resource assessments to identify areas of CSG potential, and to inform evidence-based CSG policy development
 - involving government agencies for water, environment, and geoscience research
- But little *nationally consistent* spatial geological data existed that could be used to inform investigation across the whole continent

National geological spatial data

- Geoscience Australia had a national surface geology dataset, but no national subsurface data



Surface Geology of Australia
1:1M scale, 2012 edition

- available for download from the Geoscience Australia website
- and web map service (WMS)

Australian Geological Provinces dataset


- A nationally compiled, harmonised geological provinces dataset was started at Geoscience Australia in 2001
 - sedimentary basins, cratons, orogens, igneous, etc
 - full extent outlines, interpreted under younger cover
 - detailed province descriptions, including age, related events, contained stratigraphic units, relations to other provinces, mineral resources, and source references
- But there was little perceived priority for the dataset and few resources were assigned to complete the data in the ensuing decade, apart from offshore sedimentary basins

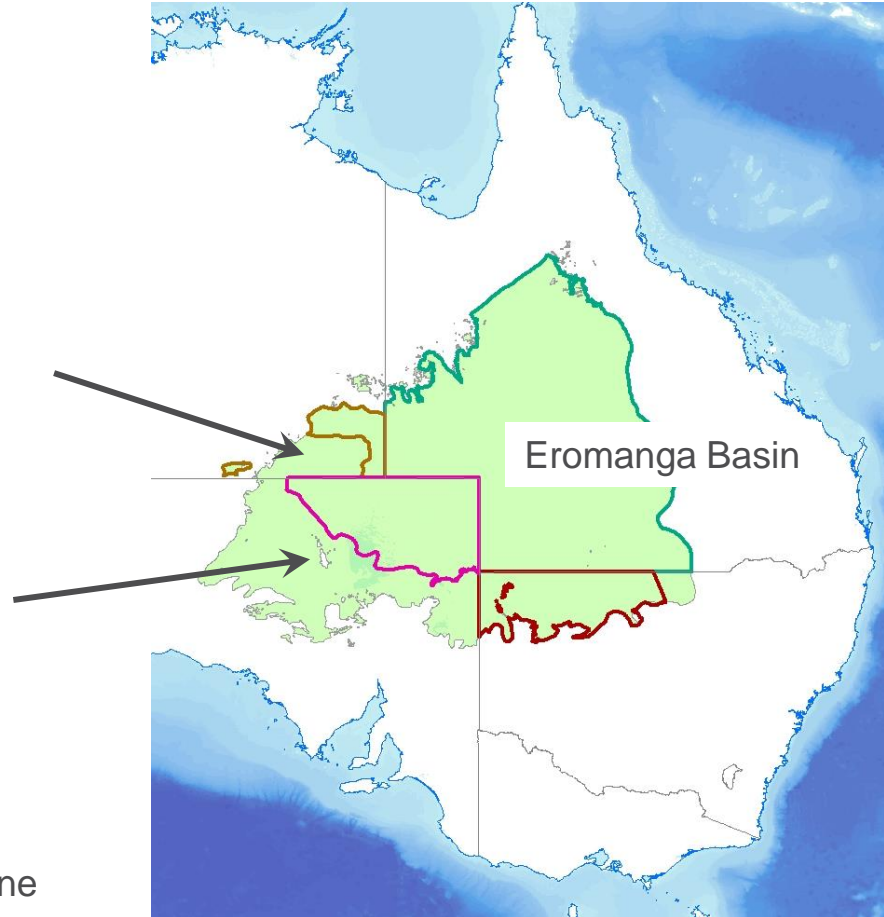
A missed opportunity

- The result was that when the Federal Government's CSG resource assessment program was begun, Australia did not have a current, consistent, or complete spatial dataset of its onshore sedimentary basins to support public policy development

The value of national geological spatial data

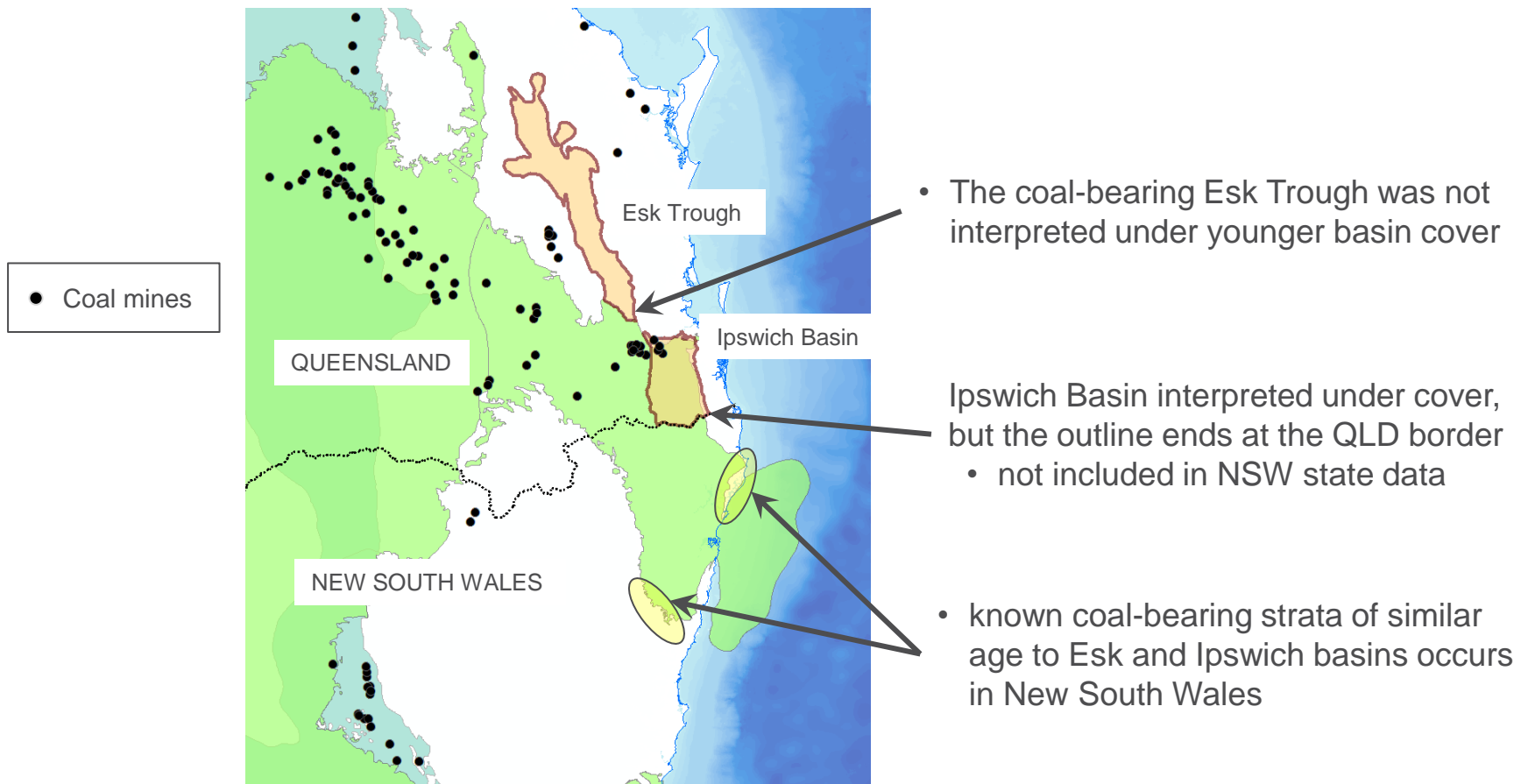
- State government geological data typically stops at state borders
 - but the coal-bearing basins do not
 - some States did not interpret under younger cover
 - some States had different stratigraphic definitions of a province

