Australian Government

Geoscience Australia

Natural Hazard Science and Emergency Management

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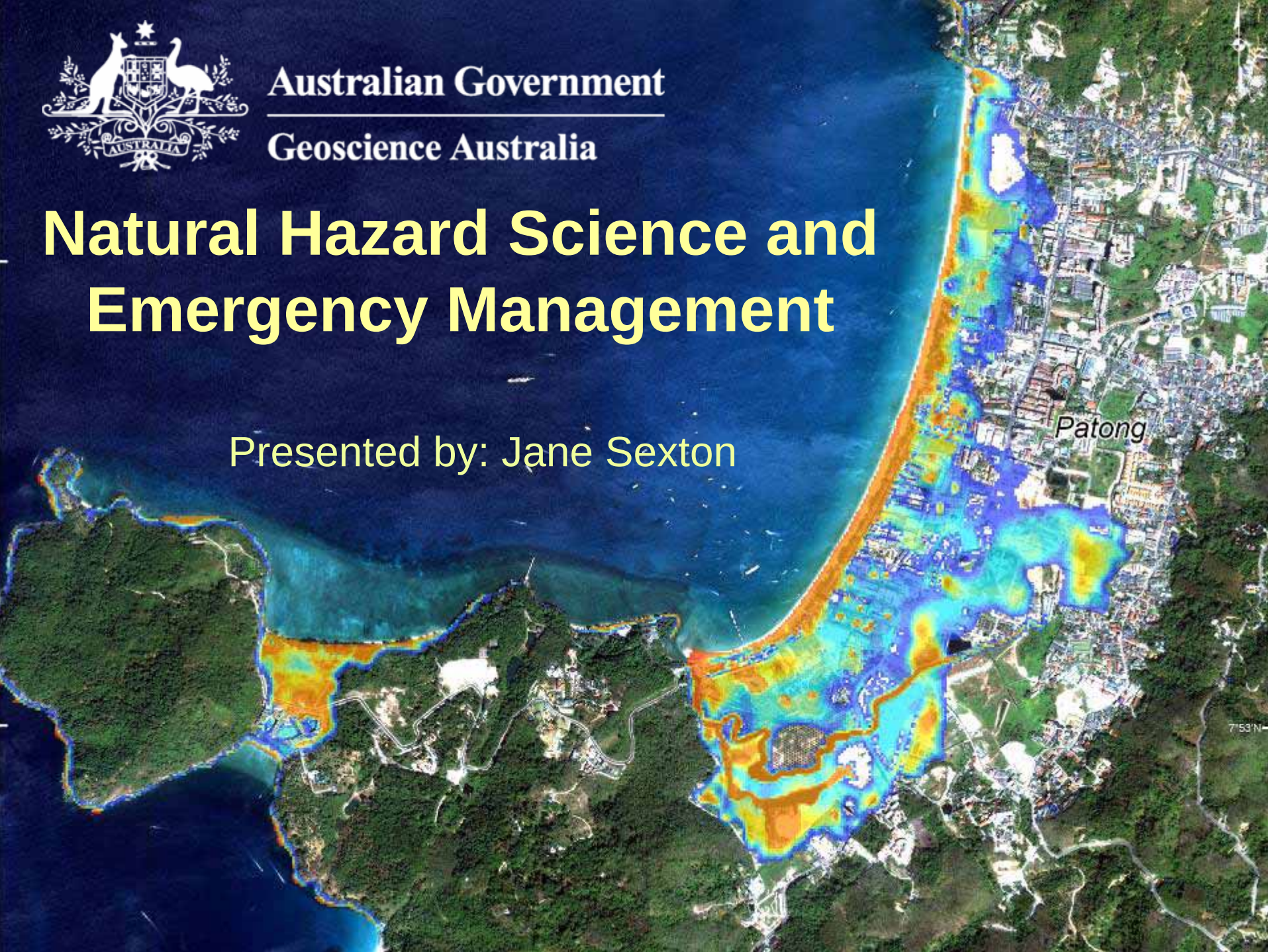
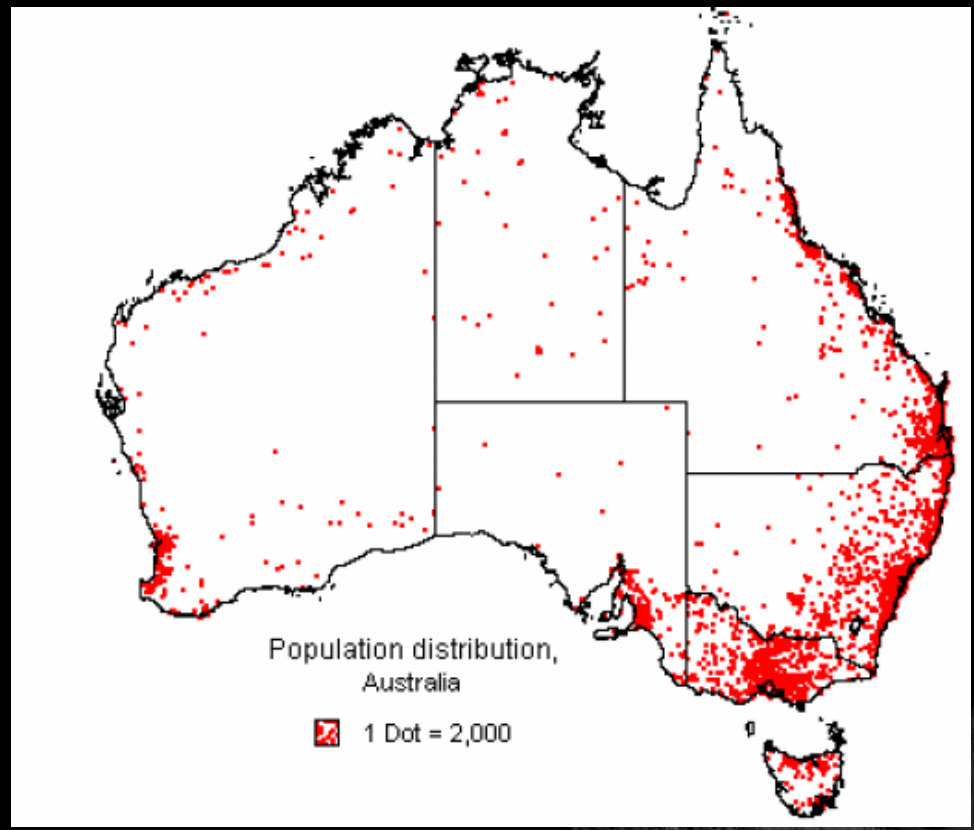


