Australian Government
Geoscience Australia

Monitoring sustainable development: Why location matters in Australia

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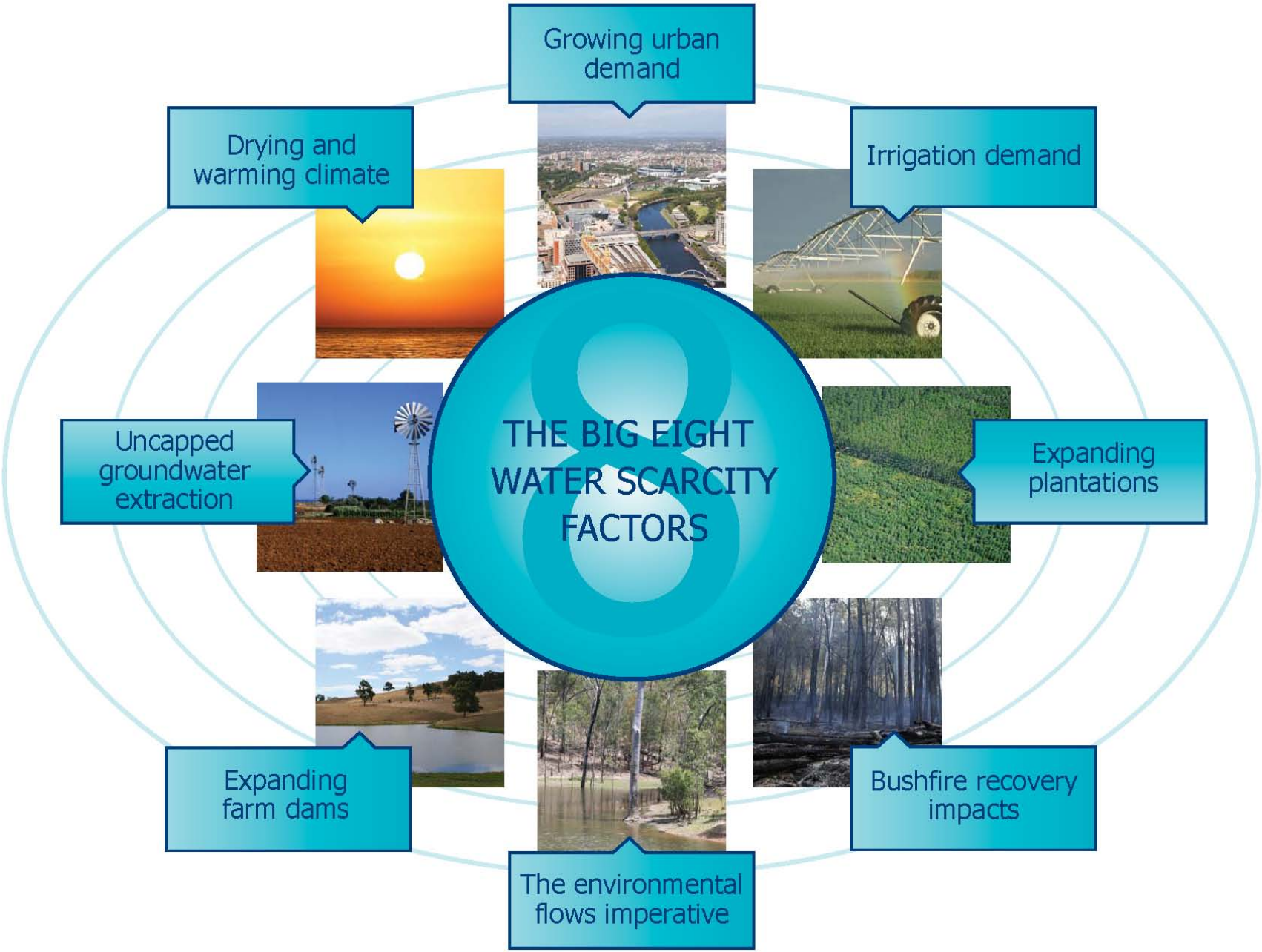
National Water Information Strategy

Understanding Energy and Water Resources

Disaster Risk Reduction in the Region

Geospatial information has a vital role to play in measuring, mapping, and monitoring these critical issues for policy making, evidence based decision making, and sustainable development



Information to support water reform

Judicious infrastructure investments

Properly functioning water markets

Accurate and timely flood warnings

Good water information is the key:

AWRIS

Greater efficiency in water use

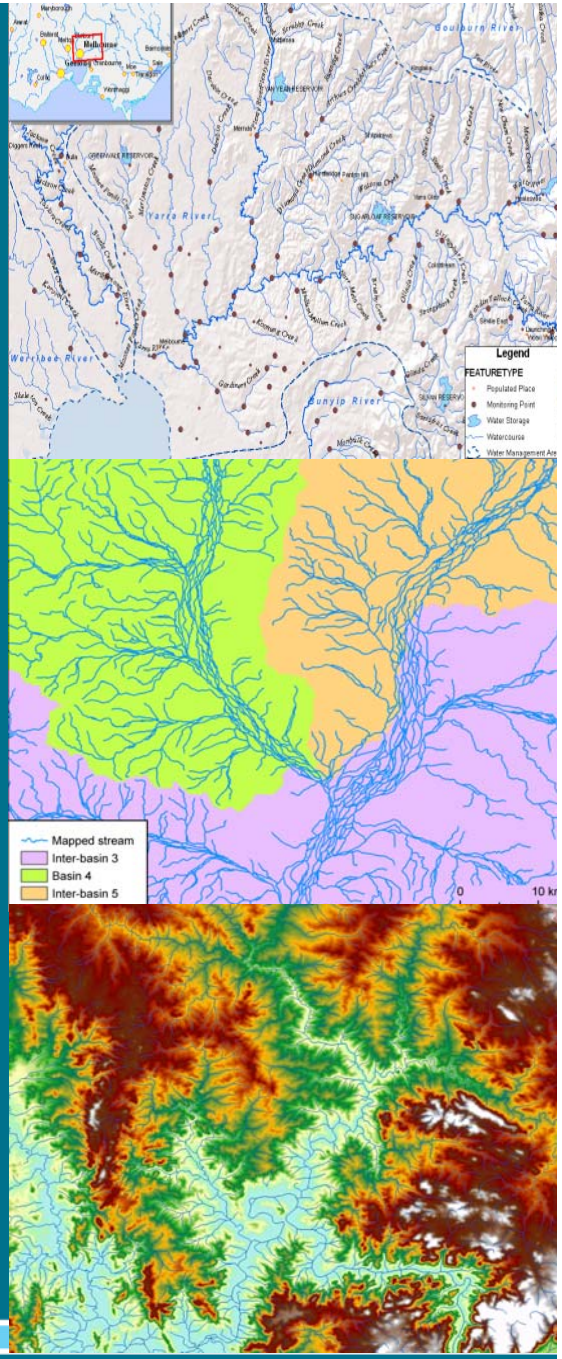
Prudent environmental flow management

Fair pricing and equitable sharing of a scarce resource

Water Information
DATA • INFORMATION • INSIGHT

Understanding Australia's water resources

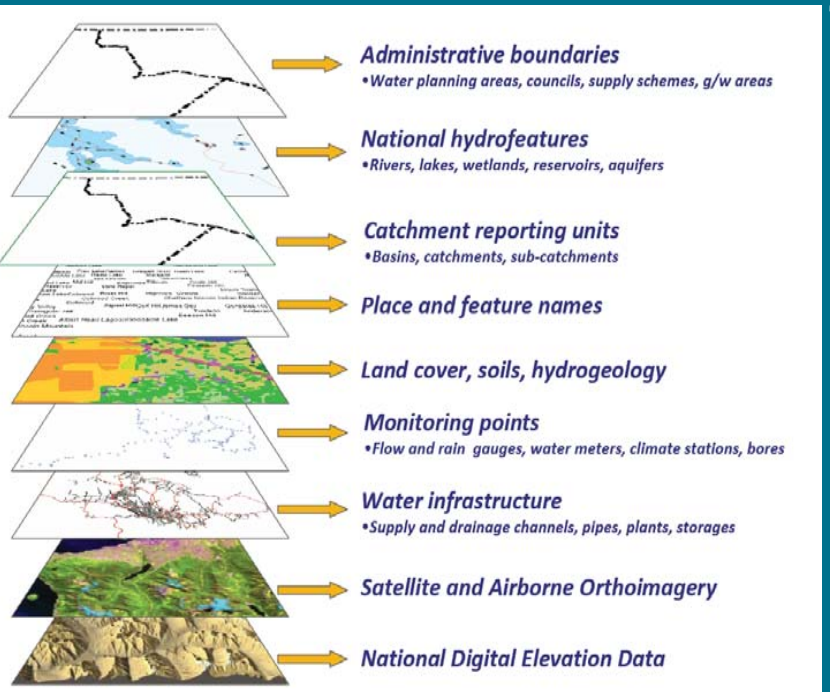
- The Australian Water Resources Information System (AWRIS) delivers high quality water information, essential to managing Australia's water resources
- The "Geofabric" registers the spatial relationships between important hydrologic features such as rivers, dams, lakes, aquifers, and monitoring points
- By detailing the location dimensions and connectivity of these hydro-features, we are able to see how water is stored, transported and used through the landscape
- The Geofabric will become the geospatial information framework for Australia's sustainable water information activities



water information

Data ⌒ Information ⌒ Insight

Geospatial information and relationships



Administrative boundaries
- *Water planning areas, councils, supply schemes, g/w areas*

National hydrofeatures
- *Rivers, lakes, wetlands, reservoirs, aquifers*

Catchment reporting units
- *Basins, catchments, sub-catchments*

Place and feature names

Land cover, soils, hydrogeology

Monitoring points
- *Flow and rain gauges, water meters, climate stations, bores*

Water infrastructure
- *Supply and drainage channels, pipes, plants, storages*

Satellite and Airborne Orthoimagery

National Digital Elevation Data

Management of water resources in the national interest

Groundwater and surface water modelling and reporting

Policy development

Evidence based decision making

Service delivery

Engaging the community

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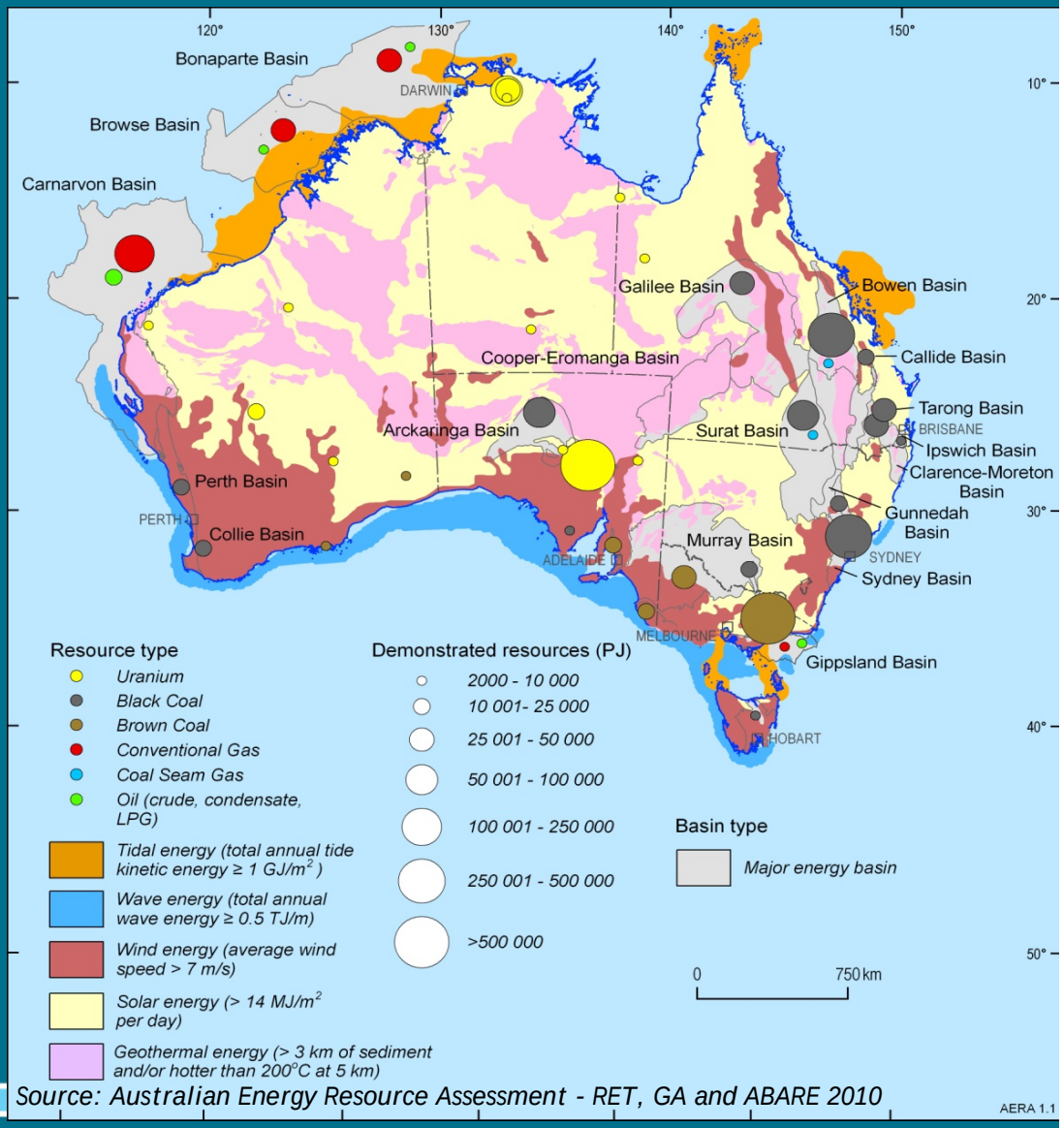
Energy in Australia

Abundant and diverse energy resources:

- Coal (black and brown) underpins exports and low-cost domestic electricity production
- Uranium >30% of world resources
- Conventional and coal seam gas
  - can meet domestic and export demand to 2030 and beyond
- Oil (crude, condensate, LPG) more limited
  - Australia reliant on imports for transport fuels

Renewable energy resources: hydro, geothermal, wind, solar, wave, tide, bioenergy

- Hydro largely developed
- Wind power growing rapidly
- Others largely undeveloped due to immature technology. Greater contribution by 2030



Source: Australian Energy Resource Assessment - RET, GA and ABARE 2010

Groundwater in Australia

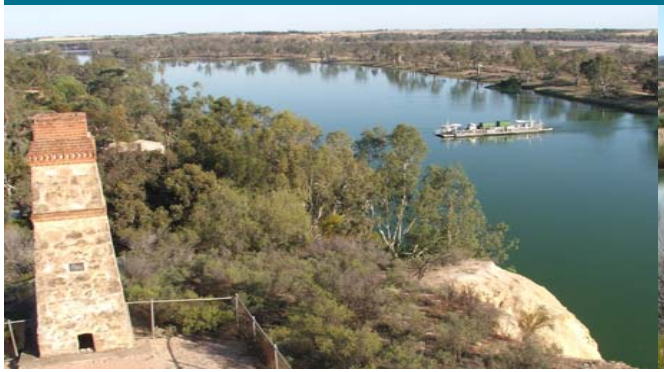
Groundwater usage:

- 17% of available water
- 30% of high security water in drought
- *Only* source of water for many regional towns, mining and remote indigenous communities

70% of rivers are dependent on baseflow

Groundwater is critical for groundwater dependent ecosystems – but poorly understood

Groundwater is also a critical issue in national energy security (coal seam gas, uranium, geothermal, shale gas)

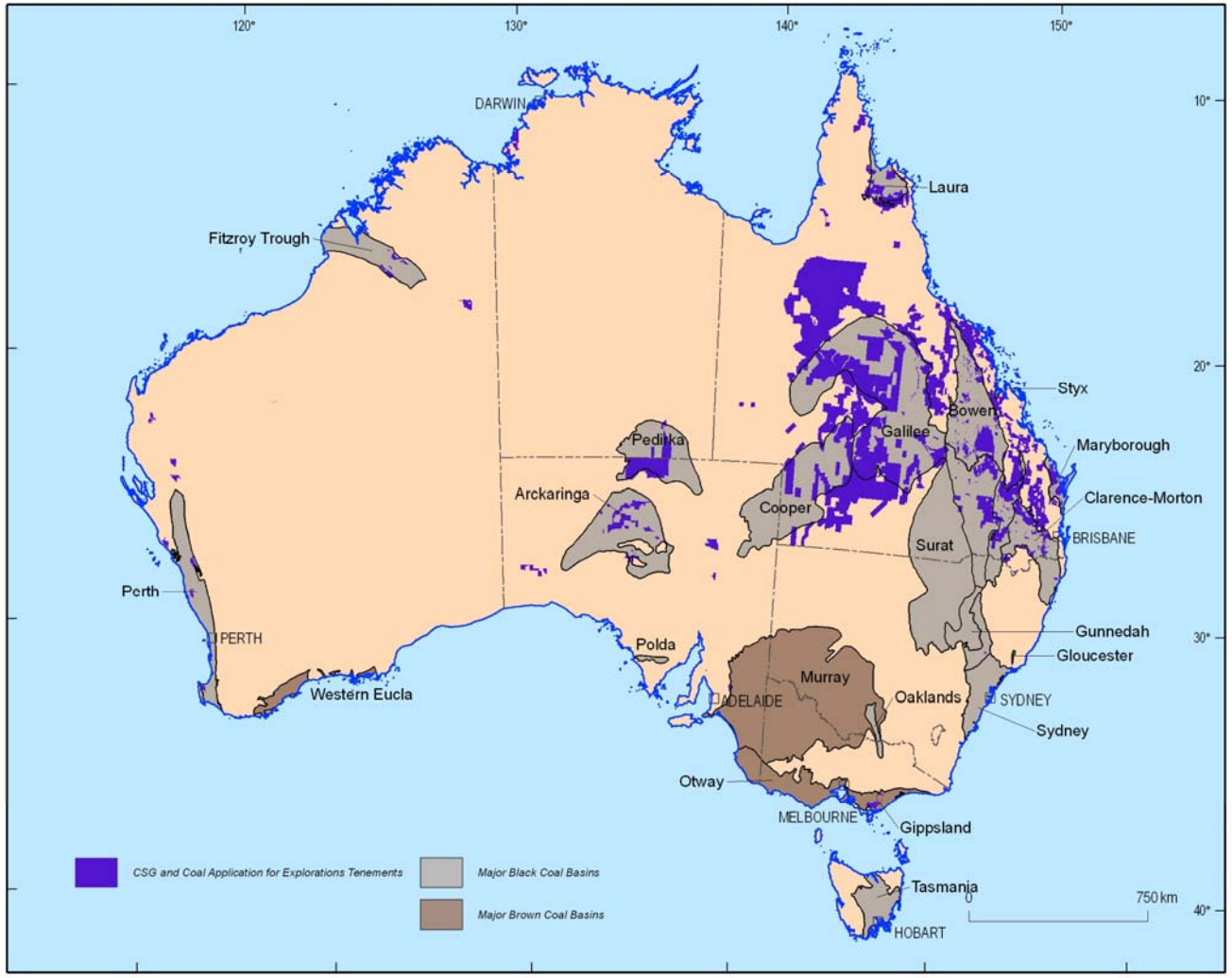


Understanding Australia's energy and water resources

- Increasing development of alternative energy sources – coal seam gas, geothermal, shale gas
- Impacts on groundwater unknown and unable to be quantified, particularly across large aquifers
- New focus on scientific evidence to build confidence in coal seam gas and coal mining
- To better inform environmental regulation and impacts of coal seam gas and coal developments on groundwater across Australia
- Early results expected

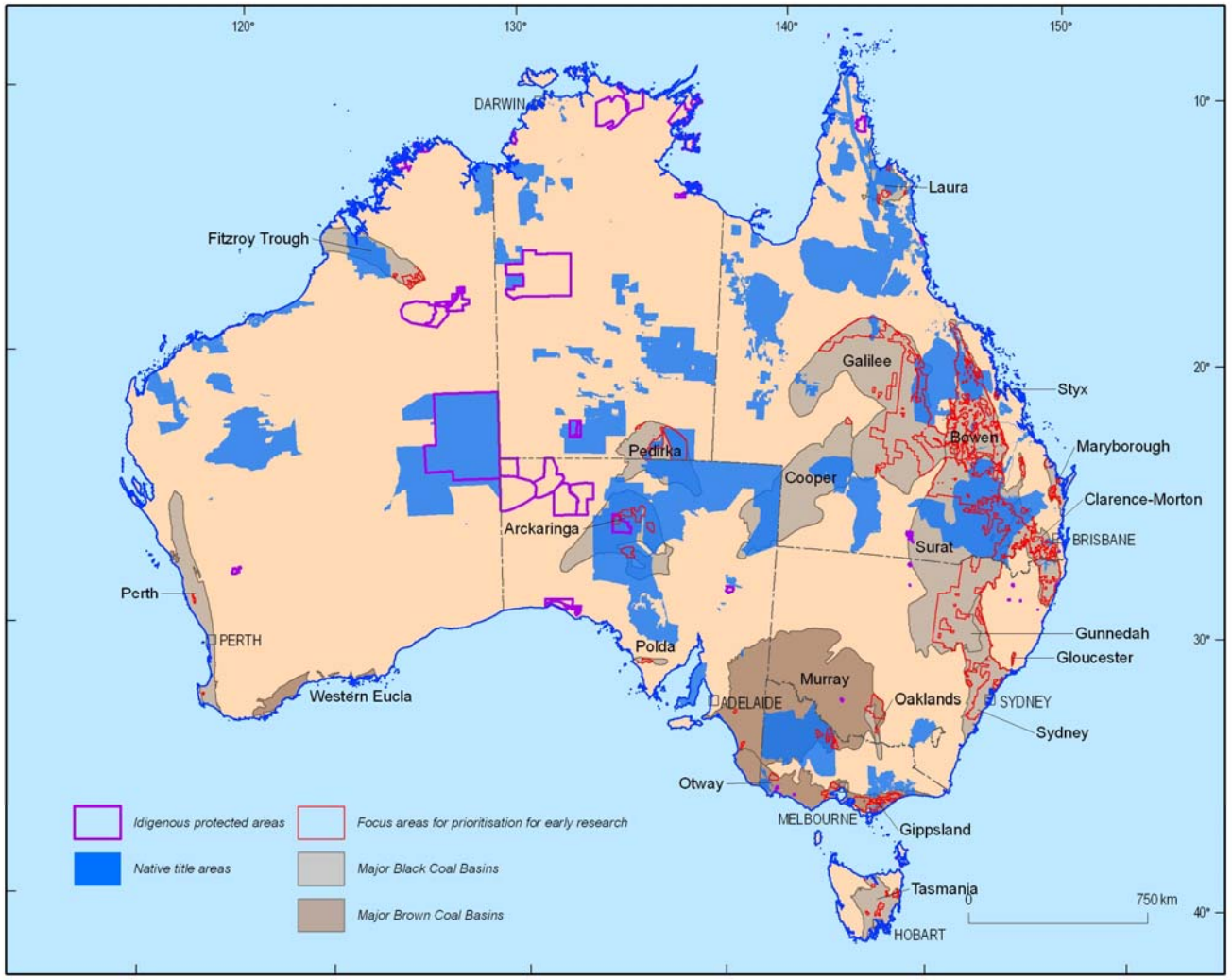
Location information to build the scientific evidence

