A decision support toolkit for 'Climate Smart' seaports

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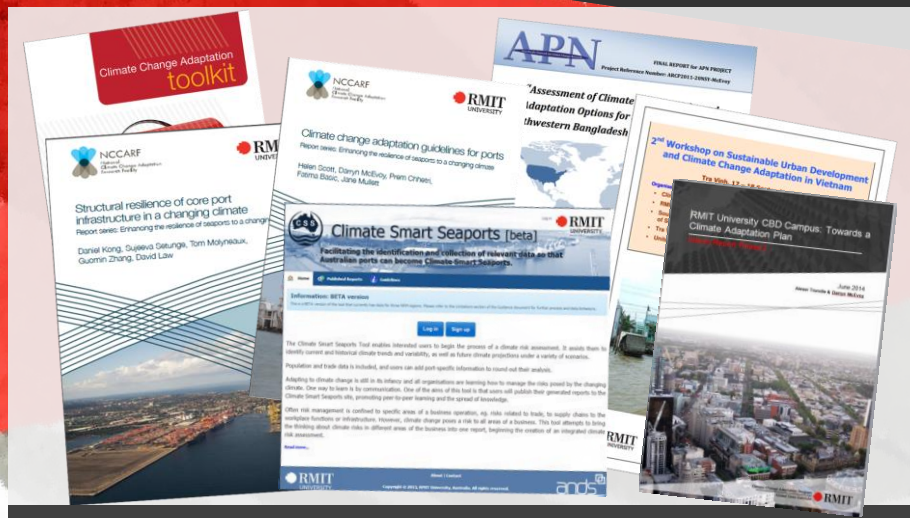

Work in Australia, the Pacific and Asia

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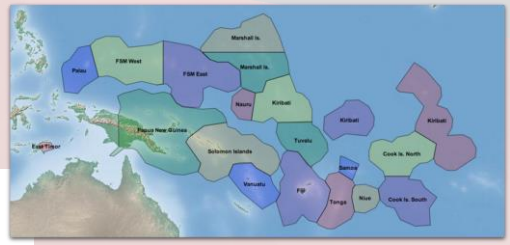
Project background: focus Australia and Pacific

Regions defined by the CSIRO Marine & Atmospheric Research (CMAR)
Australia: natural resource management (NRM)
Pacific: Flander's Marine Institute & CSIRO



Case studies in Australia:
Gladstone Ports Corporation (Gladstone)
NSW Ports (Port Botany, Port Kembla, Yamba, Eden)
Gippsland Ports (Lakes Entrance, Corner Inlet)

Case Studies in the Pacific:
Fiji Ports Corporation (Suva Port)
PNG Ports Corporation (Port Moresby)
Swire Shipping

Funders: Australian National Data Service; USAID

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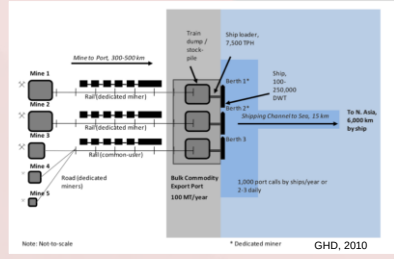
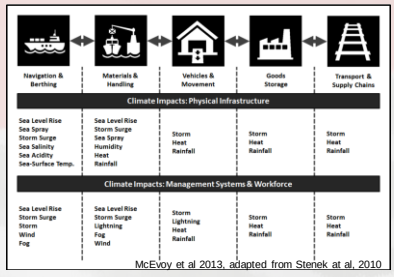
Why seaports?

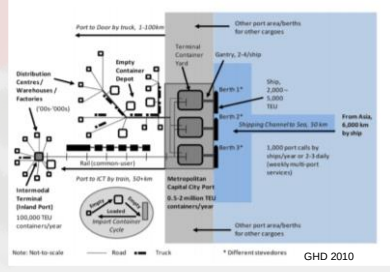
- Ports are responsible for between 80 – 90% of all trade
- Ports are nodes in a wider transport network
- Climate impacts on ports vary spatially and temporally (including extreme events and long term climate change)
- Few ports have dealt with climate change across all areas of the port business
- Integrated management of climate change is needed