A bit about Australia

- Population of 20.5 million
- Highly urbanised (92%), 85% live within 50km of coast

- Natural hazards:
  - Bushfire
  - Flood
  - Tropical Cyclone
  - Severe storm
    - hail, tornado
  - Earthquake
  - Tsunami
  - Landslide



Natural disasters in Australia

- Cyclone Tracy (1974)
  - 65 died, 25000 evacuated by air, 70% homes destroyed, $800 million in 1974
- Townsville & Katherine Floods (1998)
  - 5 died, 7000 houses destroyed, US$280 million
- Ash Wednesday Bushfires (1983)
  - 75 died, 2500 homes destroyed, $400 million in 1974
- Newcastle Earthquake (1989)
  - 13 died, 130 injured, $4 billion

Natural disasters in Australia

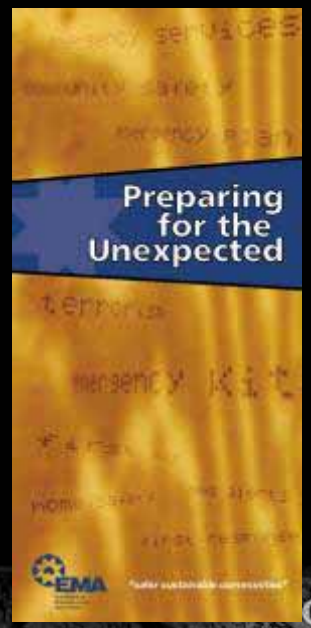
- Meckering Earthquake (1968)
  - 6.9 magnitude, town destroyed
- Thredbo Landslide (1997)
  - 18 died, high profile rescue
- Sydney Hailstorm (1999)
  - 35000 buildings suffered serious roof damage, $1 billion damage
- Canberra Bushfires (2003)
  - 4 died, 480 homes destroyed, $500 million