 national dataset outline



The value of national geological spatial data

- Spatial data for the subsurface extents of basins and coal-bearing strata were inconsistent or non-existent in adjacent States



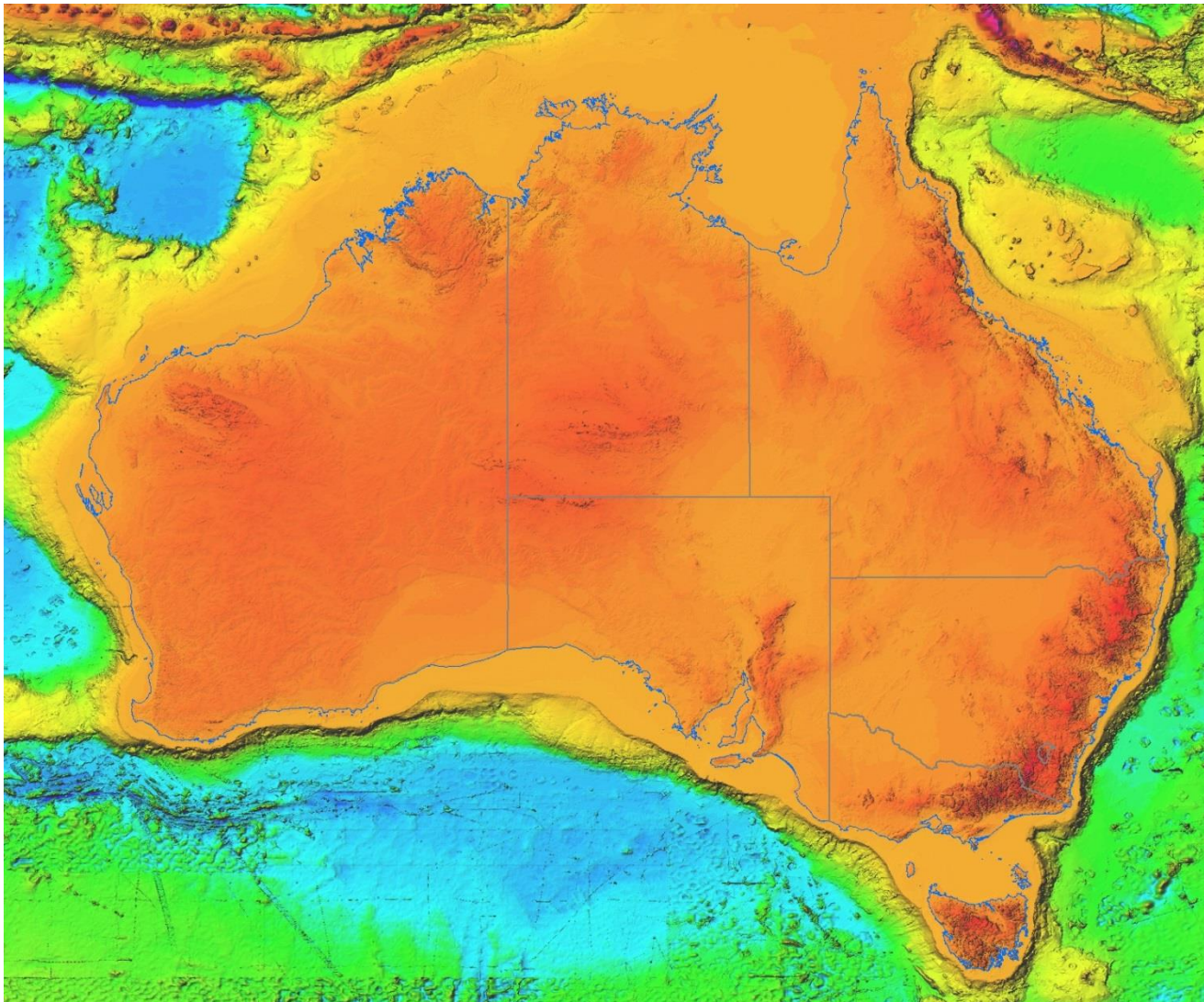
Size doesn't matter

- Need a national coverage?
- Tempted to map only the larger basins to quickly cover the continent?
- No time or money to be concerned with smaller basins?