GHD, 2010



McEvoy et al 2013, adapted from Stenek at al, 2010



GHD 2010

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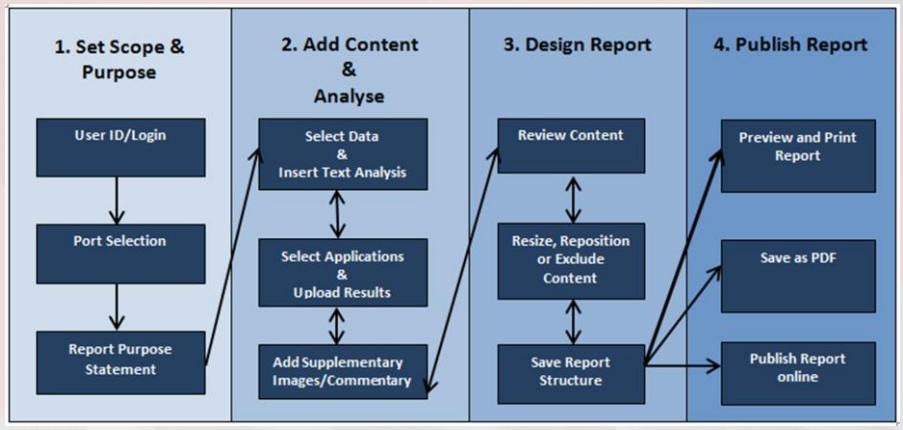
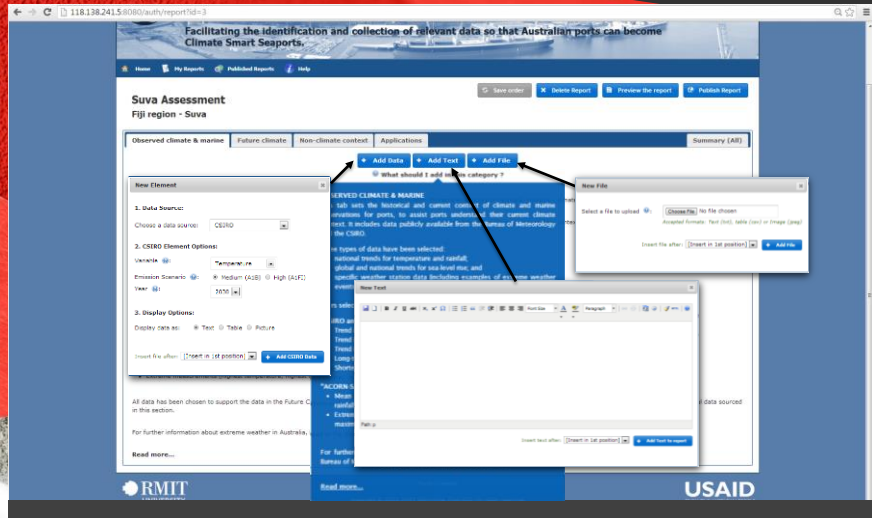
Harnessing sectoral expertise



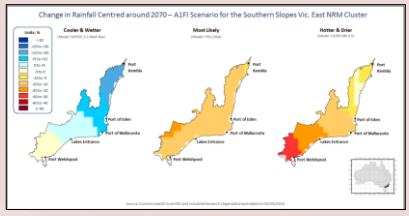
Aim is the creation of a report that can be used within the port business as a starting point for adaptation actions

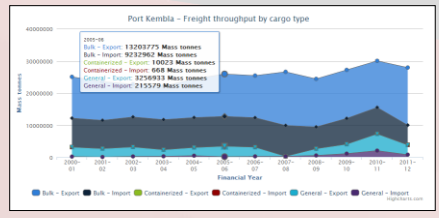
Workboard process



Steps: Observed Climate/Marine > Future Climate/Marine > Non-Climate > Applications

Trusted data: Australia



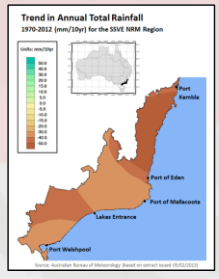


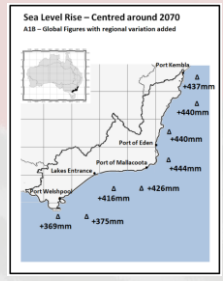
Observed trend in:
- temperature
- rainfall
- sea level