The Natural Hazards Management Community

- Emergency Services
  - ambulance, fire, police, military
- Volunteer Response agencies - SES, CFA

- Federal Government
  - Funding, Technical Advice, Service Delivery
- State Government
  - Planning, Community Services
  - Health, Welfare
- Local Government
  - Social workers

- Geoscientists, Engineers
- Psychologists, Sociologists
- Local communities & interest groups

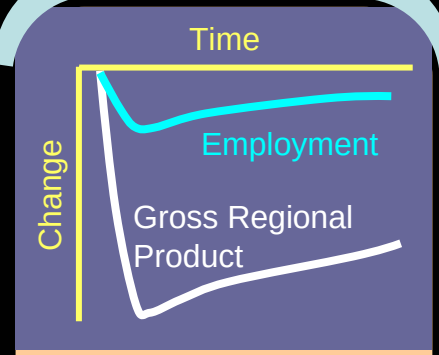


Risk Methodology

Hazard

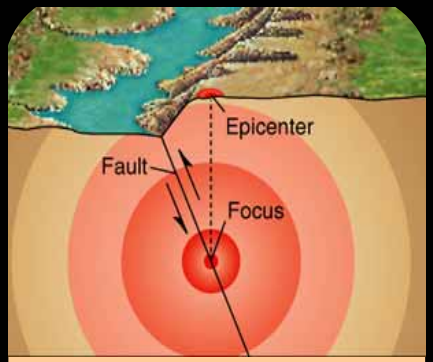
Exposure

Vulnerability



Impact

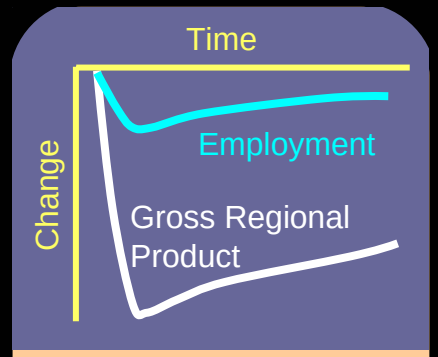
Risk Methodology



Simulate An Earthquake

Exposure

Vulnerability



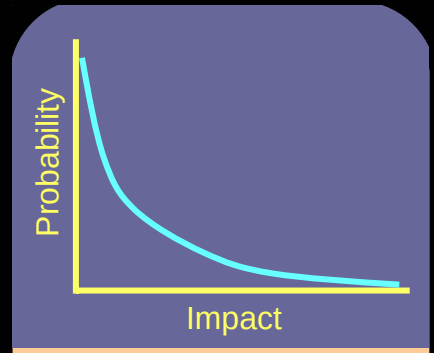
Impact

Risk Methodology