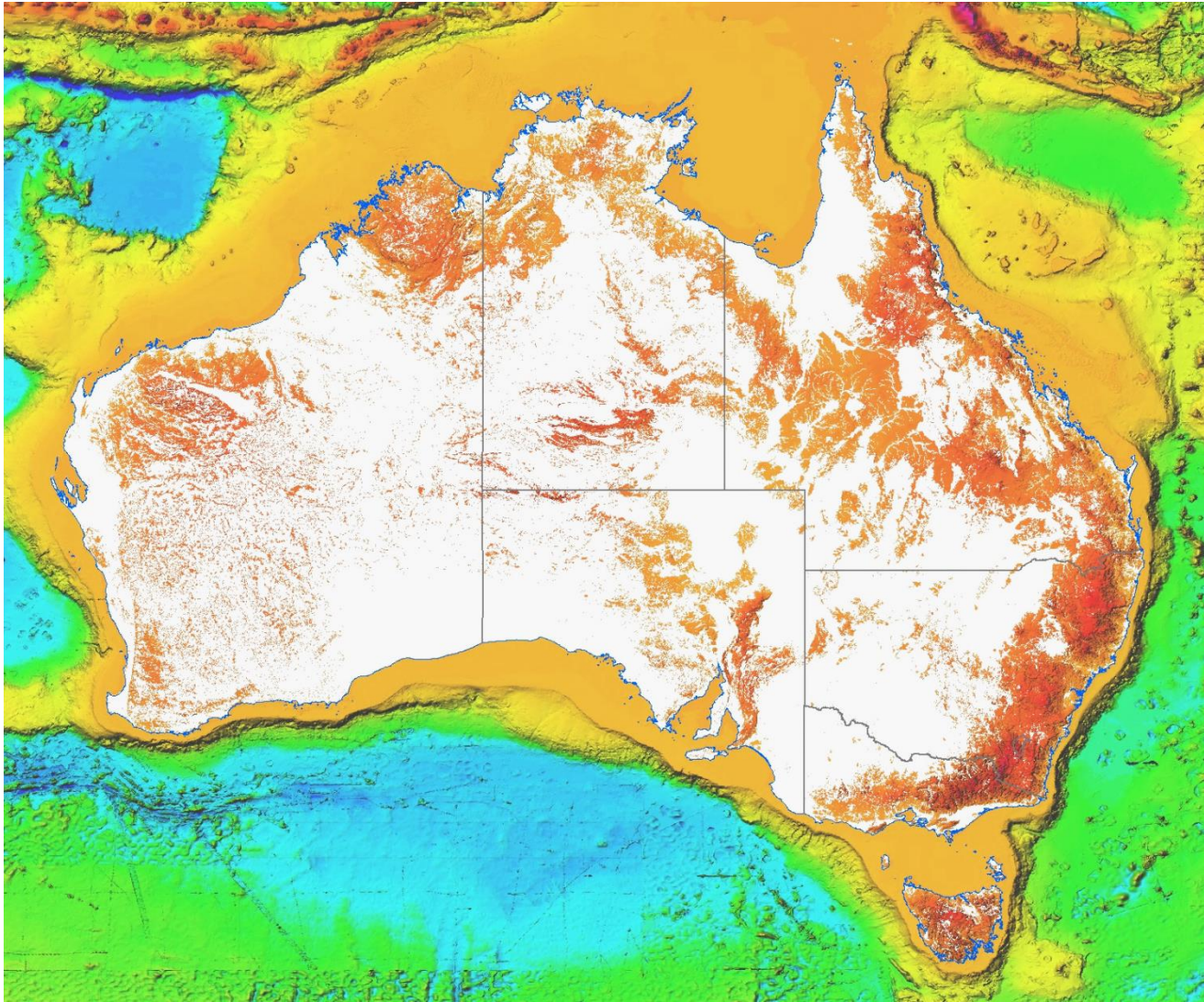
Gloucester Basin

- only ~10 x 50 km
- coal-bearing outlier of the Sydney Basin with CSG potential
- prime agricultural land
- horse studs and wealthy land owners with political clout
- Highly politicised geology