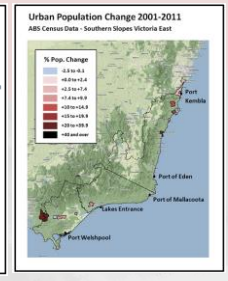
Observed extremes
- temperature
- rainfall
- wind gust

Observed & projected mean:
- temperature
- rainfall
- relative humidity
- wind speed

Projected sea level rise







Spatial and temporal compatibility issues across climate and non-climate data

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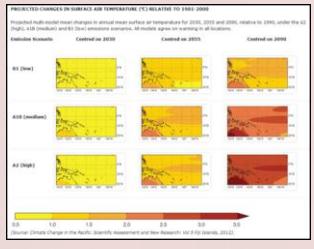
Trusted data : Pacific

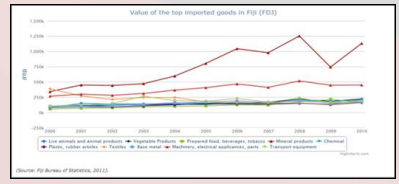
Observed trend:
- max/min temperature
- rainfall
- sea level

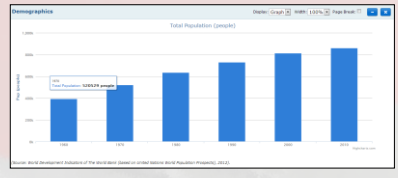
Observed extremes:
- max. temperature
- rainfall
- wind
- sea level

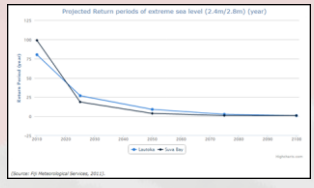
Projected mean:
- temperature
- rainfall

Projected extremes:
- max. temperature
- rainfall (>200mm)
- Wind (>80kts)
- sea level (>2.4/2.8m)









Availability and compatibility issues across climate and non-climate data

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Applications: Past impact

Past Climate Impact Description

Display: Graph Width: 100% Page Break:

Consequences Rating of Storm surge in 1995

In 1995, the port experienced a disruptive storm surge event. This event impacted the port directly. The impact was described as: *"Surge flooded the port and work stopped for 4 days during the storm and during the clean up."*

The identified business consequences of these impacts, and their severity can be represented by the following graph:

Other business consequences of these impacts are identified as: *"There were no other business consequences"*

The response to this disruptive climate related event is described as *adequate*. The following changes have been nominated as a result of the event: *"no"*

A new impact description can be generated for each climate event: a qualitative approach

Applications: Current vulnerability

Current climate vulnerability assessment for Port ..... Date .....

Work through this table with your colleagues and rate your agreed understanding of the current impact each *climatic event* has on each *area of port activity*. Use the table at the end of this document for the rating (5 – significantly vulnerable to 1 – not vulnerable). Put the information back into the tool provided.

		CLIMATIC EVENTS										
		Sea current	Wave climate	Sea surface temperature	Sea salinity	Storm surge	Cyclones	Intense rainfall	Other severe climates	Heat wave	Drought	
Marine infrastructure	Channels											
	Port entrance											
Port infrastructure	Shore protection (seawalls, breakwaters)											
	Vessel roadstead (berths, jetties)											
Port superstructure	Other Paving, surfacing											
	Drainage systems											
	Cargo storage (stacking yards, warehouses, silos)											
	Offices, service buildings											
Operations	Ship to shore cargo handling (RoRo, LoLo, bulk solids, bulk liquids)											
	Quay and terminal cargo handling (fork lifts, trucks, carriers)											
Supply Chain	Hinterland connections (road, rail, waterways)											
	Coastal connections (shipping, ports)											
Workforce	Health											
	Safety											

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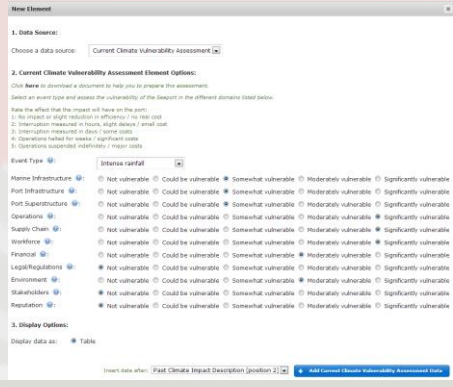
- Driven by port expertise: a qualitative approach
- Downloadable form, enabling 'workshop' interaction
- Online Tool - displays as a table
- Can be repeated for multiple past events, or used across port sectors (eg. OH&S vs. engineering)