CSG and coal resource extraction applications across major coal areas



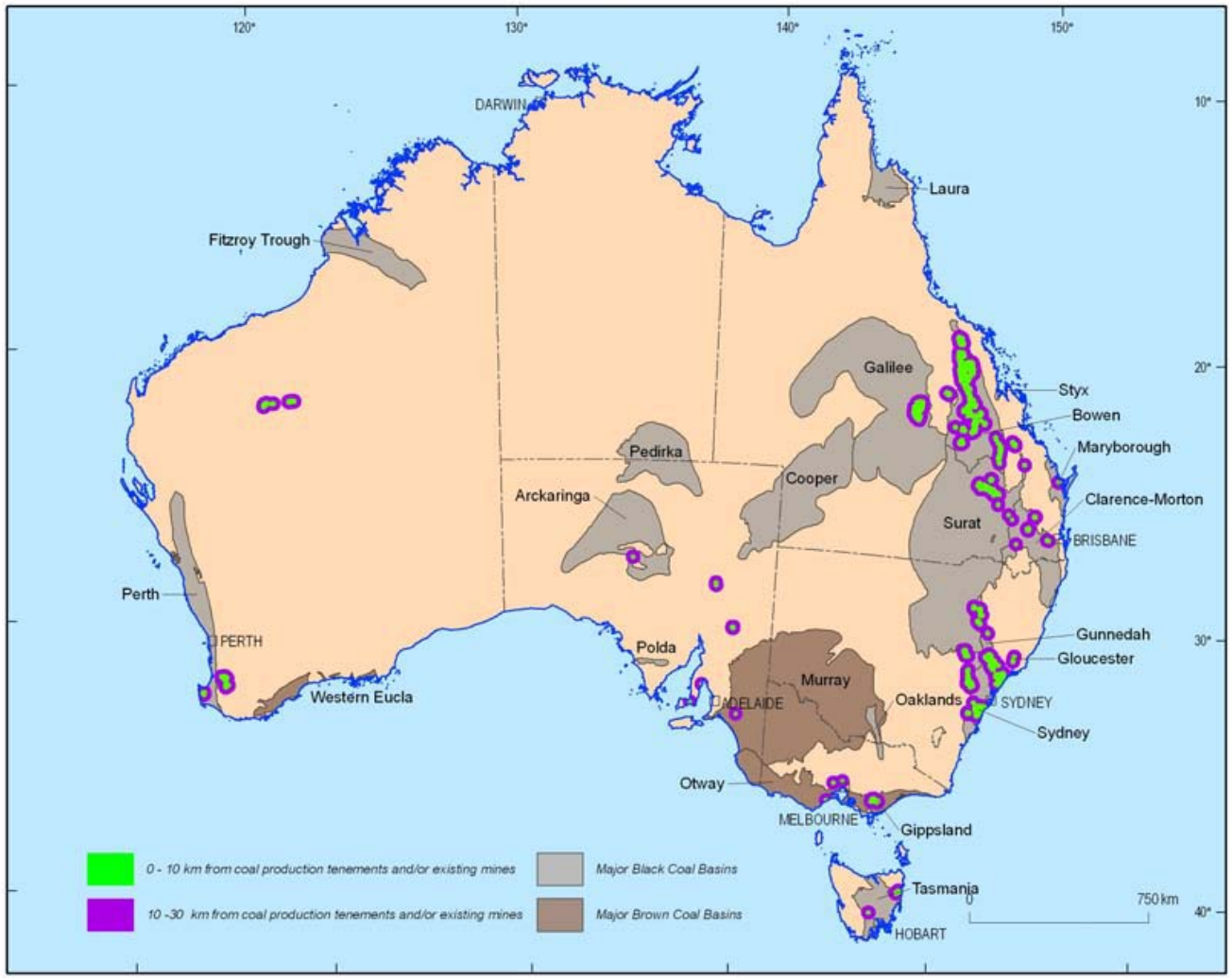
Location information to build the scientific evidence

Areas of cultural and environmental significance assist in prioritising ecological and social factors



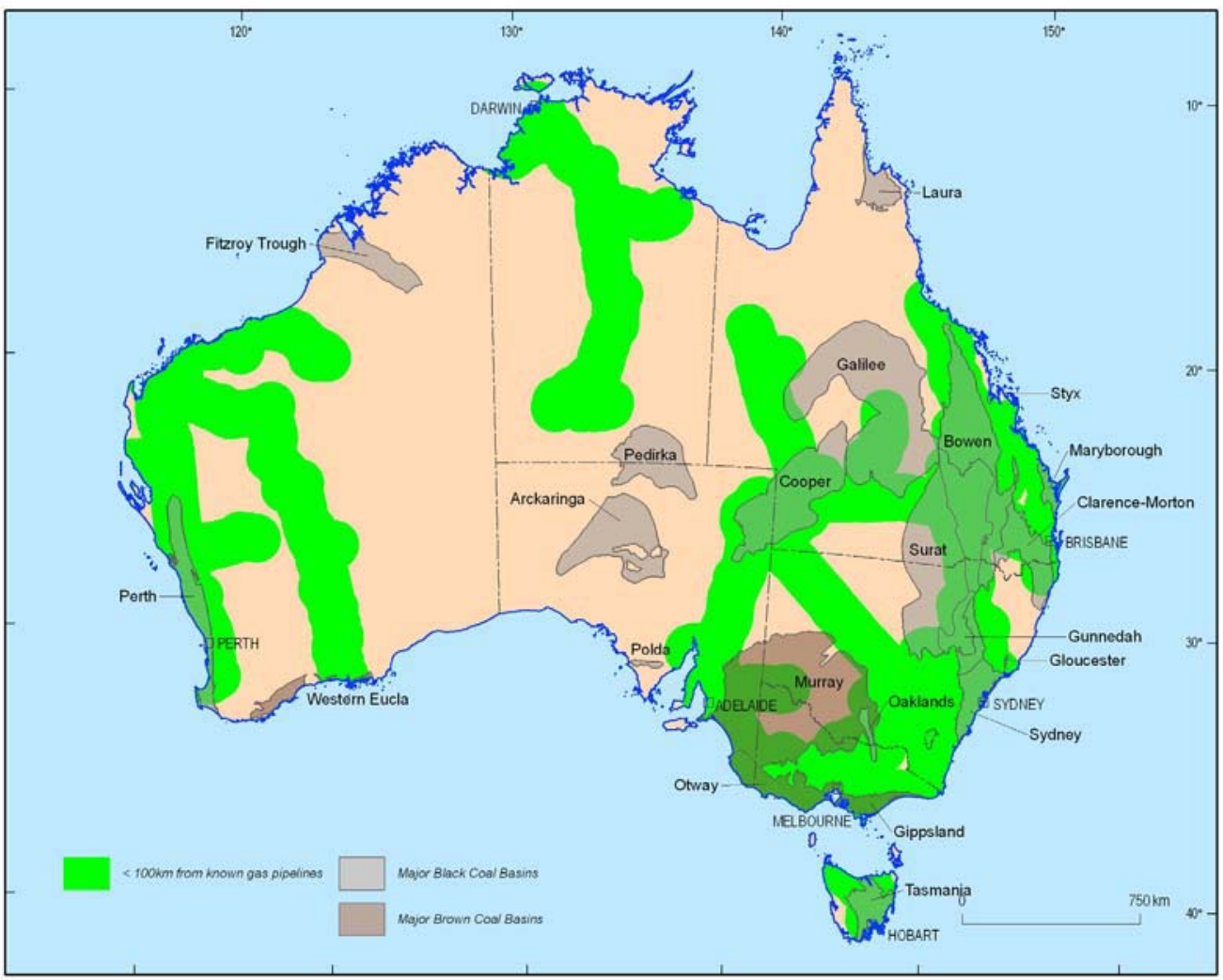
Location information to build the scientific evidence

