
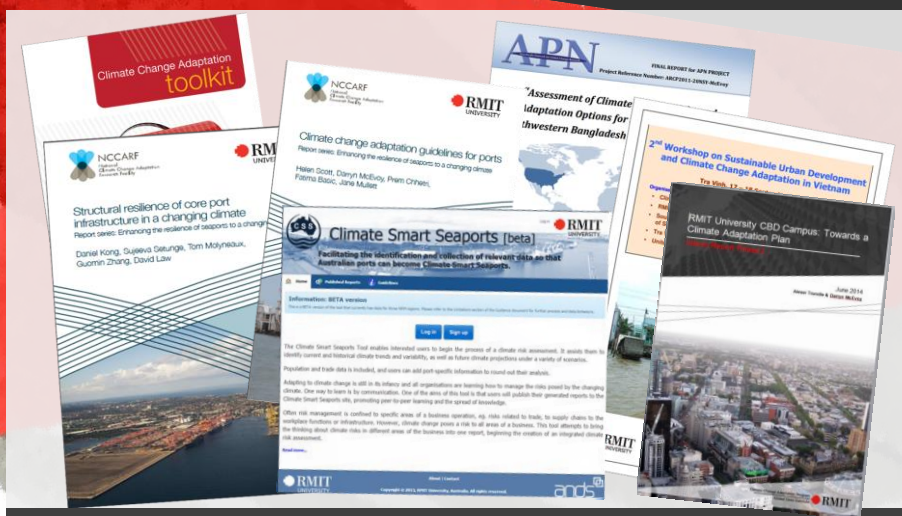


A decision support toolkit for 'Climate Smart' seaports


Darryn McEvoy, Jane Mullett, Alexei Trundle, Sophie Turner, Helen Scott
Heinz Schmidt, Guillaume Prevost, Ravi Sreenivasamurthy

Climate Change Adaptation Program
Global Cities Institute  **RMIT**

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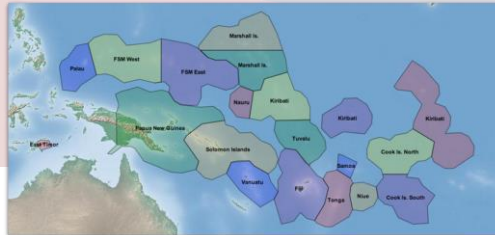


Work in Australia, the Pacific and Asia

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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:

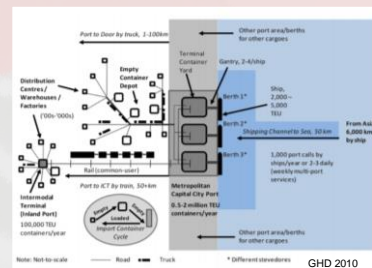
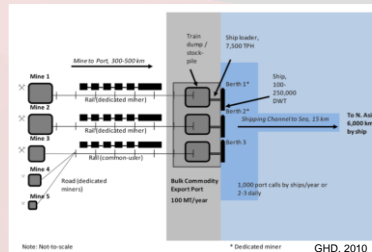
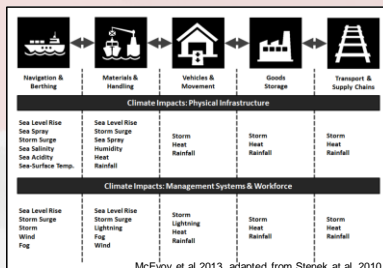
Fiji Ports Corporation (Suva Port)
 PNG Ports Corporation (Port Moresby)
 Swire Shipping

Funders: Australian National Data Service; USAID

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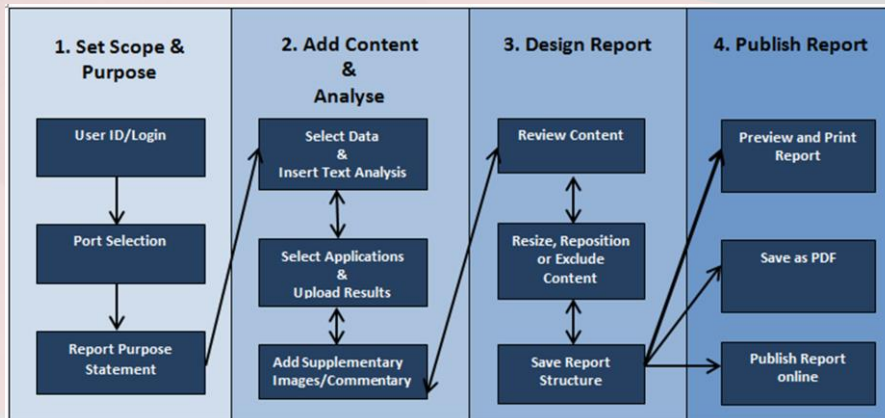
Why seaports?

