

Geospatial approaches to mapping the susceptibility of coasts to the impacts of climate change

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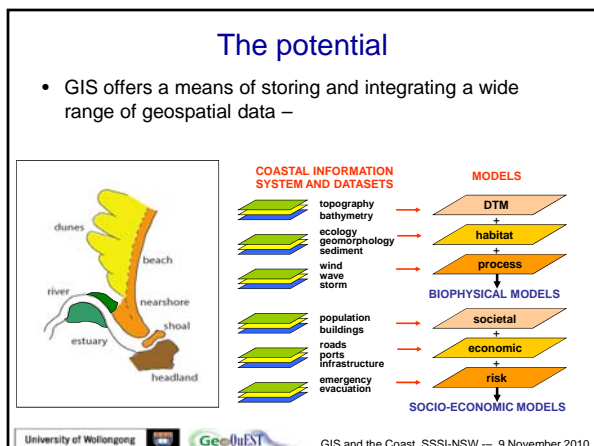
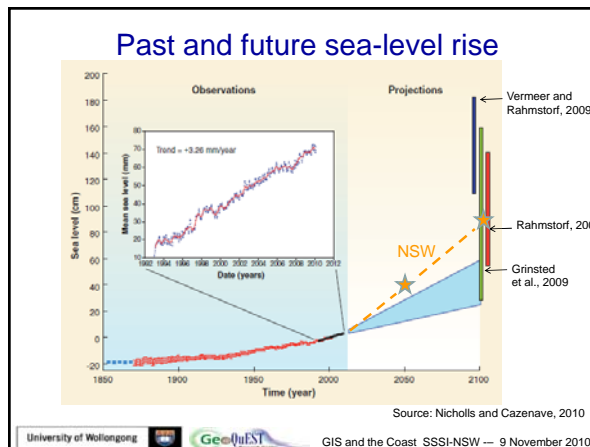
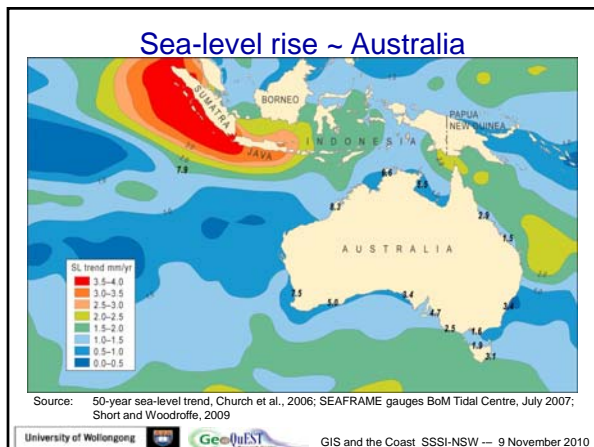
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Coastal awareness ~ climate change

- Managing our coastal zone in a changing climate
 - Parliamentary inquiry
- Climate Change risks to Australia's coast
 - Dept of Climate Change

NSW Draft sea-level policy – and associated guidelines

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For example – Hurricane Katrina

'No one knows for sure how many residents and business owners in the hurricane areas have used the site to see if their buildings are still standing – or, in the case of New Orleans, surrounded by water'

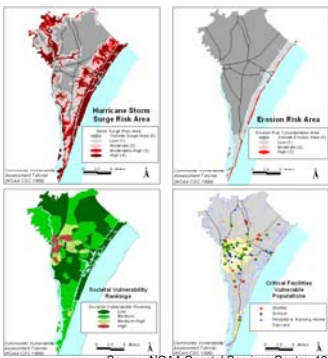
Brian McClendon, director of engineering, Google Earth

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Community Vulnerability Assessment Tool CVAT

NOAA – 7 step procedure

1. Hazard identification
2. Hazard analysis
3. Critical facilities analysis
4. Societal analysis
5. Economic analysis
6. Environmental analysis
7. Mitigation opportunities analysis