Existing mines and associated infrastructure are identified



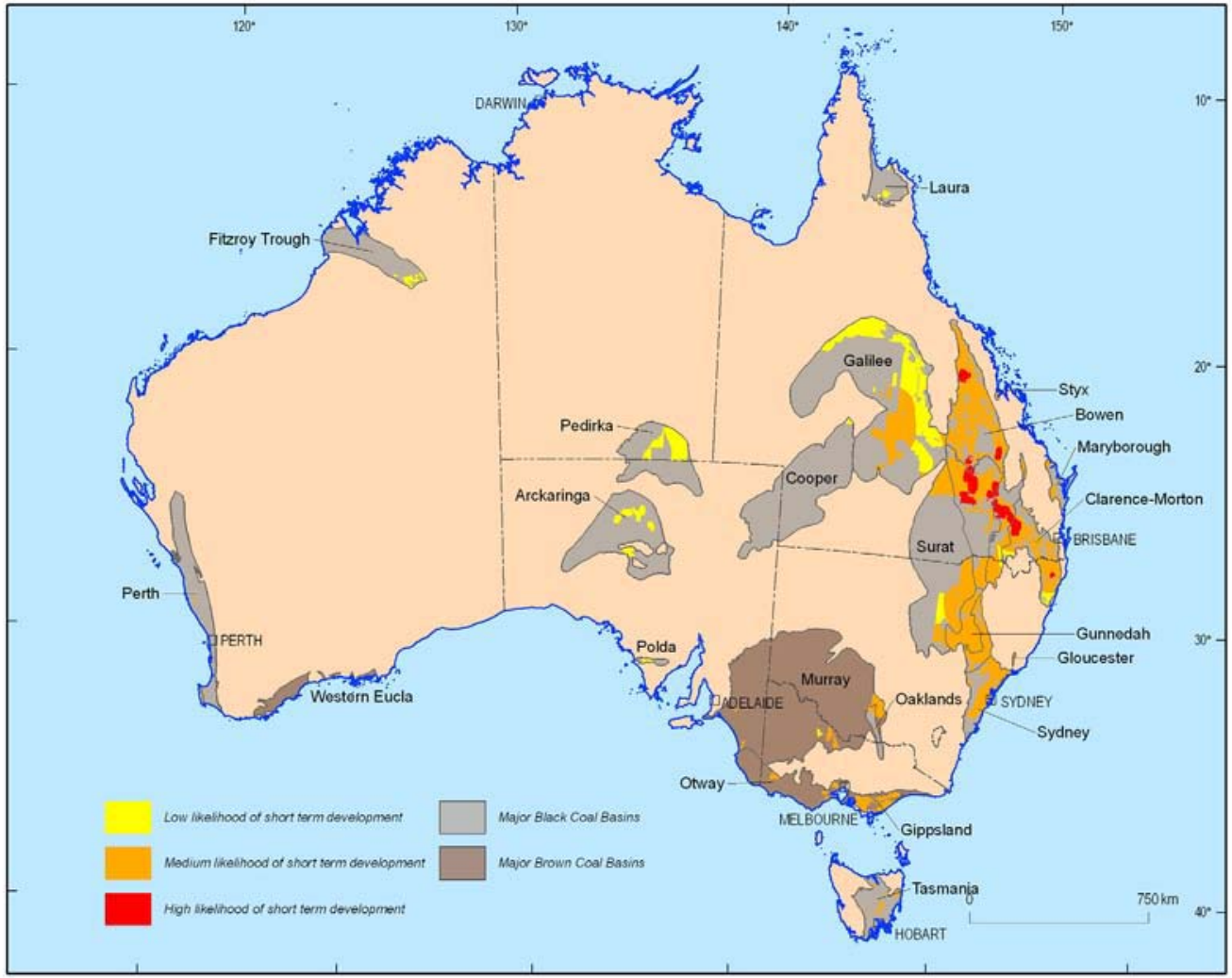
Location information to build the scientific evidence

By identifying the location of existing gas infrastructure the indicative areas of new developments can be identified



Location information to build the scientific evidence

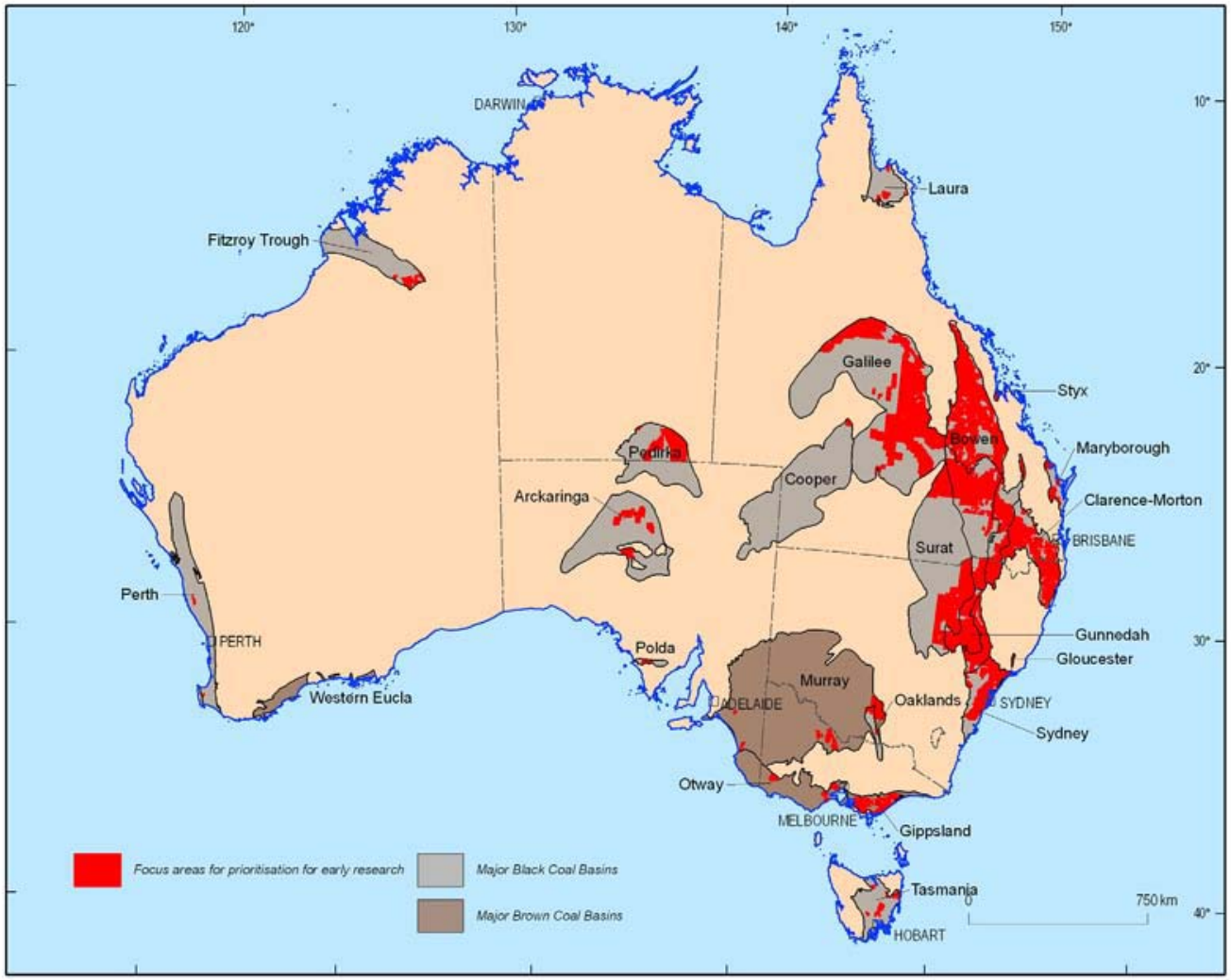
By combining the previous datasets we can identify the areas and likelihood of potential short-term development



