



GEORGES BAY

Tides, sea level rise & coastal risks.

18 June 2026

Panorama Hotel, St Helens



ACEAS
Australian Centre for Excellence
in Antarctic Science

UNIVERSITY of
TASMANIA 

climate
futures 

Natural Hazards Atlas
TASMANIA



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Acknowledgement of Country

We acknowledge the Traditional Custodians of the various lands on which we work today and the Aboriginal and Torres Strait Islander people participating in this meeting.

We pay our respects to Elders past, present and emerging, and recognise and celebrate the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters of Tasmania.



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GEORGES BAY

Preparing for future sea level changes

Dr Karen Palmer



Australian Government
Australian Research Council

The Australian Centre for Excellence in Antarctic Science is a
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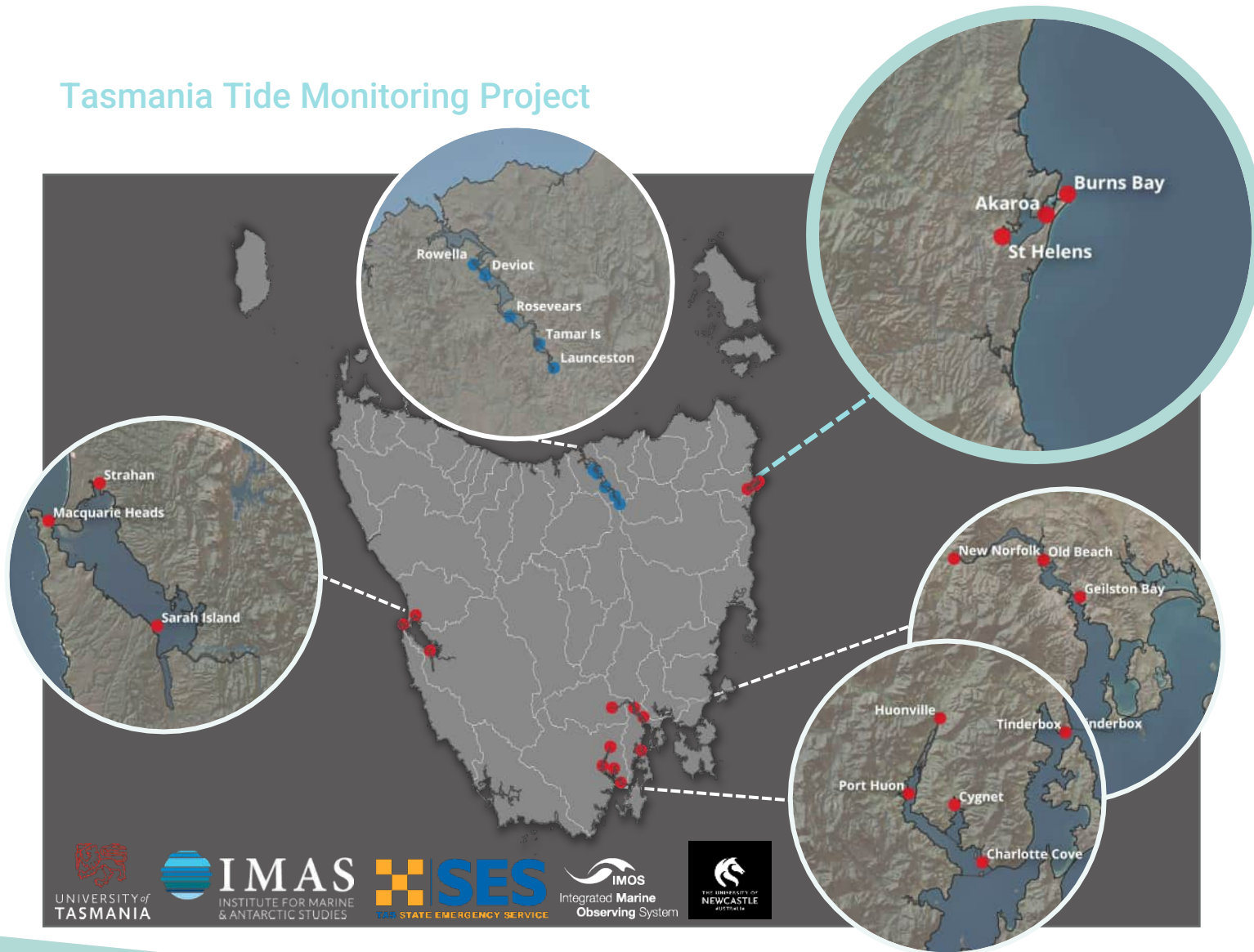
This research was supported by the Australian Research Council Special Research Initiative,
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GEORGES BAY