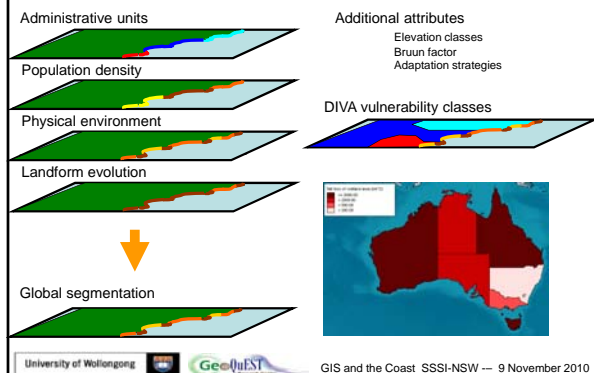
Source: NOAA Coastal Services Centre, 1999

Linear vs ‘non-linear’ mapping of the coast

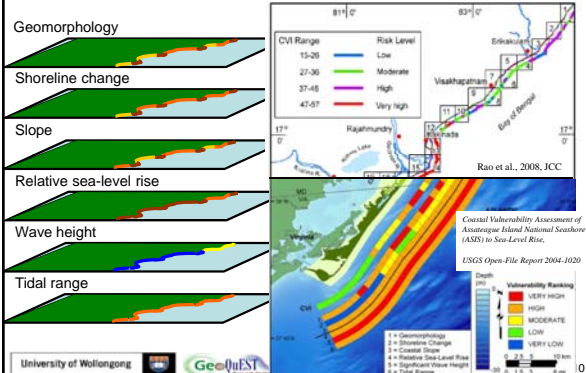
- Linear approaches to vulnerability analysis
 - DINAS-Coast – DIVA
 - Coastal Vulnerability Index (CVI)
 - Geomorphic Stability Mapping - Smartline

- Limitations to GIS vulnerability analysis
 - Inundation – the ‘Bath-tub’ approach
 - Estuaries – and the ‘Venice effect’
 - Erosion – the ‘Bruun rule’ – and beyond