Simulate "All" Earthquakes

Exposure

Vulnerability

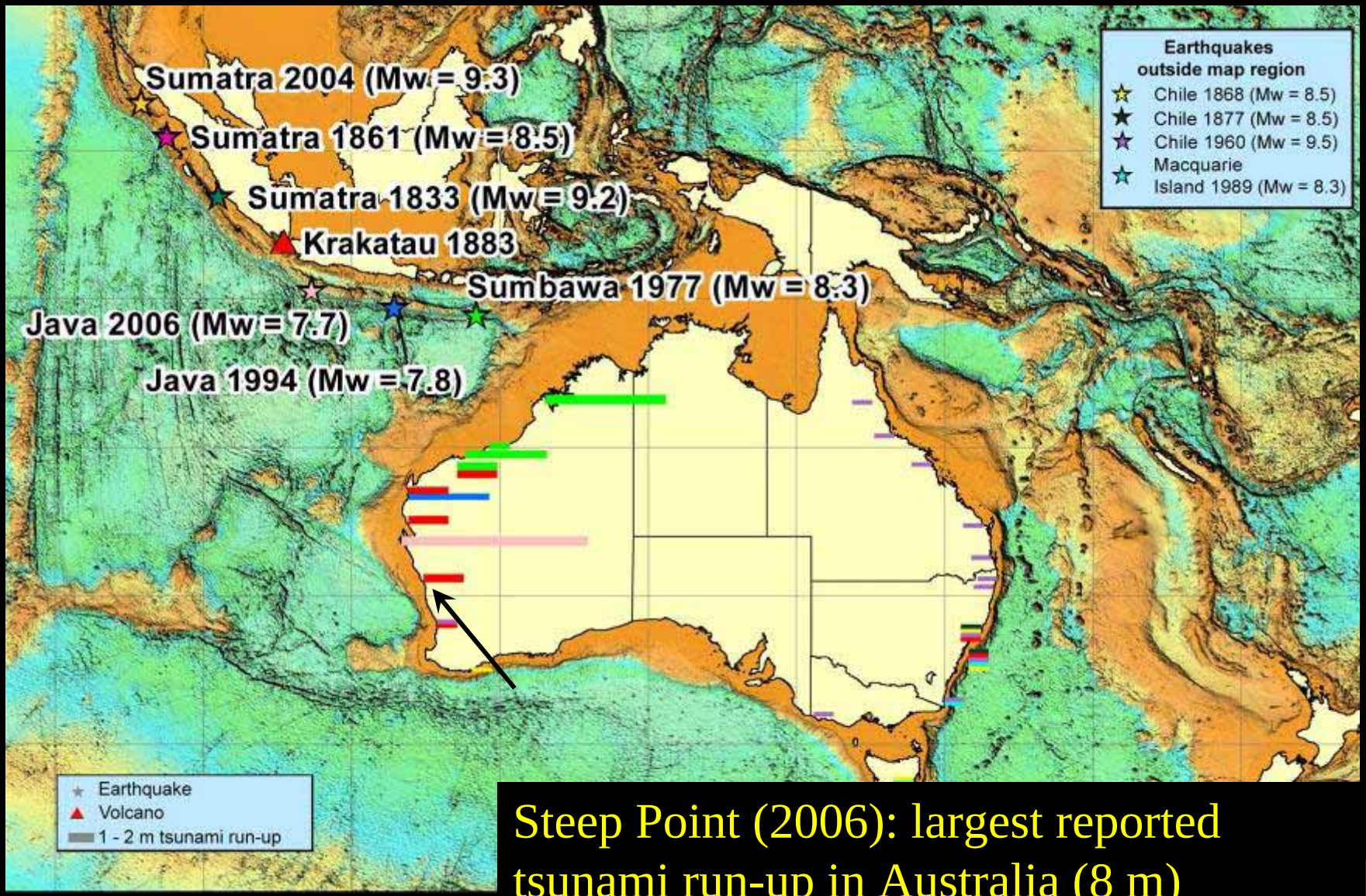


Risk

Case Study

- Understanding tsunami risk to Australia

Historic Tsunami in Australia



Steep Point (2006): largest reported tsunami run-up in Australia (8 m)

Tsunami risk assessment for Western Australia - collaboration with Fire and Emergency Services Authority

What is the point of a warning if you don't have a plan?

What is the relative tsunami risk to the Western Australia coastline?

What do *emergency managers* want to know?

How often do tsunami occur?

What is the maximum credible tsunami?

Tsunami Risk in WA

- Select three “worst-case” events
- These are large magnitude events generated off Java (magnitude 9.0 and 9.3) and Sumba (magnitude 9.1)