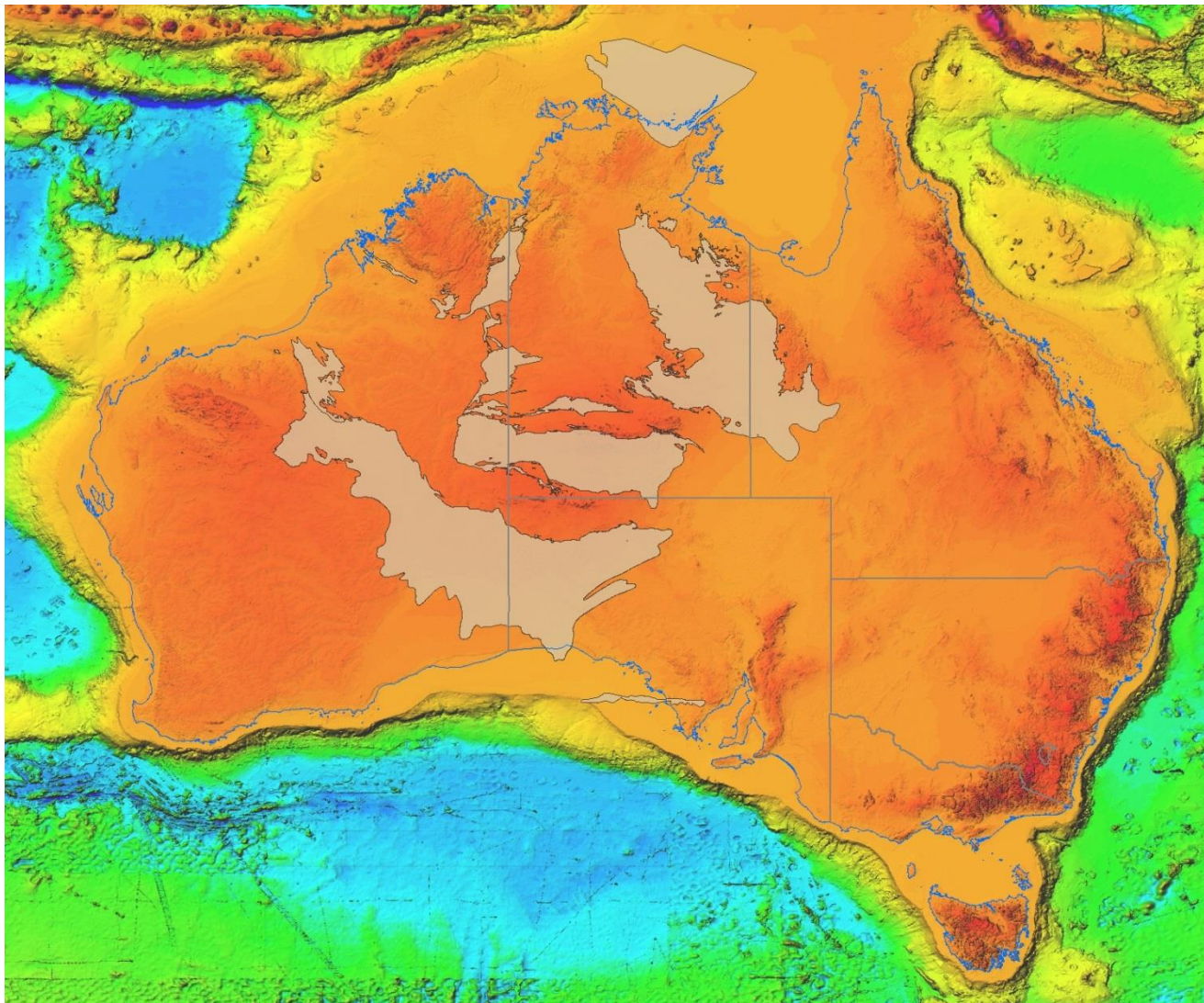




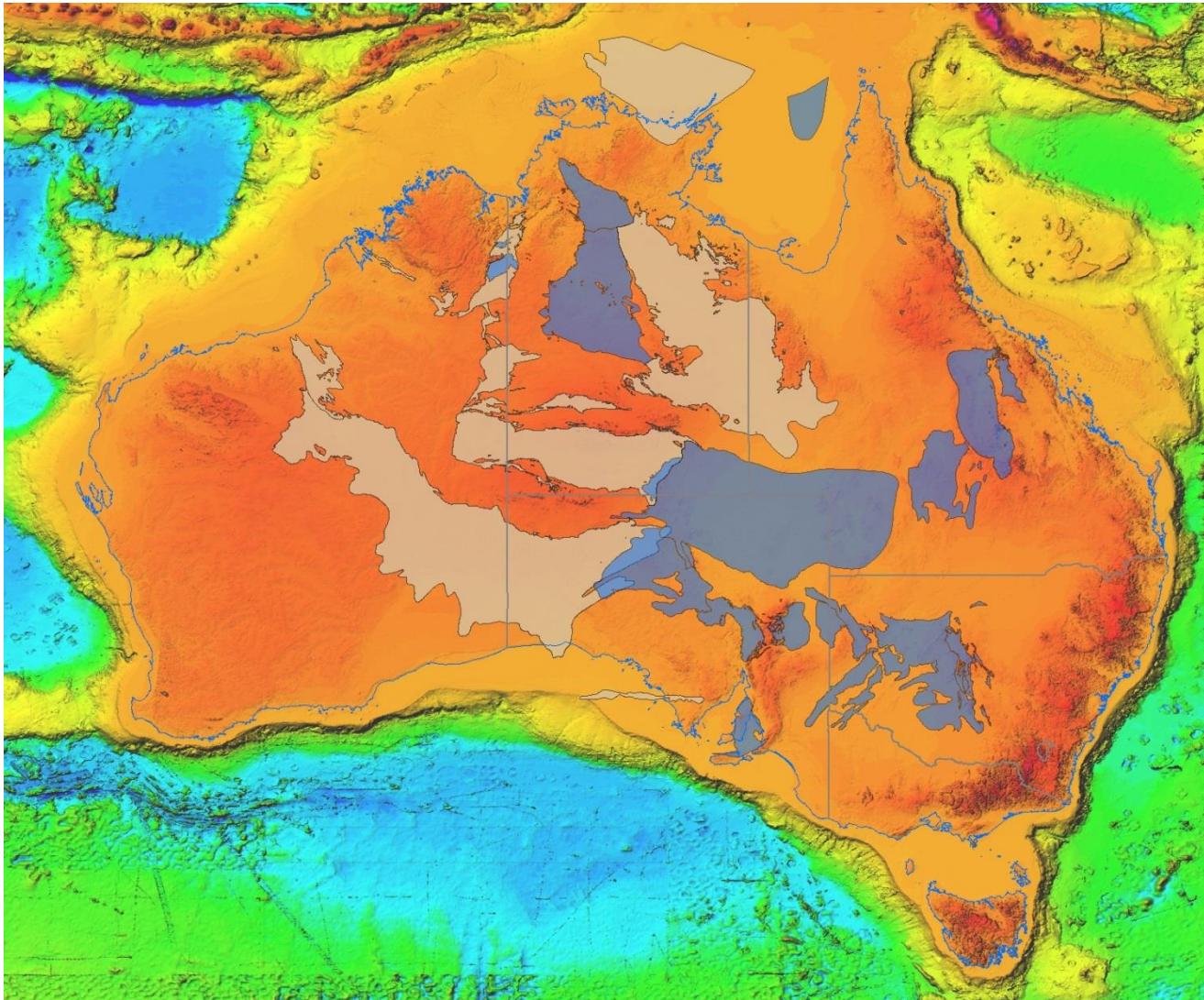
A short tour of the Australian Geological Provinces dataset...