Location information to build the scientific evidence

These are the initial focus areas to build the scientific evidence.

The next step is to understand the groundwater resources interacting with these areas



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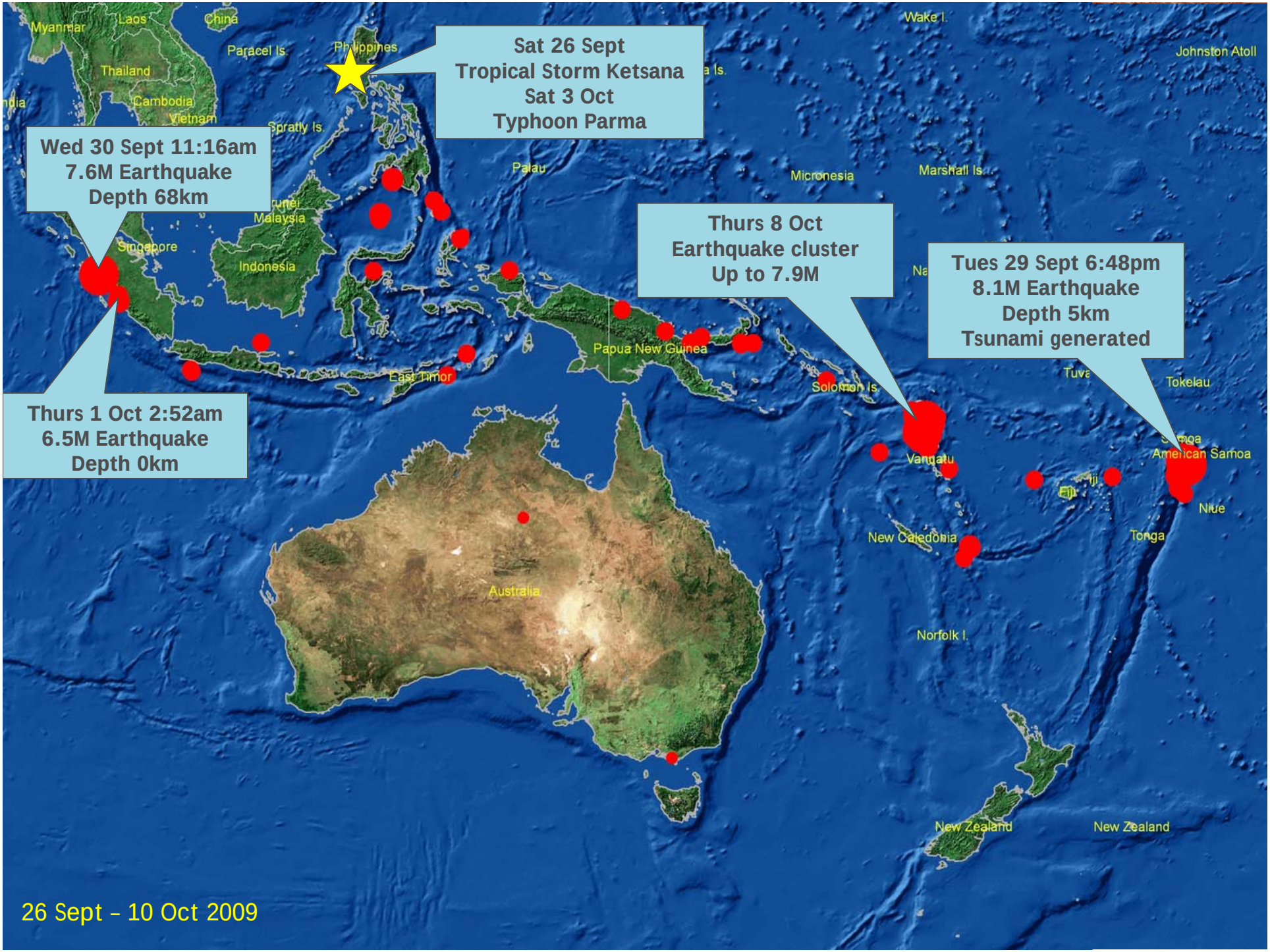

Sat 26 Sept
Tropical Storm Ketsana
Sat 3 Oct
Typhoon Parma
Wed 30 Sept 11:16am
7.6M Earthquake
Depth 68km
Thurs 8 Oct
Earthquake cluster
Up to 7.9M
Tues 29 Sept 6:48pm
8.1M Earthquake
Depth 5km
Tsunami generated
Thurs 1 Oct 2:52am
6.5M Earthquake
Depth 0km
Myanmar
Laos
China
Thailand
Cambodia
Vietnam
Paracel Is
Philippines
Spratly Is
Palau
Micronesia
Marshall Is
Wake I.
Johnston Atoll
Malaysia
Singapore
Indonesia
Papua New Guinea
East Timor
Solomon Is
Vanuatu
Tuvalu
Tokelau
American Samoa
Fiji
Niue
Tonga
New Caledonia
Australia
Norfolk I.
New Zealand
New Zealand
26 Sept – 10 Oct 2009

TS *Ketsana*, Manila

- Descended on the greater Manila area on 26 Sept. 2009
- Not strong in terms of wind intensity, but 420mm of rain in 24hrs
- 464 deaths and total damage PhP4 billion
- Flood depths up to 6 metres, taking months to recede
- Uncontrolled urbanisation – poor planning, insufficient floodways, drainage clogged, infrastructure and settlements encroaching on natural waterways, informal settlers on riverbanks and hazard areas
- No coordination: key datasets, tools and information required
- Required a comprehensive program of hazard and risk assessment to improve knowledge