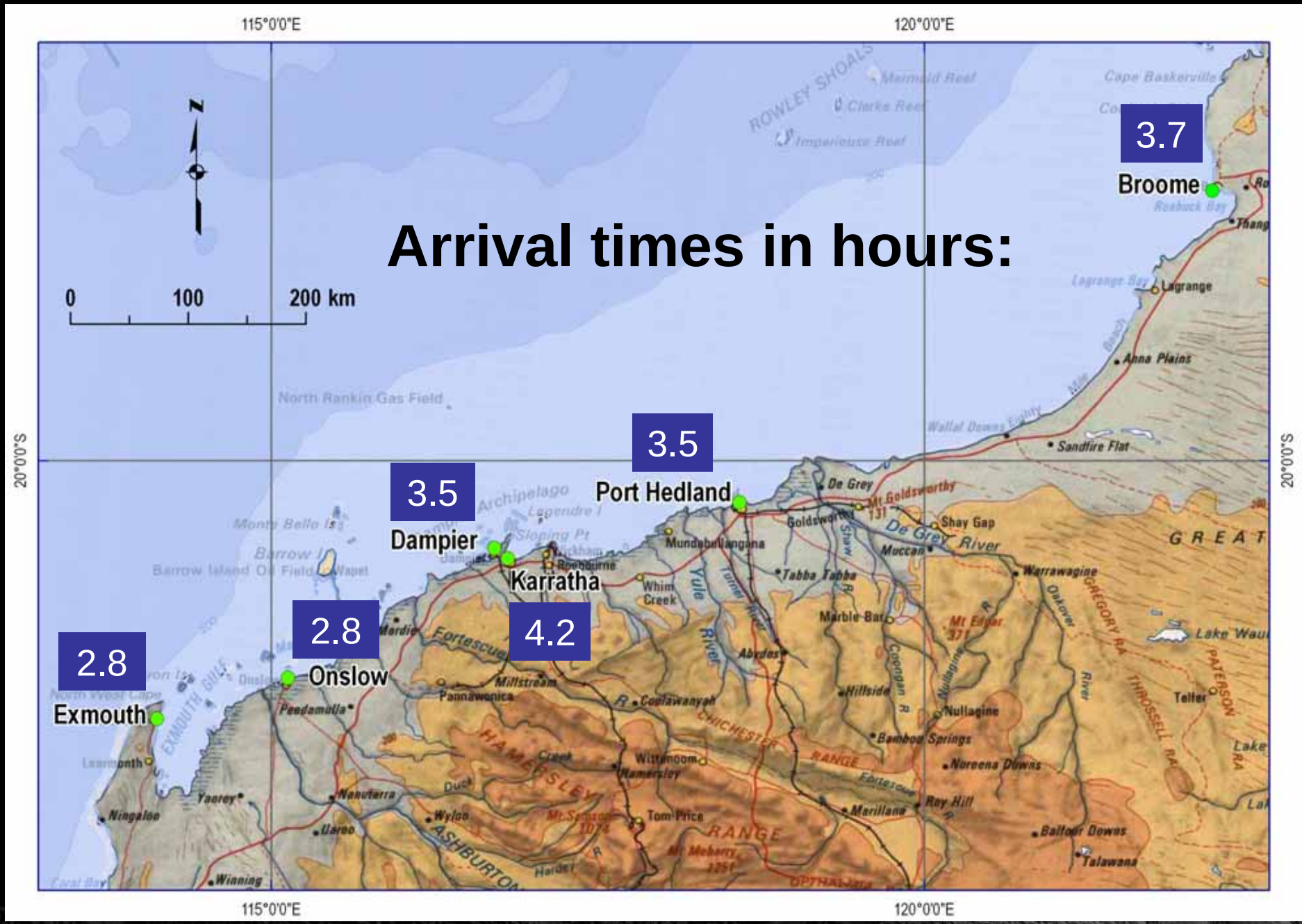
What do

emergency managers

want to know?

How often do tsunami occur?
What is the maximum credible tsunami?

→ What is the time to impact?


Arrival times in hours:
115°0'0"E
120°0'0"E
20°0'0"S
0
100
200 km
3.7
Broome
3.5
Port Hedland
3.5
Dampier
Karratha
2.8
Onslow
4.2
2.8
Exmouth