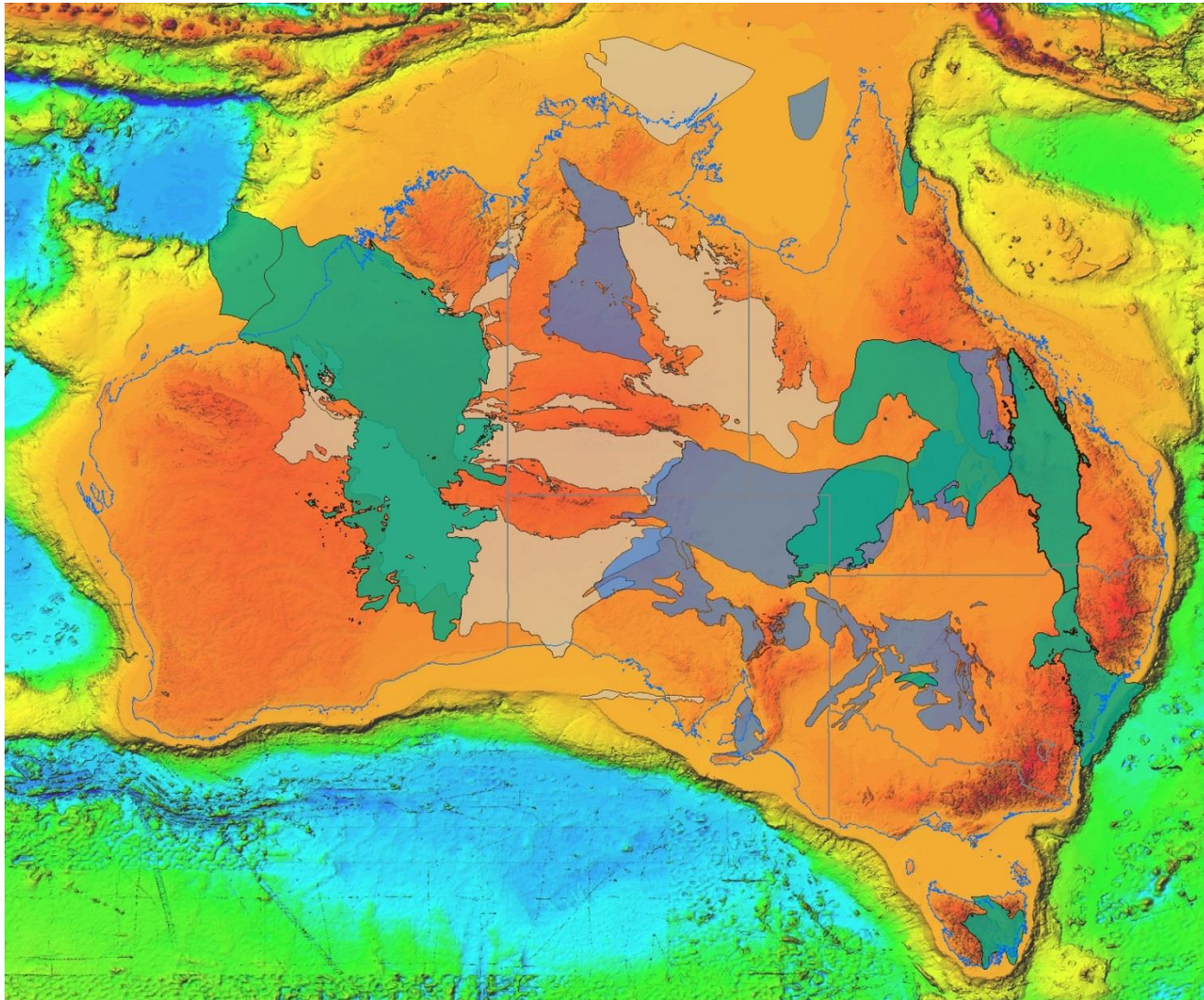
The surface of Australia is 90% covered in poorly consolidated regolith