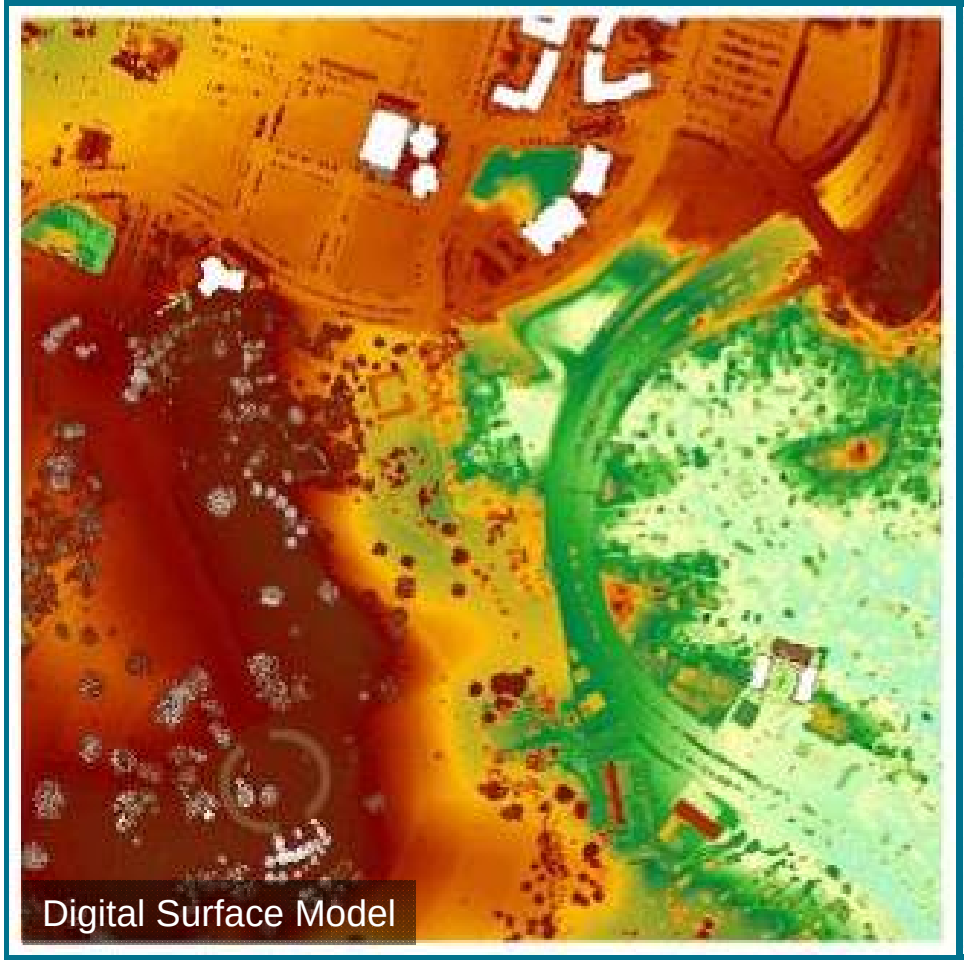
Greater Metro Manila area risk assessment project (2010-2013)

Initiated by Australian Government in response to TS *Ketsana* in 2009, and part of a broader AusAID disaster resilience initiative

Objective is to assess the potential impact from flood, cyclone and earthquake in the Greater Metro Manila area by developing and providing fundamental geospatial datasets, information, and capacity

Data includes high resolution Digital Elevation Models, imagery, and exposure information to underpin disaster impact scenario modelling