Applications: Risk rating of impacts

- Download risk table
- Rate consequence & priority
- Build group consensus
- Upload results to tool

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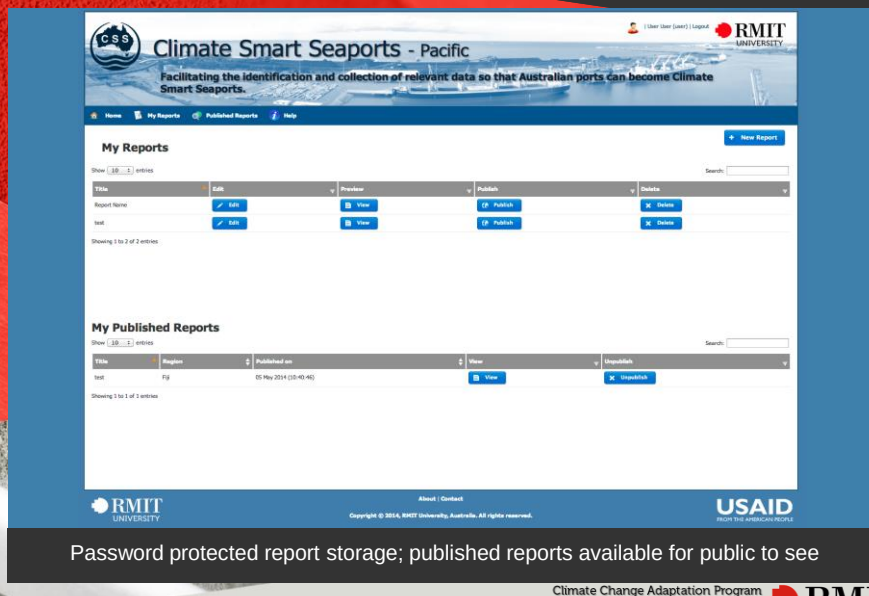
Report storage



Password protected report storage; published reports available for public to see

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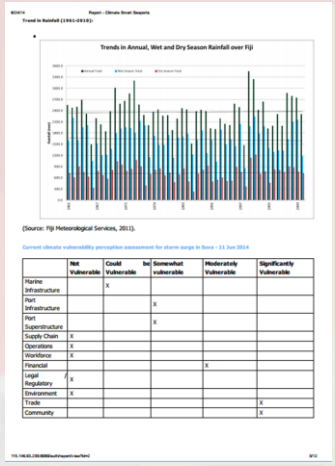
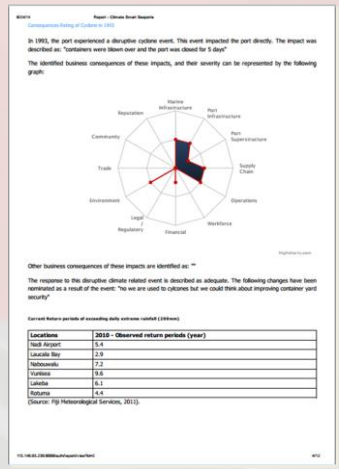
Report extraction





Report Preview: Order data/text, Exclude elements, Publish Report or Print

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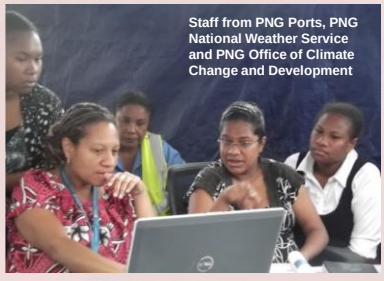
Workshops


Staff from PNG Ports, PNG National Weather Service and PNG Office of Climate Change and Development


Staff from Fiji Ports, Fiji Ships & Heavy Industries and Port Terminal Ltd

Group workshop sessions in Fiji and PNG: iterative input into tool development

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Online Access

Climate Smart Seaports – Pacific
http://115.146.87.23:8080/

Climate Smart Seaports – Australia
http://seaports.eres.rmit.edu.au:8080/

Code
http://code.google.com/p/climate-smart-seaports/

Deploying the software
https://github.com/eresearchrmit/seaports-pacific

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Thank you

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