- 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



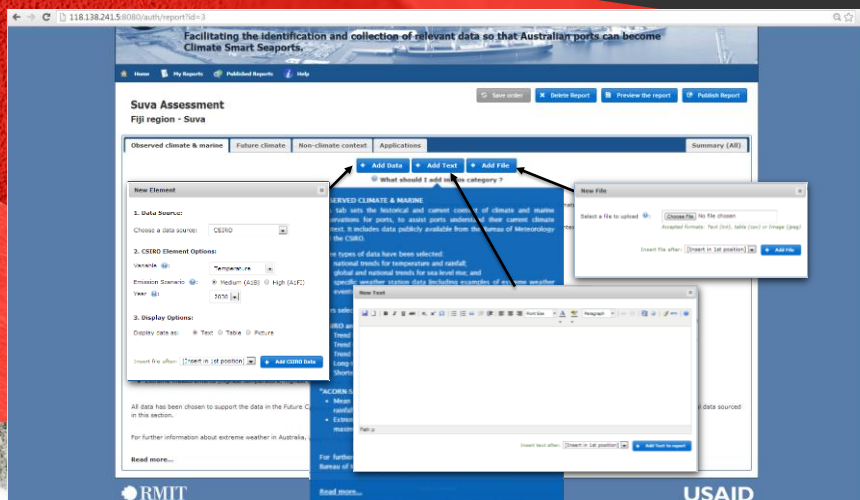
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Harnessing sectoral expertise



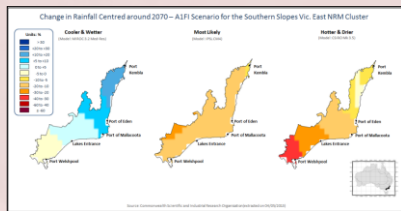
Aim is the creation of a report that can be used within the port business as a starting point for adaptation actions

Workboard process



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

Trusted data: Australia



Observed trend in:

- temperature
- rainfall
- sea level

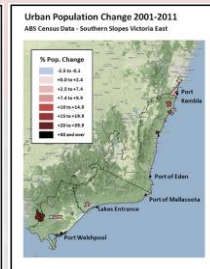
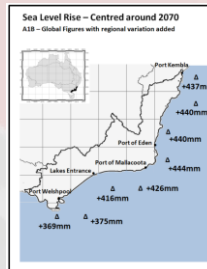
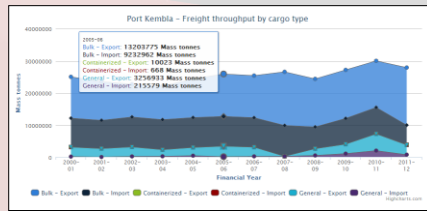
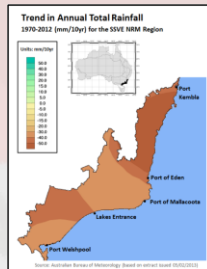
Observed extremes

- 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

Trusted data : Pacific

Observed trend:

- max/min temperature
- rainfall
- sea level

Observed extremes:

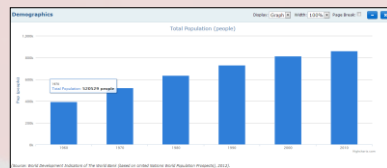
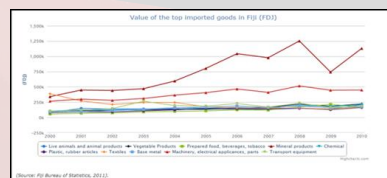
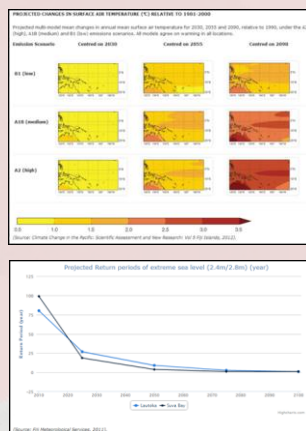
- max. temperature
- rainfall
- wind
- sea level