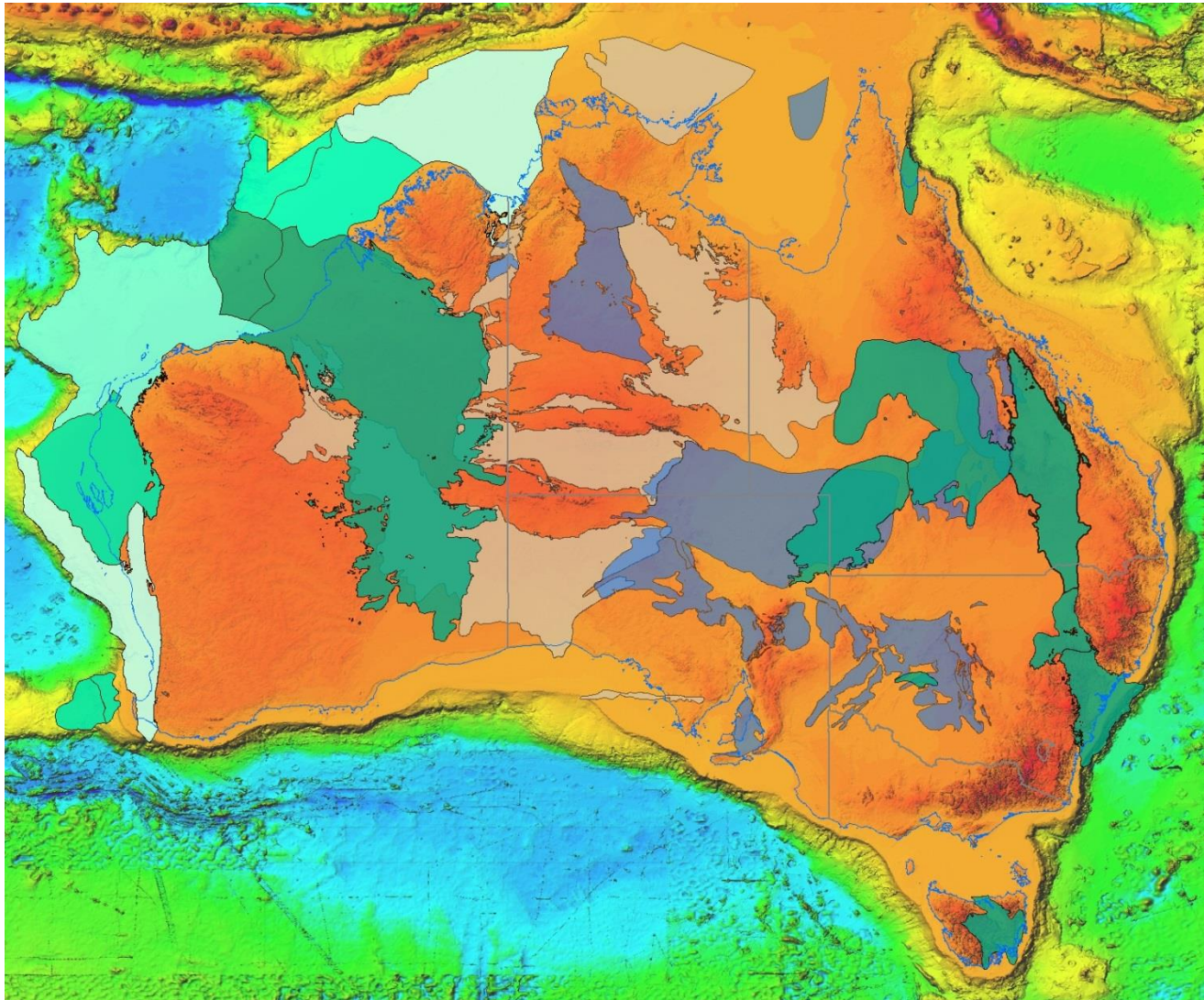
Neoproterozoic-Paleozoic sedimentary basins