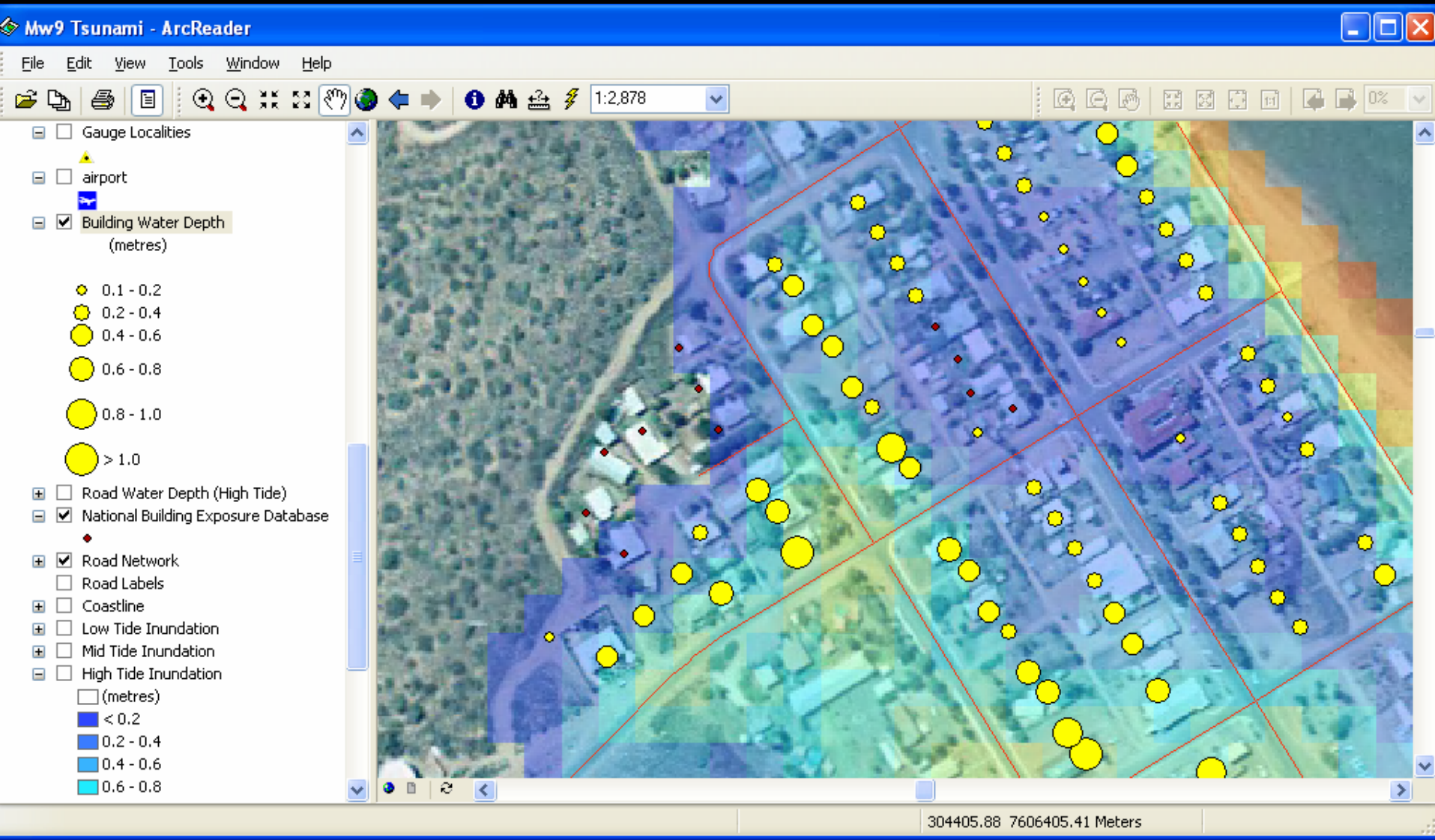
What do
emergency managers
want to know?

How often do tsunami occur? What is the maximum credible tsunami?

What is the time to impact?

What are the onshore impacts?
- inundation extent
- people
- built environment

GIS Decision Support Tool



Tsunami Impact Assessment

National Exposure Information System (NEXIS)

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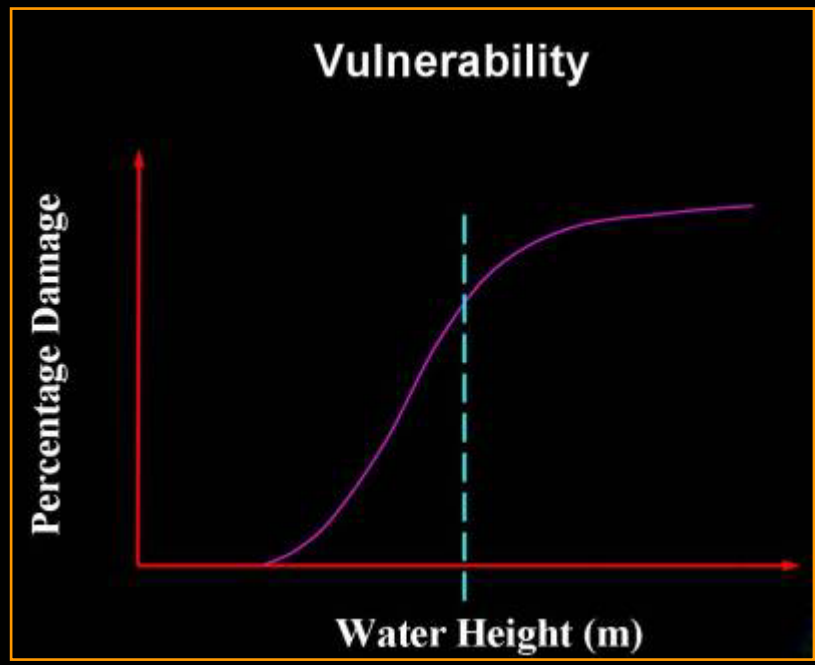