Projected mean:

- temperature
- rainfall

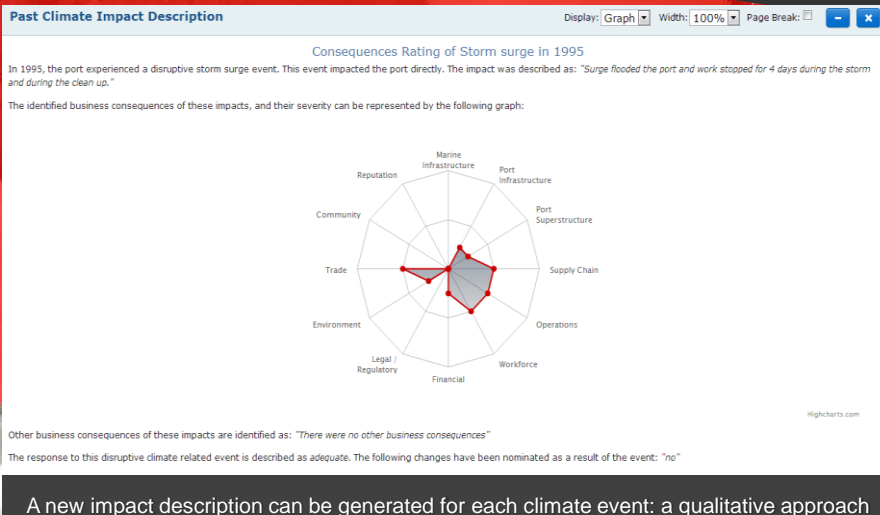
Projected extremes:

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



Availability and compatibility issues across climate and non-climate data

Applications: Past impact



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 level rise	Wind damage	Sea level rise	Storm surge	Cyclones	Extreme rainfall	Wild fires / drought	Heat waves	Drought
Marine infrastructure	Channel									
	Port entrance									
Port infrastructure	Shore protection (seawalls, breakwaters)									
	Vessel moorings (berths, piers)									
Port superstructure	Other Paving, surfacing									
	Drainage systems									
	Cargo storage (warehouses, yards, container stacks)									
Operations	Other, service buildings									
	Ship to shore cargo handling (cranes, LCL, bulk solids, bulk liquids)									
Supply Chain	On-shore and terminal cargo handling (port BUs, truck, rail, etc.)									
	Intermodal connections (road, rail, waterways)									
Workforce	Coastal connections (shipping ports)									
	Health									
	Safety									

Page 1 of 2

- 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)

New Element

1. Data Source:

Choose a data source: Current Climate Vulnerability Assessment

2. Current Climate Vulnerability Assessment Element Options:

Click here to download a document to help you to prepare this assessment.

Select an event type and assess the vulnerability of the impact in the different domains listed below.

Rate the effect that the impact will have on the port:

1. No impact or slight reduction in efficiency / no net cost
2. Interruption measured in hours, slight delay / small cost
3. Interruption measured in days / some cost
4. Operations halted for weeks / significant cost
5. Operations suspended indefinitely / major costs

Event Type:

Intensity Level:

Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Marine Infrastructure: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Port Infrastructure: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Port Superstructure: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Operations: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Supply Chain: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Workforce: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Financial: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Legal/Regulatory: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Environment: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Stakeholders: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

Reputation: Not vulnerable | Could be vulnerable | Somewhat vulnerable | Moderately vulnerable | Significantly vulnerable

3. Display Options:

Display data as: Table

Insert data when: Past Climate Impact Description (position 2)