High resolution Digital Elevation Model and imagery

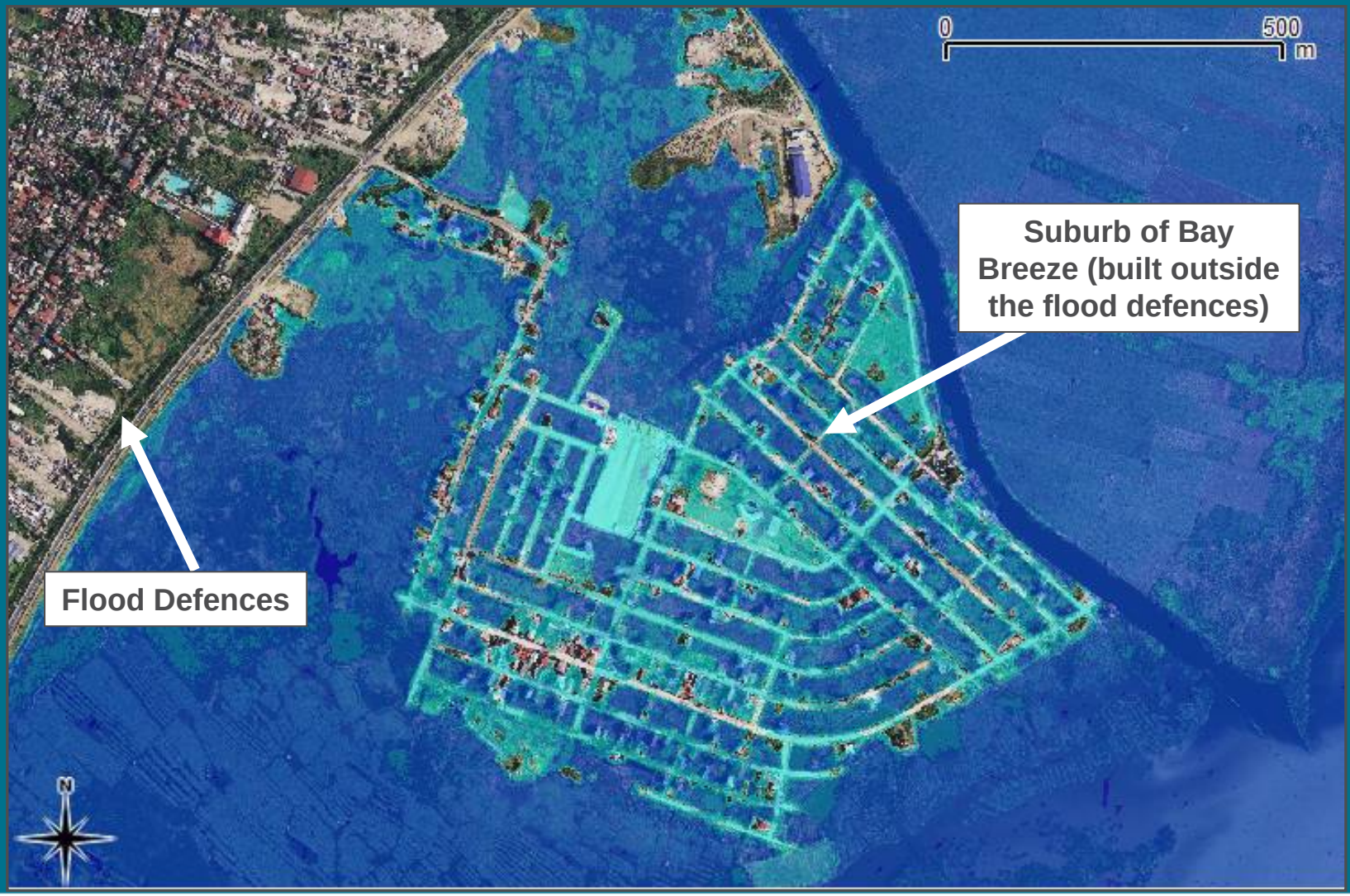


High resolution Digital Elevation Model and imagery

High-resolution imagery draped over Digital Elevation Model

Taguig flood modelling

1 in 5 year Lake Laguna flood – assuming flood defences work

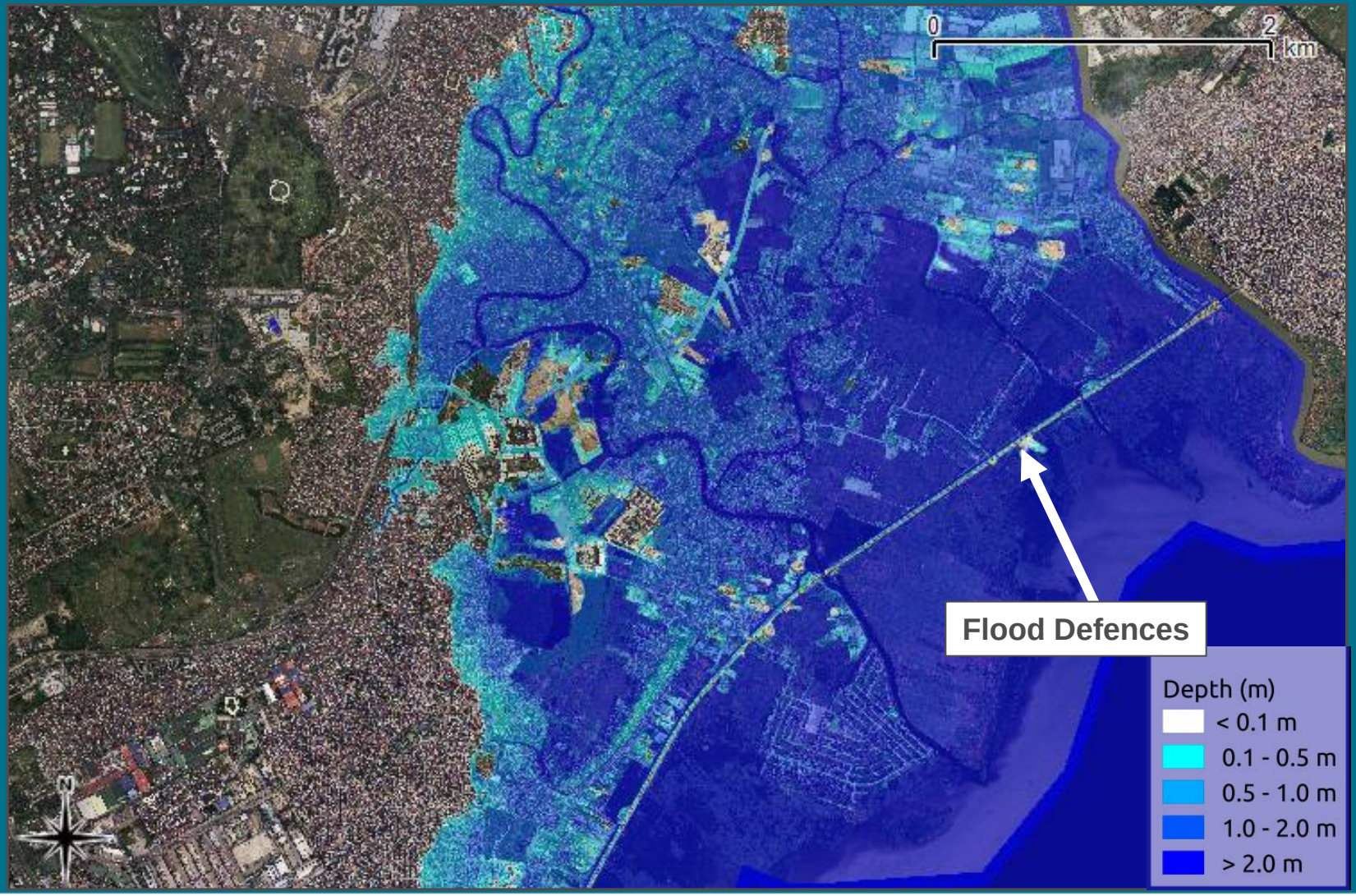


Taguig flood Modelling

1 in 5 year Lake Laguna flood – assuming flood defences fail

Taguig flood modelling

1 in 100 year Lake Laguna flood – assuming flood defences fail



Exposure Information

Taguig City – first LGU for exposure database development

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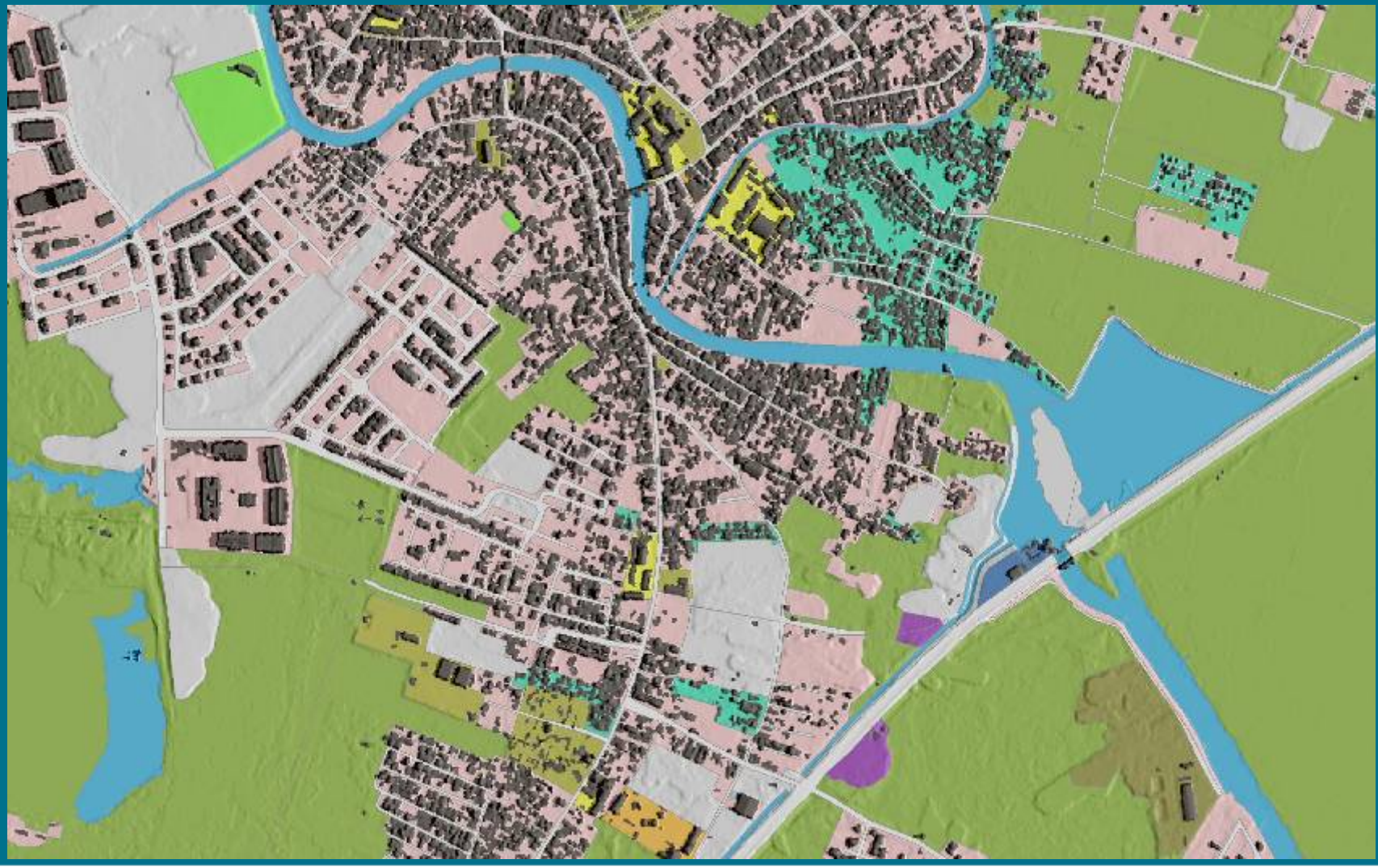
Taguig City – first LGU for exposure database development



"How can you manage that which you cannot measure? This (data) can be used for measuring. How can you monitor effectively that which you cannot map?"

Presidential Advisor on Environmental Protection, Mr. Nereus Acosta, Government of Philippines, September 2011

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