

# SEASCAPES

Volume 3, Issue 1

Autumn 2000

## Multi Hazard Risk Assessment Studies in Queensland

In mid-1999 the Department of Emergency Services in Queensland sought tenders from suitably qualified consultants to develop a multi-hazard risk assessment methodology template for local government regions throughout the State. The regions initially targeted include Cairns, Mackay and Hervey Bay.

Systems Engineering Australia Pty Ltd (SEA) was retained by the successful consortium headed by Queensland Risk Management Consultants, with technical aspects covered by BHP Engineering (now Hatch Associates).

SEA provided an assessment of the following hazards:

Cairns and Mackay:

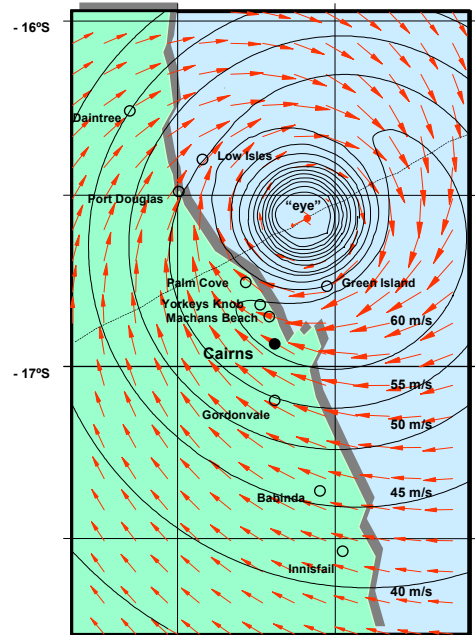
- tropical cyclone winds
- tropical cyclone storm surge
- Hervey Bay:
- tropical cyclone winds

- tropical cyclone storm surge
- severe thunderstorm winds and hail

Each of these major hazards were assessed based on historical records from the Bureau of Meteorology archives and the results of statistical and numerical modelling undertaken over a number of years.

Estimated damage factors were calculated for each suburban area based on the potential exposure of the sites and the range of predicted wind speeds from the Australian Standard wind loading code (AS1170.2 - 1989). Qualitative impacts were also provided of the extent of inundation possible due to tropical cyclone storm surge.

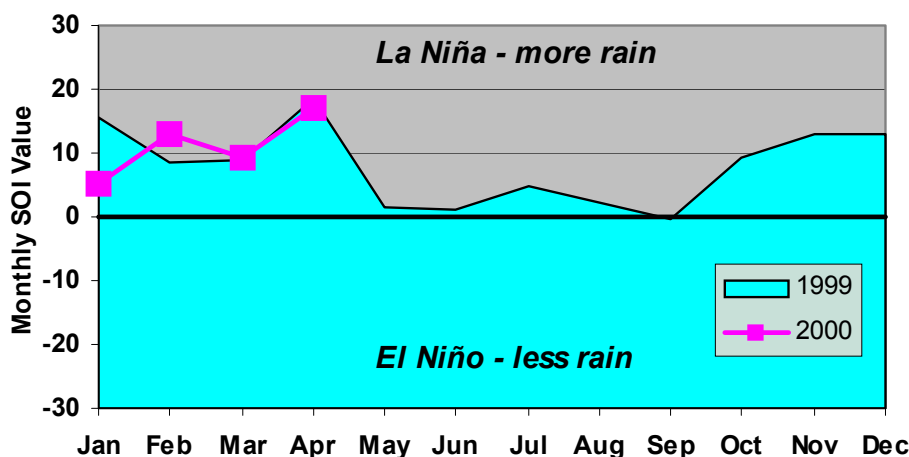
The results of the studies are expected to assist Local Government Authorities in prioritising their counter disaster planning and mitigation efforts.



A theoretical cyclone crossing the coast just north of Cairns.

## La Niña Trending Like 1999 ?

The monthly Southern Oscillation Index (SOI) has continued its increasing trend into April, essentially identical to the 1999 value at this time, and with a 5 month running mean of +11. While a drop is to be expected over the next few months, near-neutral or La Niña conditions look likely to persist for the next 6 to 9 months. This suggests a continuation of increased rainfall and tropical cyclone activity in northern Australia for the 2000/2001 season. Although only three tropical cyclones affected Queensland this year - same as last - all impacted the coastline, which is typical of the westward shift during La Niña conditions. [Data and comments based on Bureau of Meteorology sources.]