Add Current Climate Vulnerability Assessment Data

Applications: Risk rating of impacts

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

Risk no.	Climate change effects	Risk area	Risk description	Details of risk (exposed threshold)	Future consequences	Priority
1	Increased sea surge	Marine infrastructure	Sediment movement, channels need deepening	Designing to based on an annual cycle		
2	Increased sea surge	Port Operations	Timing of equipment with weather zone	Costs of maintenance/ replacement of equipment		
3	Increased sea surge	Supply chain	Flooding of key road for transport of goods	High risk if road washes out		

New Element

1. Data Source:
Choose a data source: Future Climate Risk Assessment

2. Future Climate Risk Assessment Element Options:
Download Future Climate Risk Assessment Matrix

Event Type: Heat wave
Supply Chain

Description of the risk

Details of the risk (eg: current thresholds)

Description of the consequences

☐ None or Negligible
 ☐ Minor
 ☐ Medium
 ☒ Major
 ☐ Extreme
 Almost Certain

Risk Category	CONSEQUENCE RATING				
	1	2	3	4	5
1. Marine infrastructure	No impact or slight reduction in efficiency	Interruption measured in hours, slight delays	Interruption measured in days, dredging/clearance of channels needed	Operations halted for weeks	Operations suspended indefinitely
2. Port infrastructure	No impact or slight reduction in efficiency	Interruption measured in hours, slight delays	Interruption measured in days, repairs needed	Operations halted for weeks	Operations suspended indefinitely
3. Port superstructure	No impact or slight reduction in efficiency	Interruption measured in hours, slight delays	Interruption measured in days, repairs needed	Operations halted for weeks	Operations suspended indefinitely
4. Operations	No impact or slight reduction in operations/equipment efficiency	Interruption measured in hours, slight delays	Interruption measured in days, damage to equipment	Operations halted for weeks	Operations suspended indefinitely
5. Supply chain	No impact or slight reduction in commodity transfer	Interruption measured in hours, slight delays	Interruption measured in days, damage to equipment	Operations halted for weeks	Operations suspended indefinitely
6. Healthcare, health and safety	Local treatment with quick recovery, hot effects	Medical triage short term, off work to			
7. Financial	Slight increase in costs and liabilities or slight reduction in income, negligible	Increase in reduction in profit, slight			
8. Legal/regulatory	Compliance not needed	Regulatory conditions			
9. Environment	On-site impact contained with little damage (on site)	On or off site damages, spillage, on			
10. Stakeholders (community, partners)	Minor opposition, need to explore relationships	Prohibit its minor acts			
11. Reputation	Clients suffer minor disruptions	Clients call or text			

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Report storage

Climate Smart Seaports - Pacific

Facilitating the identification and collection of relevant data so that Australian ports can become Climate Smart Seaports.

User Name (last) | Logout

Home
My Reports
Published Reports
Help

My Reports

Show 1 to 2 entries

Title	Sub	Provider	Publish	Delete
Report Name	Edit	View	Publish	Delete
test	Edit	View	Publish	Delete

Showing 1 to 2 of 2 entries

My Published Reports

Show 1 to 1 entries

Title	Region	Published on	View	Unpublish
test	PI	05 May 2014 (10:40:40)	View	Unpublish

Showing 1 to 1 of 1 entries

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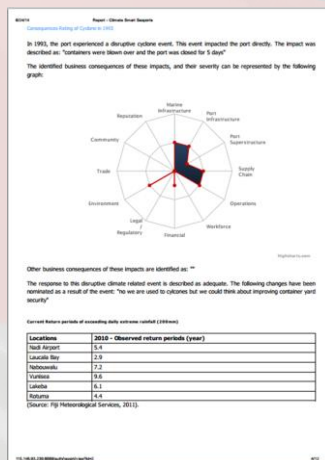
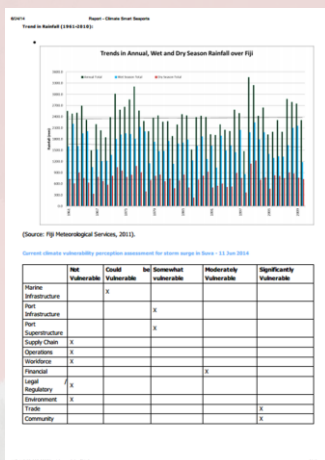
FROM THE AMERICAN PEOPLE

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

Workshops



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

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>

Thank you

Jane Mullett

jane.mullett@rmit.edu.au