Darryn McEvoy

Leader of the Climate Change Adaptation Programme

Deputy Director of the Victorian Centre for Climate Change Adaptation Research (VCCCAR)

**Rotterdam September 2010**

www.rmit.edu.au

RMIT UNIVERSITY

## Melbourne, its coastline, ports and climate change

1. Introducing Melbourne
2. Coastline and climate change
3. Ports
4. Enhancing the resilience of seaports to climate change


Melbourne


## Victorian Coastal Strategy

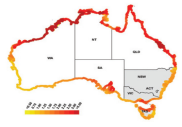
Three significant issues have been identified:

- Climate change (sea level rise)
- Population increase and urban growth (over 40 km of the urban area is already exposed to a beachfront)
- Marine ecological integrity

*Planning Policy needs to consider a sea level rise of 0.8m.*

## ASSESSING COASTAL VULNERABILITY TO CLIMATE CHANGE

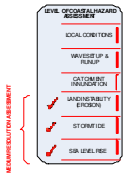
NATIONAL [1]
STATE & REGIONAL [2]



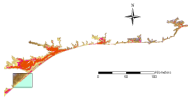
**FIRST PASS - NATIONAL COASTAL VULNERABILITY ASSESSMENT**

OUTPUTS
- National Report: *Climate Change Risks to Australia's Coast*
- Smartline dataset released(Oz Coasts webpage)
- Flood visualisation tool to be released in February
- Future work: storm surge and erosion modelling in case study areas

APPLICATION
- High level policy setting
- Identify areas where further data/information is required
- Establish priorities for additional investment



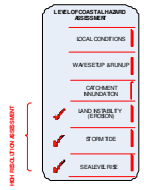

STATE & REGIONAL [2]



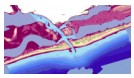
**SECOND PASS - VIC COASTAL VULNERABILITY ASSESSMENT**

OUTPUTS
- High resolution DEM released
- Victorian Coastal Vulnerability Assessment dataset to be released mid2010
- CSIRO Technical Reports

APPLICATION
- Policy development & strategic planning across Victoria
- Establish priorities for additional investment and further hazard assessment
- Monitoring and evaluating change in coastal bathymetry and topography over time
- Communication and education tool
- Input dataset for risk assessment and scenario planning
- Preliminary dataset for establishing planning overlays and flood levels in the absence of more detailed information




MUNICIPAL & SETTLEMENT

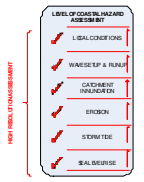


PROPERTY

**THIRD PASS – LOCAL COASTAL HAZARD VULNERABILITY ASSESSMENTS**

OUTPUTS
- Assessment of coastal hazards by 'coastal units'/municipal, settlement or property scale
- Datasets and metadata generated for selected sites and pilot study areas
- Methodology for coastal hazard assessment documented

APPLICATION
- Municipal planning schemes/planning overlays and flood levels
- Statutory planning tools
- Monitoring and evaluating change in coastal hazards over time
- Communication and education tool
- Input datasets for risk assessment and scenario planning
- Documented methodologies to guide coastal vulnerability assessments across Victoria




## Future Coasts 2nd Pass

- Using high resolution Digital Elevation Modelling (DEM), the Future Coasts team based at the Victorian Department of Sustainability and Environment (DSE) has combined the DEM with storm tide scenarios to map inundation extent for the entire Victorian coast. This work has been done in collaboration with CSIRO (Commonwealth Scientific & Industrial Research Organisation).
- Currently, DSE's Future Coasts team is completing the post-processing data (involving Quality Assurance). The team is refining the dataset so that it is usable for local stakeholders, ensuring that it meets the public need.
- It is anticipated that this information will be released in early 2011.
- Future Coasts Program (www.climatechange.vic.gov.au/futurecoasts)