## SEASCAPES

SEASCAPES features the developing risk assessment capabilities of Systems Engineering Australia Pty Ltd (SEA). Our services include statistical analysis of tropical cyclone data, quantitative estimation of insurance losses, cyclone wind, wave and storm surge modelling, flood risk assessment and severe thunderstorm downbursts, hail and tornadoes.

Visit us on the web:  
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# The AGSO Cities Project



Bureau of Meteorology

Systems Engineering Australia (SEA) is currently assisting the Bureau of Meteorology in Queensland provide specialist input to the the Australian Geological Survey Organisation (AGSO) *Cities Project* for the Mackay and South-East Queensland regions. SEA's role is to consult and liaise with Bureau of Meteorology staff in the Queensland Regional Office to collate available data and provide technical input to the AGSO study reports covering all meteorological hazards, namely tropical cyclones, storm surge, severe thunderstorms and flooding. The flood assessment forms the greater portion of the study and has involved consultation with all regional local government authorities in SE Queensland.

The *Cities Project*, or *National Geohazards Vulnerability of Urban Communities Project*, is a four-year program of applied research and technique development designed to improve AGSO's capacity to analyse and assess the risks posed by a range of geohazards. The project is an initiative by AGSO (previously the Bureau of Mineral Resources) to broaden its traditional focus on geological hazard phenomena, especially earthquakes and volcanoes, to a more holistic focus on risk management. The developmental phase of the project is planned to run through to June 2000.

The project is managed by the AGSO Geohazards Risk Mitigation Group and its overall objective is to facilitate safer, more sustainable and more prosperous Australian communities. The research and technique development program is evolving through a series of multi-hazard case studies of increasing complexity and scale. There are four distinct series of case studies involved:

- earthquake microzonation projects of Homebush Bay (NSW), Launceston (Tasmania) and Adelaide City (SA).
- comprehensive multi-hazard risk studies of the Queensland centres of Cairns, Mackay, Gladstone and South-East Queensland. These are the core research and developmental case studies and link closely with parallel research being undertaken under the Bureau of Meteorology-led Tropical Cyclone Coastal Impacts Program (TCCIP);
- the *Newcastle 99 Project*, in which the experience of the 1989 earthquake will be used to calibrate and validate the risk analysis and risk assessment techniques, models and tools against the reality of Australia's only major urban centre earthquake disaster;
- projects addressing earthquake risk to key utility lifelines risk in the Australian Capital Territory and nine areas of the Sydney metropolitan area, commencing with Botany; and,
- a landslide risk assessment of Wollongong.



Output from the program includes published studies, presentations and comprehensive databases and mapping of the hazard phenomena and the elements at risk (the buildings, roads, infrastructure and people) in each community. Priority is also being given to the production of community awareness material, such as the *Landslide Awareness* brochure produced in collaboration with Emergency Management Australia.

## Some of the SEA Clients Since 1996

### Tropical Cyclone Risks:

- RACQ-GIO Insurance
- Commercial Union Insurance
- Suncorp Metway Insurance
- Aon Group Australia Limited
- Powerlink Queensland

### Severe Thunderstorm Risks:

- Suncorp Metway Insurance
- Macquarie University, Natural Hazards Research Centre
- Powerlink Queensland

### Flood Risks:

- RACQ-GIO Insurance, Qld.

### Coastal and Ocean Hazards:

- Woodside Offshore Petroleum, WA.
- Dept Natural Resources, Vic.
- Environmental Protection Agency, Qld.

### Multi-Hazard Studies:

- Dept Emergency Services, Qld.
- Bureau of Meteorology / AGSO

### Research:

- The Risk Prediction Initiative, Bermuda.



## Transmission Line Risk Studies

Systems Engineering Australia is currently providing specialist tropical cyclone and severe thunderstorm analyses and advice to Powerlink Queensland, the operator and owner of the extensive electricity power distribution system across Queensland. Powerlink has experienced a number of transmission line structural failures over a period of time, mainly thought to be caused by severe thunderstorms and/or tornadoes in SE Queensland. The present study is designed to re-examine these risks and also to consider tropical cyclone impacts on the distribution network across the whole State.

**Real risk management decision - making tools for your business.**

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