= Estimates of

Number of houses affected

Number of people affected

National Level Data

DTED Level 2 DEM
(30m Grid - Integer)

1.5 m Contour
Highest Astronomical Tide

0 0.25 0.5 1 1.5 2 Kilometers

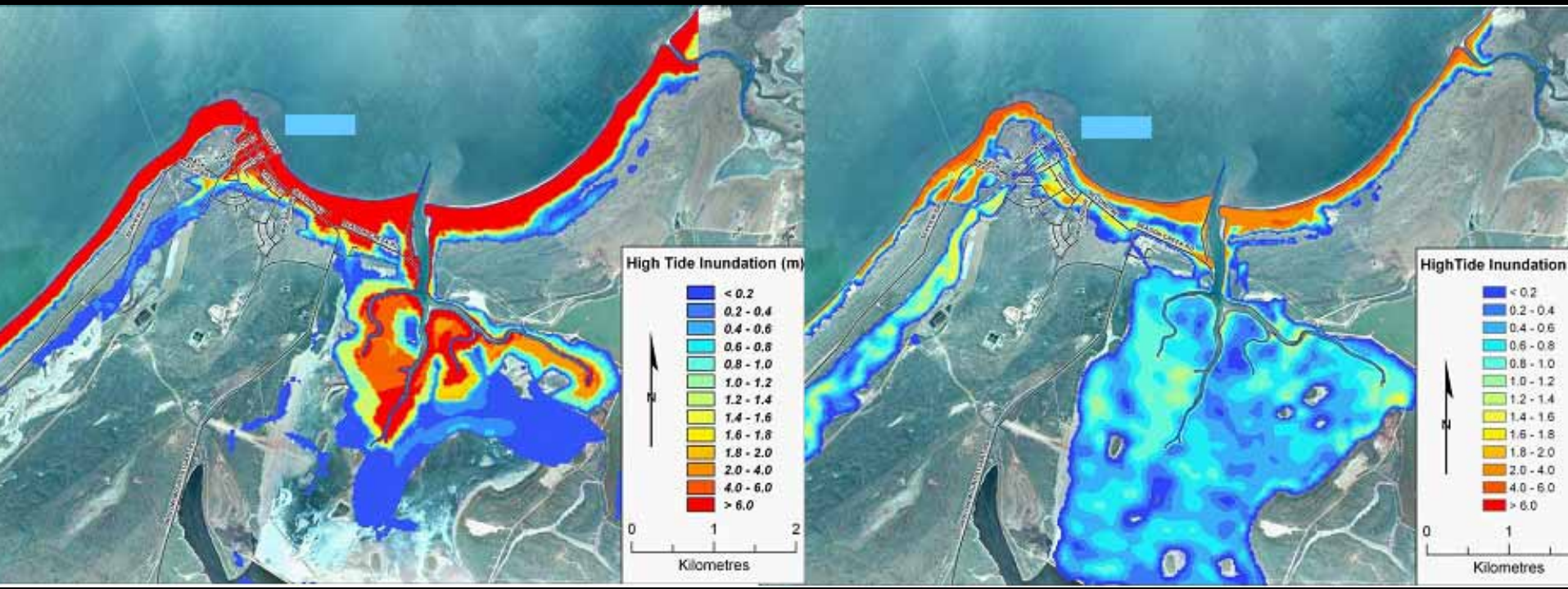
State Level Data

DLI Orthophoto DEM
(20m Grid - Floating Point)

1.5 m Contour
Highest Astronomical Tide

0 0.25 0.5 1 1.5 2 Kilometers

Impact on inundation results



In Summary

- Significant benefit in using models to support natural hazard management
- Developing tools for stakeholders to assist decision making
- Requires consultation and collaboration
- Lot of work to still be done

Questions?

- More information: http://www.ga.gov.au/hazards/