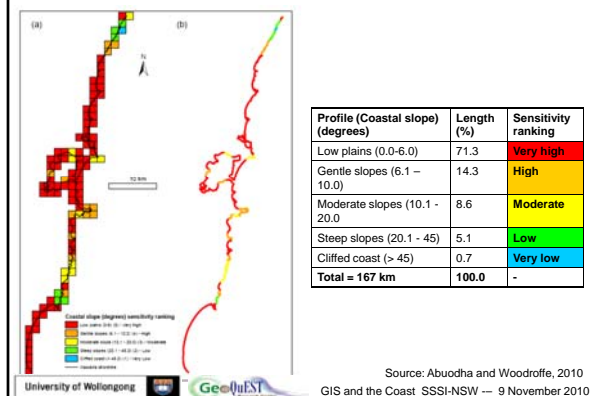
DINAS Coast – DIVA tool



Coastal Vulnerability Index - CVI

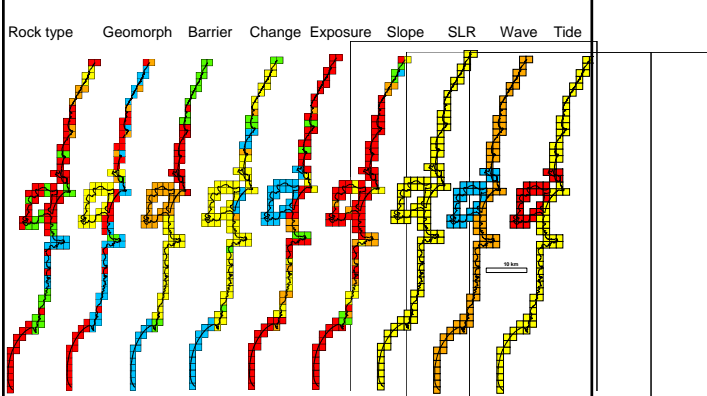


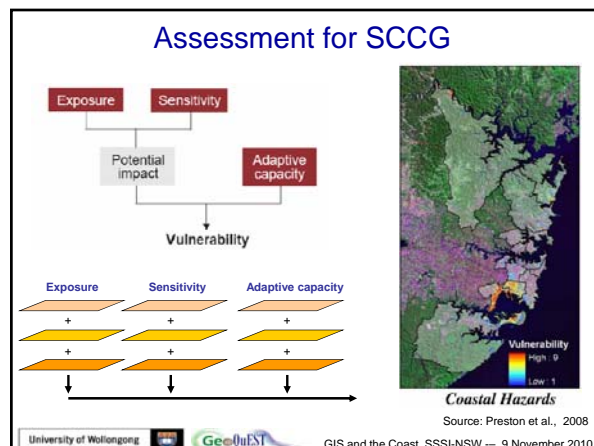
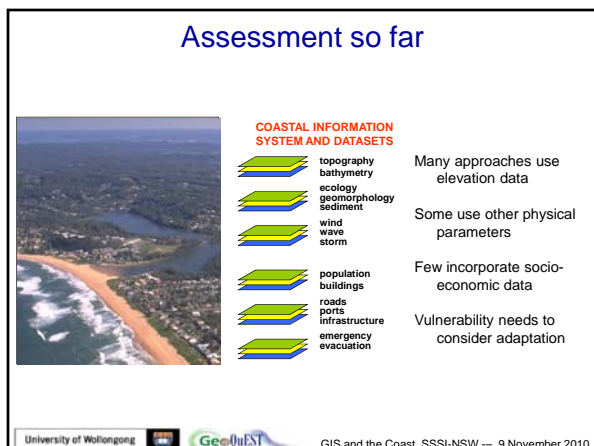
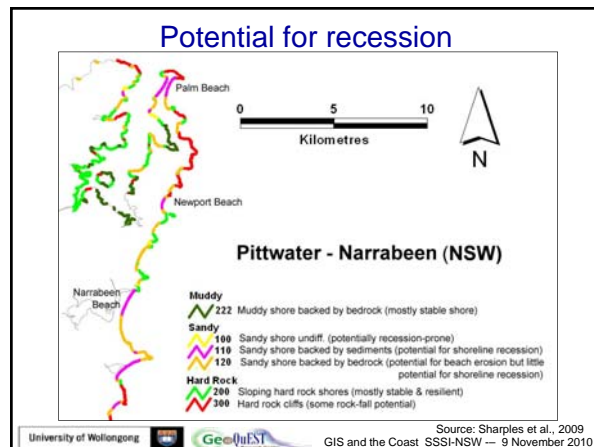
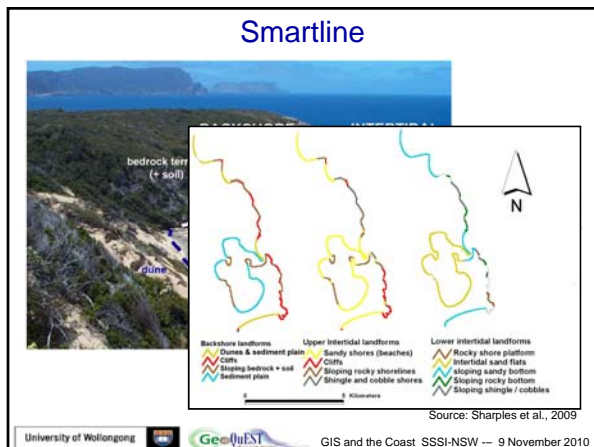
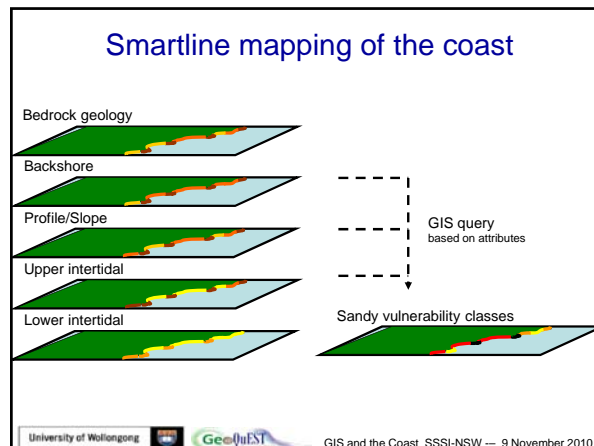
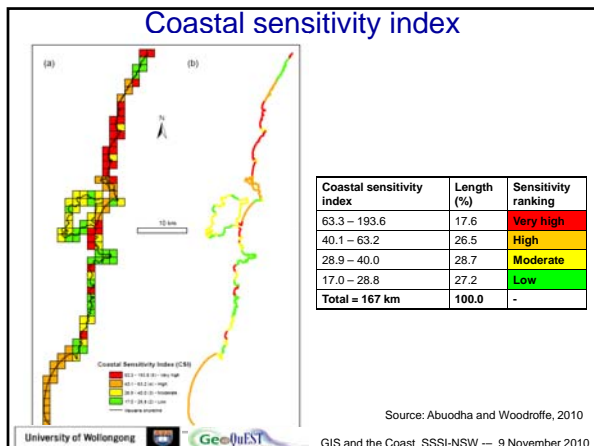
Coastal slope ~ Illawarra