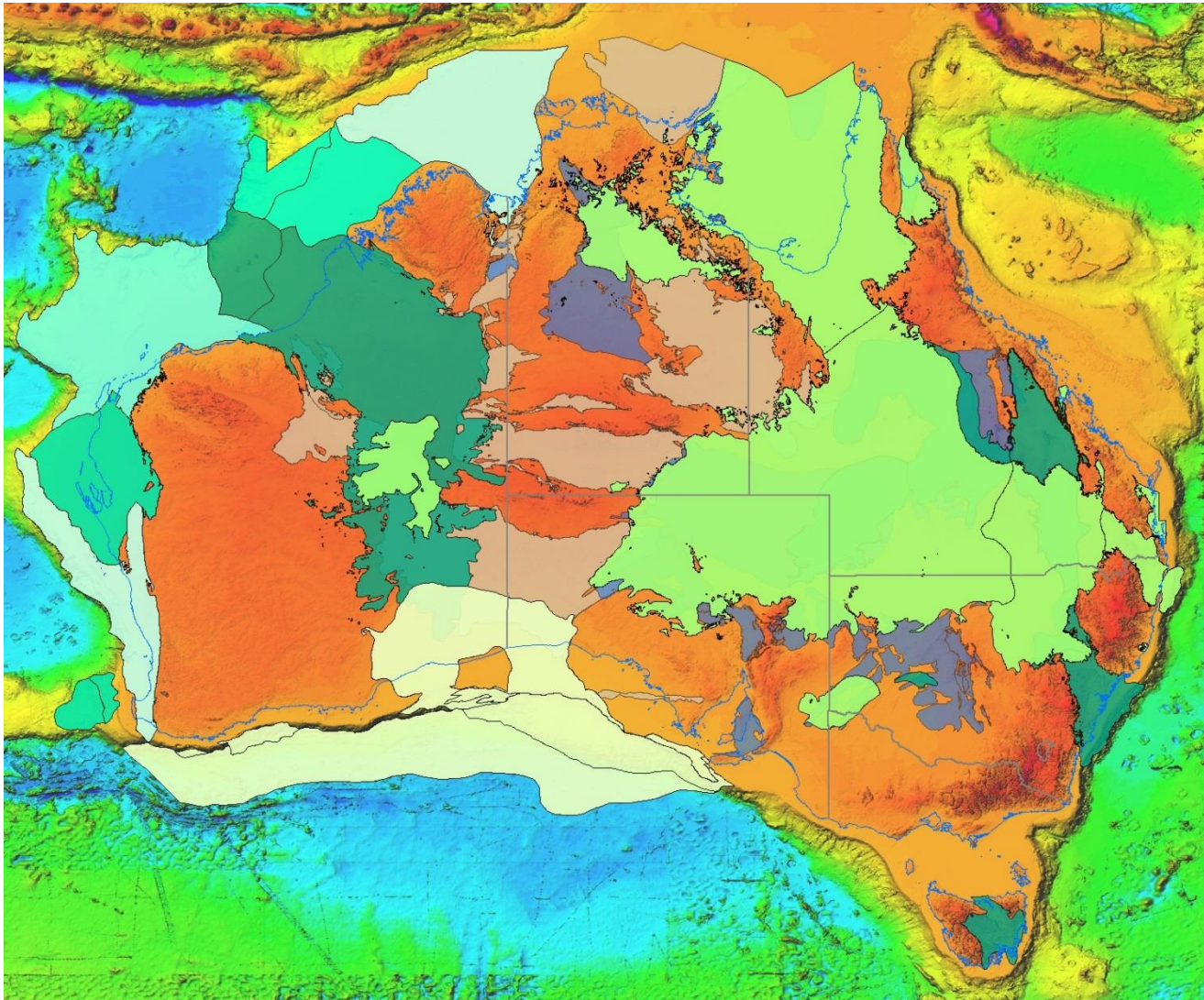
Early Paleozoic sedimentary basins



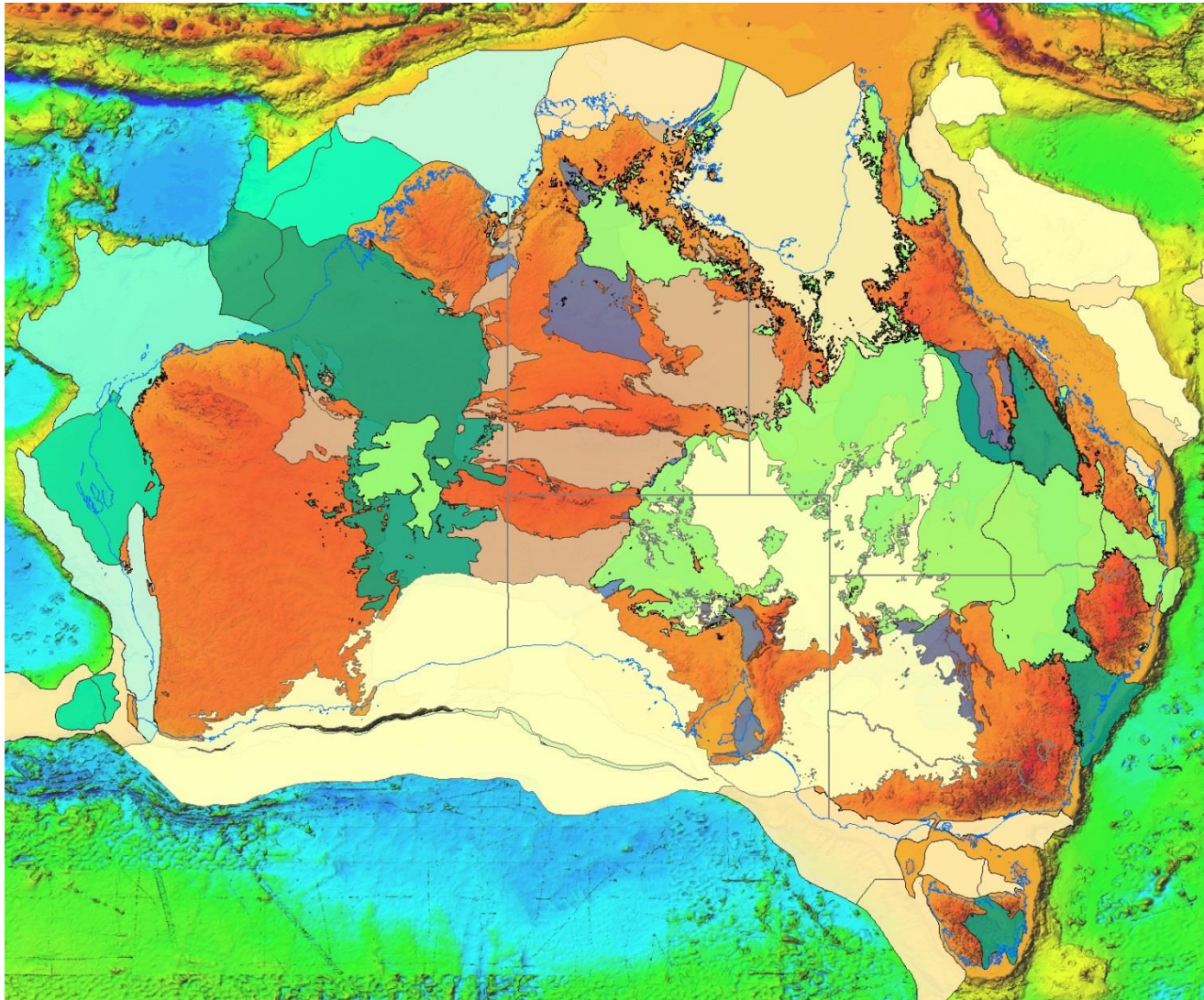
Late Paleozoic-Mesozoic sedimentary basins