Port of Melbourne Corporation

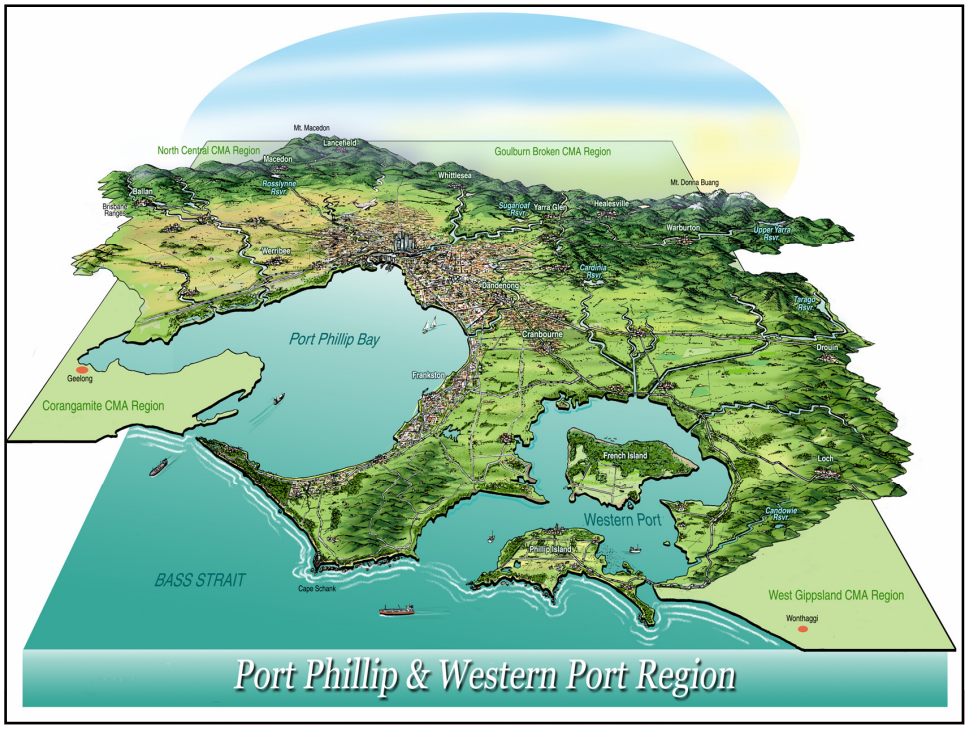

MSC ELEONORA
Port of Melbourne Corporation

## Melbourne's ports

The Port of Melbourne is Australia's largest container port (other Melbourne ports include Hastings, Geelong and Portland), however faces a series of challenges in the future:

- Rapidly increasing activity (throughput doubling to 4.4 million containers by 2020, and almost doubling again to 8 million by 2035)
- Competition for land
- Bay, rather than deep sea, port (controversial dredging issue)
- Traffic congestion





## Where to next?

- Legislation introduced to State Parliament in June 2010 has also set in motion plans to merge the ports of Melbourne and Hastings.
- Proposal presented to Ports and Major Projects Minister, and circulated to other Government ministers to gradually transfer operations from the Port of Melbourne to Geelong and Hastings.
- An international container terminal would be built at Geelong, ready for operation in about a decade.
- In the longer term — over about the next 30years — Hastings' deepwater port expanded.
- Removes port operations from inner Melbourne, freeing up the docks for a new waterfront residential and commercial hub.



## Where to next?

- Port of Hastings has the benefits of being deep water, it is outside of the metropolitan area (and a large proportion of the containers are destined for the SE corridor), land availability which can be purchased relatively cheaply, new build therefore an opportunity to plan forward in a sustainable manner (and take account of climate change).
- BUT, there are transport issues including the need to upgrade the rail link and the road links, Hastings is currently a small community (need for significant new infrastructure), concern about the impact on the environment, particularly wetlands with RAMSAR status.



## Enhancing the resilience of seaports to climate change

A rise in sea level is the most obvious concern, though other important climate-related hazards will also act to amplify adverse impacts on structural and functional resilience e.g. changes to temperature regimes, precipitation patterns, wetting and drying cycles, soil moisture, storm events, sea surge etc.

- Work package 1: Understanding future risks (climate and non-climate)
- Work package 2: Structural resilience
- Work package 3: Functional resilience

## Enhancing the resilience of seaports to climate change

**Structural resilience**

Activity is comprised of three main components:

1) mapping and characterising the vulnerability of different port infrastructure according to a system hierarchy;
2) undertaking detailed predictive modelling of the deterioration of key infrastructure (software models plus 3D visualisation capacity to allow strategic targeting of hot spots);
3) developing resilience metrics (and data for the development of composite resilience indices).



## Enhancing the resilience of seaports to climate change

**Functional resilience**

Issues of functional resilience will be addressed according to:

1) land use patterns;
2) port operation and freight distribution;
3) organisational structure and institutional adaptive management;
4) employment, skills and work-force preparedness.

## Enhancing the resilience of seaports to climate change

**Deliverables:**

- State-of-the-art knowledge and methodologies for the assessment of infrastructure vulnerability to climate-related hazards (core and wider environs)
- Software tools and models (including visualisation capacity),
- Identification and evaluation of adaptation measures with recommendations for design guidance and management strategies,
- A system of resilience metrics based on structural, functional and institutional attributes. This data will be integrated to produce composite resilience indices for ports which will be replicable nation-wide (with relevance internationally).



## Contacts:

Ports: Ralph Kenyon (ralph.kenyon@portofhastings.vic.gov.au)

Future Coasts: Jenni Rigby (jenni.rigby@dse.vic.gov.au)

www.rmit.edu.au

RMIT UNIVERSITY