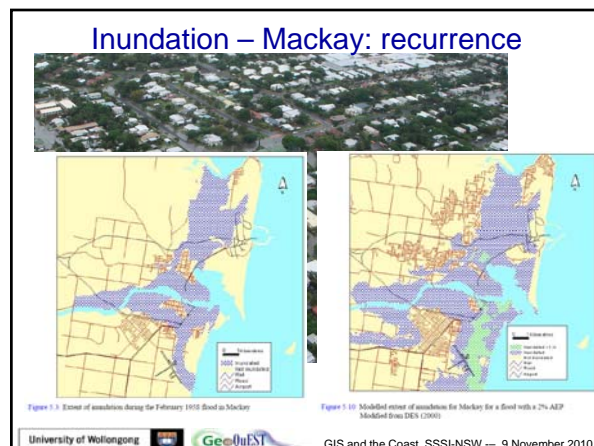
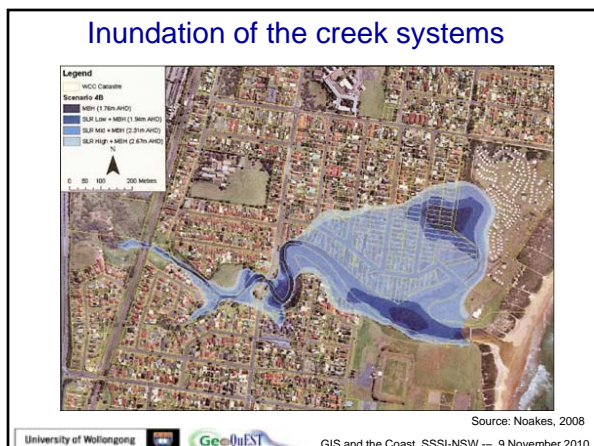
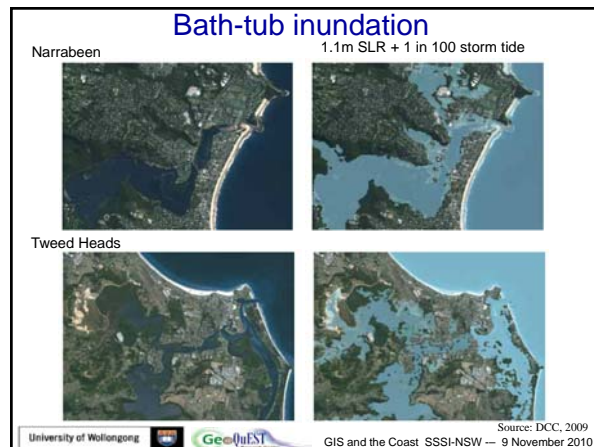
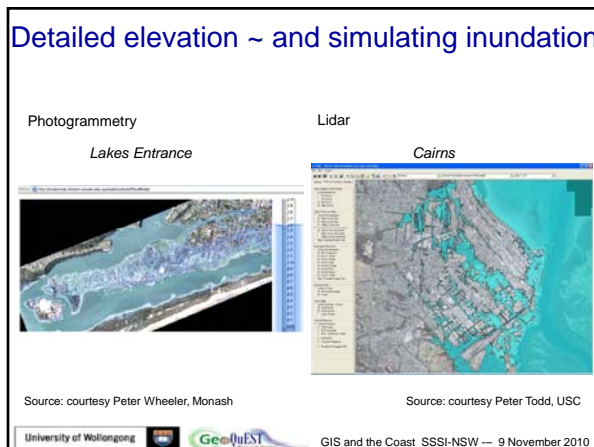
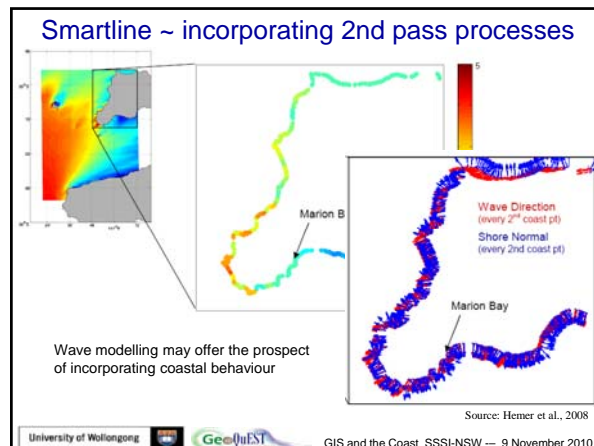
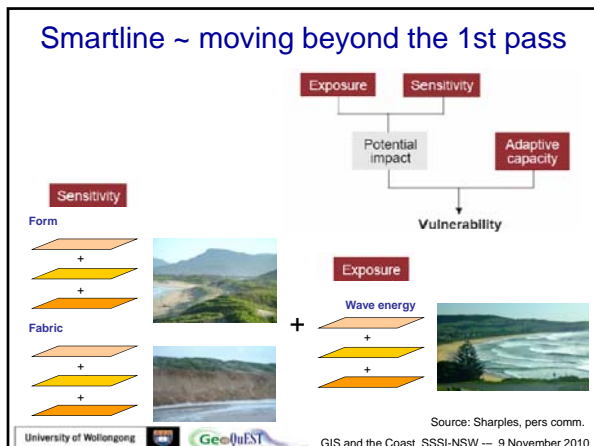


