



UniSA

Vulnerability in transport infrastructure – and impacts of climate change ...

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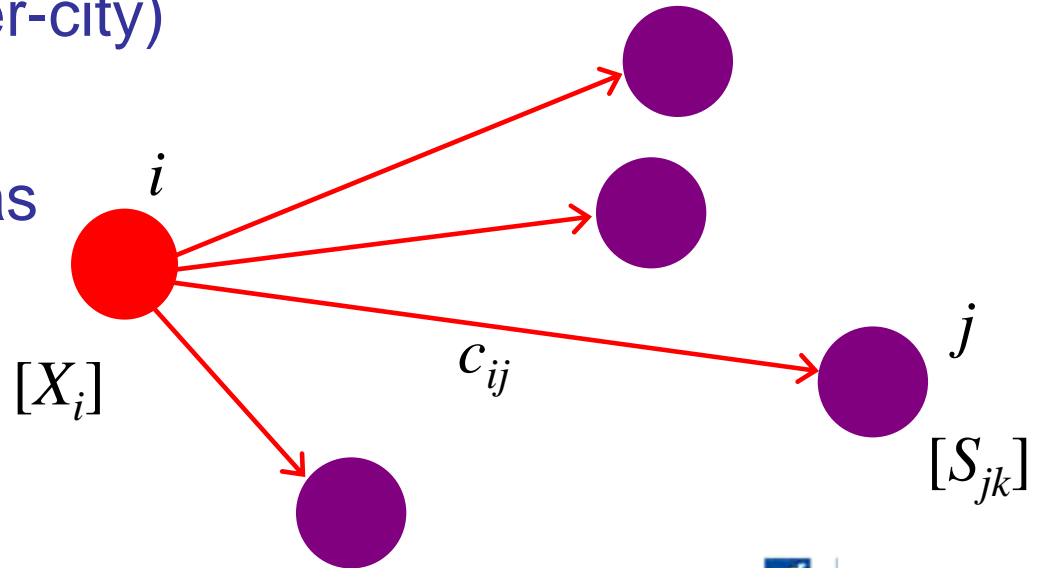
Institute for Sustainable Systems & Technologies
University of South Australia

- Defining vulnerability
- Accessibility indicators and applications
- Using accessibility in vulnerability analysis
- Case studies – SA's regional road network
- Climate change ...
- Further work

- Vulnerability is related to network reliability
- It seeks to examine the (social and economic) ***consequences*** of network failure or degradation
- And to indicate critical elements in a network
 - i.e. where failure/degradation will have the worst potential impacts
- ... use Accessibility measures as metrics

- Primerano and Taylor (2004):
 - the ease for people to participate in activities from specific locations to a destination using a mode of transport at a specific time

- Different indices are needed for different applications, e.g. spatially
 - strategic level (e.g. inter-city)
 - urban areas
 - rural (and remote) areas