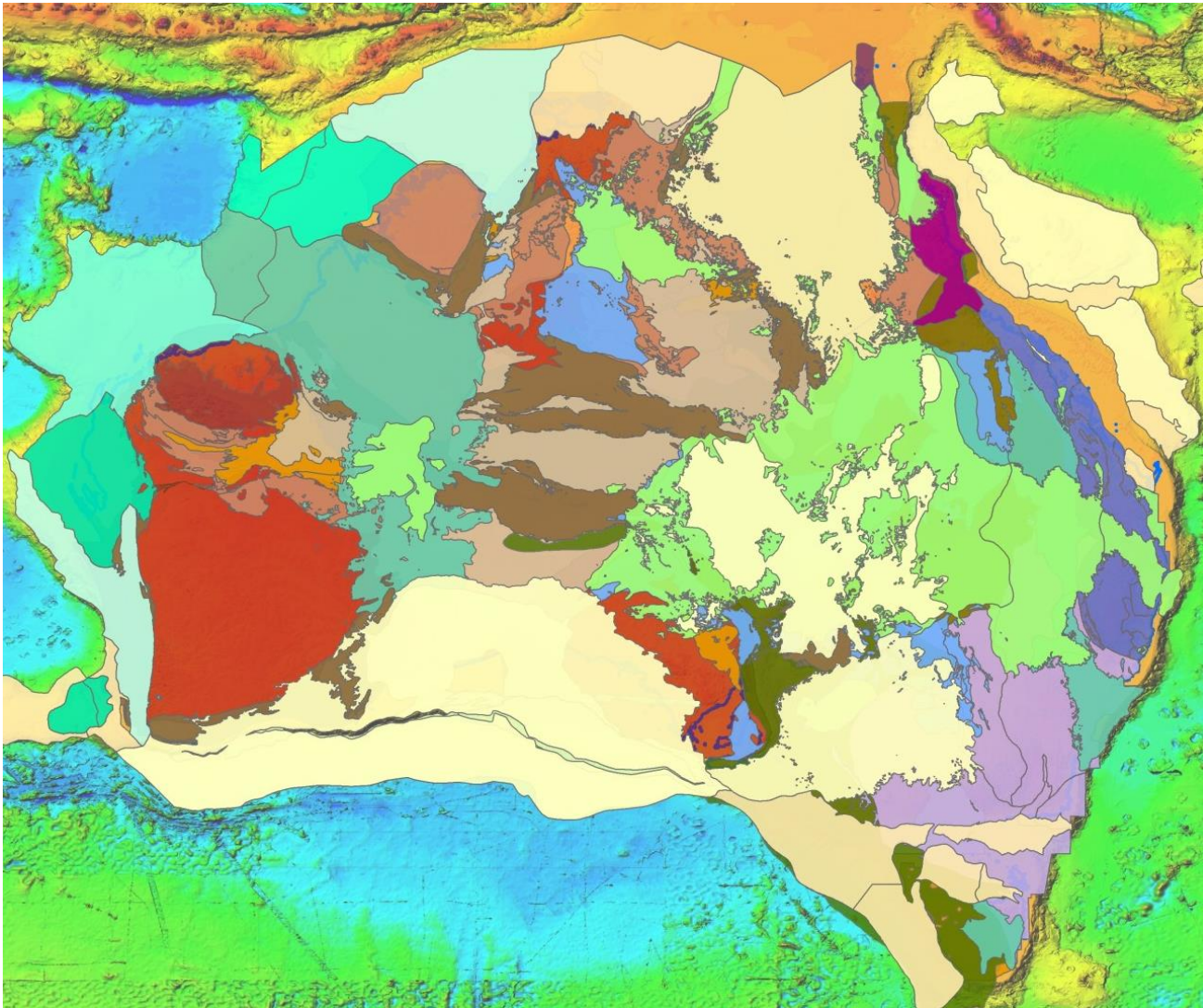
Late Paleozoic-Cenozoic sedimentary basins



Mesozoic sedimentary basins



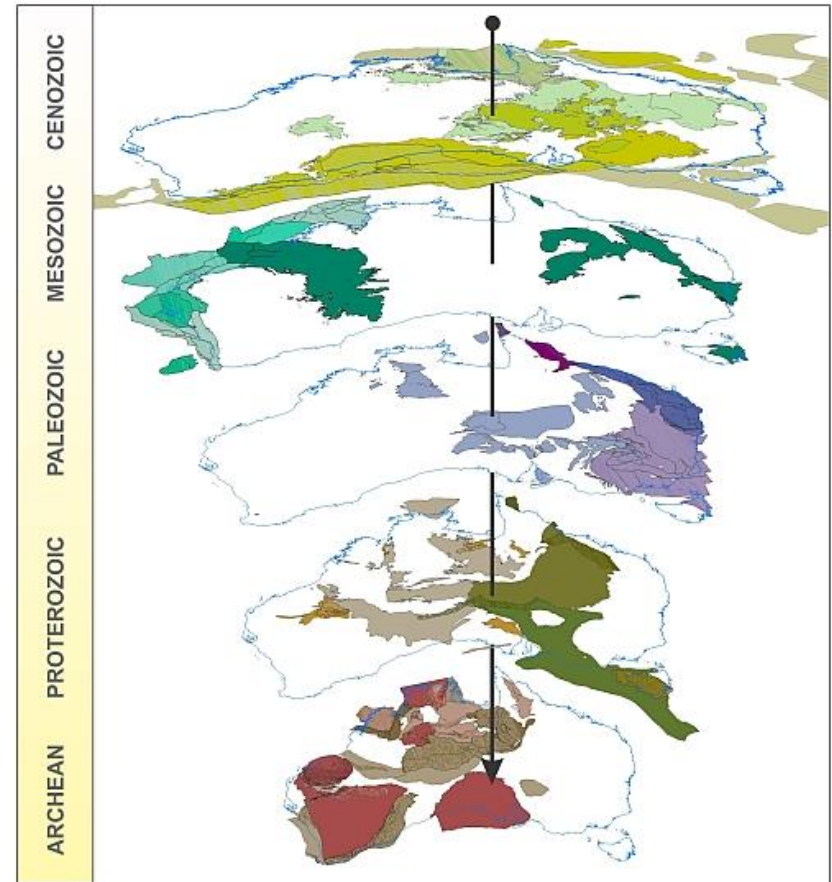
Mesozoic-Cenozoic sedimentary basins



All sedimentary and tectonic provinces (cratons, orogens)

Australian Geological Provinces dataset

- A preliminary edition of the national geological provinces dataset was published in September 2013
- It is still not complete, and many of the larger basins do not contain the detail required to adequately support CSG resource analysis
 - i.e., the extents of coal-bearing sub-basins to identify coal-bearing regions within large, otherwise coal-poor, sedimentary basins



Conclusions

- The story of the Australian Geological Provinces dataset is a sobering tale of the value of fundamental geological spatial data in an age of an increasingly informed and politically active public
- As scientists, we must be able to provide our political leaders with good quality basic geoscience data to support evidence-based public policy
- With GIS analysis now commonplace in scientific research, well maintained basic geoscience spatial data will continue to underpin research, public policy, and industry decision making
 - if only we can find and fund the people we need to compile the data!



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Thank you

Any Questions?

Phone: +61 2 6249 9575

Web: www.ga.gov.au

Email: Oliver.Raymond@ga.gov.au

Address: Cnr Jerrabomberra Avenue and Hindmarsh Drive, Symonston ACT 2609

Postal Address: GPO Box 378, Canberra ACT 2601