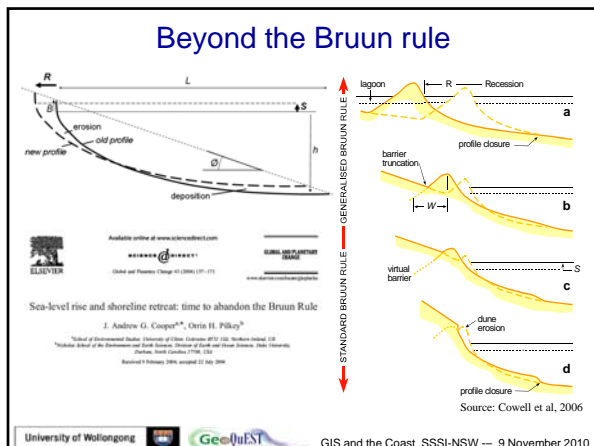
Source: Abuodha and Woodroffe, 2010

Illawarra ~ CSI vulnerability









Inundation and the Venice effect

- Exposure – often focus on beaches
- Need to incorporate hydrodynamics and coastal behaviour
- Rarely incorporate adaptation
- Few studies on estuaries
- Beware the 'Venice effect'

2007

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Summary – and conclusions

- Sea level will continue to rise
- GIS provides a very VISUAL means of indicating vulnerability
- There are different approaches appropriate at different scales
- Most focus on physical variables
 - Form and fabric; some processes
 - Few include socio-economic factors
- Need to study
 - Vulnerable estuaries – Venice effect
 - Sub-segment variability of coast
- Predictive capability still limited
 - Must incorporate coastal behaviour
 - Probabilistic approach needed
 - Scope to better use past changes

Source: Church et al., 2006

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