ARIA Remoteness Index

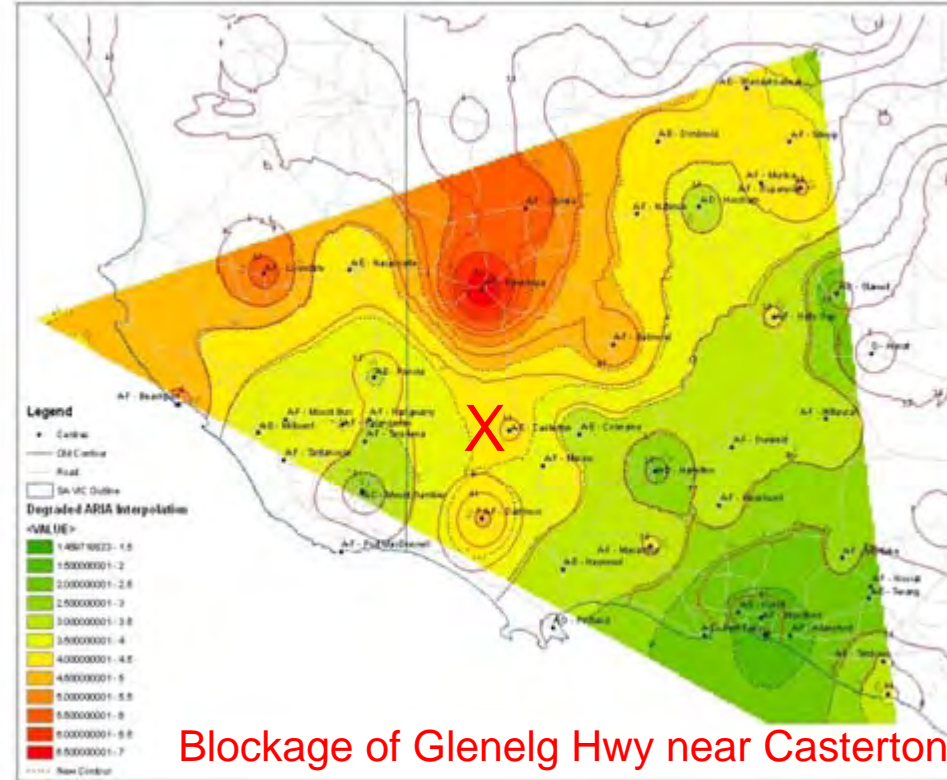
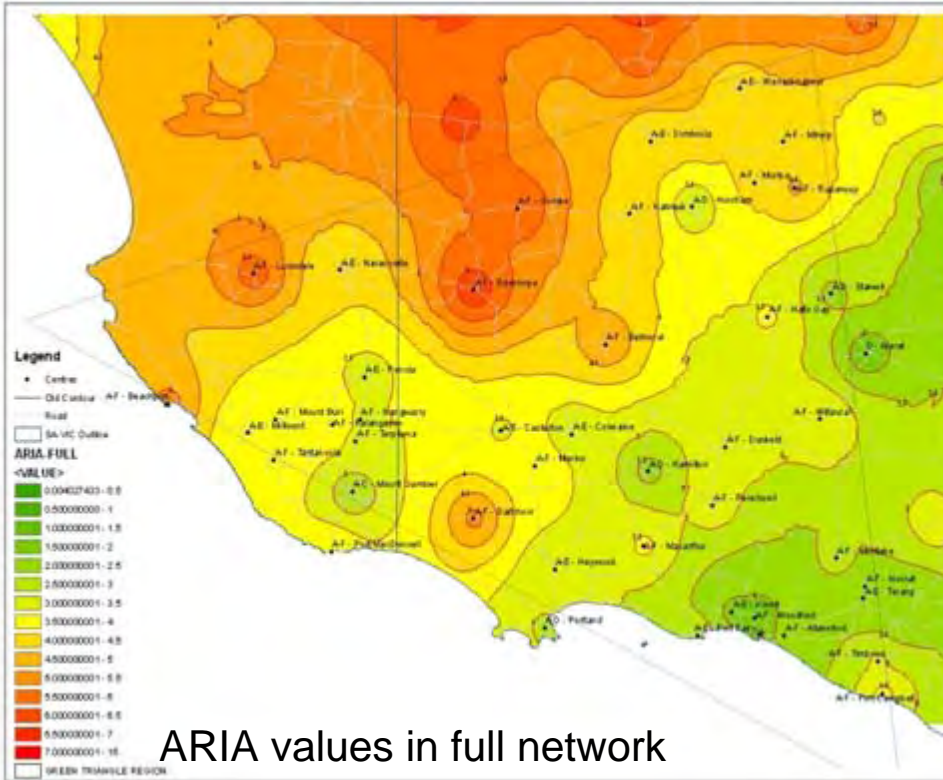
- Accessibility/Remoteness Index of Australia
- ‘All of government’ measure of access to human services (health, education, government services, etc)
- ARIA measures the relative remoteness of a locality, as
 - highly accessible
 - accessible
 - moderately accessible
 - remote
 - very remote
- Uses road distances to ‘service centres’

The 'Green Triangle'

- Mt Gambier-Warnambool-Horsham
 - straddling the SA/Vic border ...
- ARIA surfaces



ARIA surfaces ...



Climate change and network degradation



Tropical cyclone *Monty* 27/02-02/03/04



Climate change and network degradation

Tropical cyclone *Monty* 27/02-02/03/04



Maitland River bridge



Climate change and network degradation



'Black Saturday' 7/02/09



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- Automating network scans:
 - critical infrastructure locations
 - improved computation methods, including ‘metalink’ networks
- Stochastic (time dependent) vulnerability – incident-based congestion, short term (weather) events, etc