Tasmania Tide Monitoring Project

Tasmania Tide Monitoring Project



Short-term monitoring in locations having high risk and poor data



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Tasmania Tide Monitoring Project

Burns Bay



Akaroa

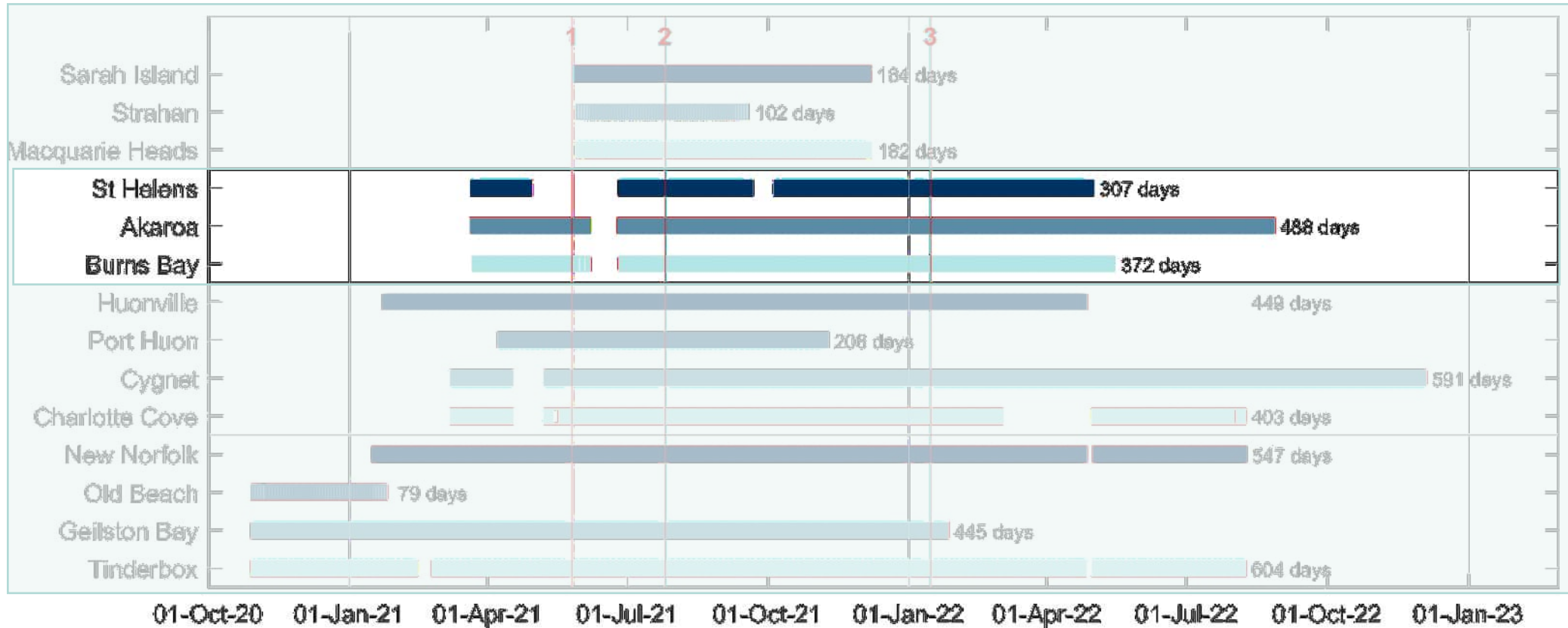


St Helens



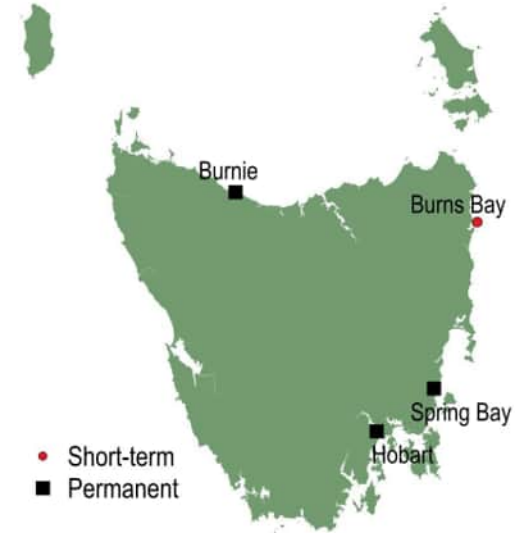
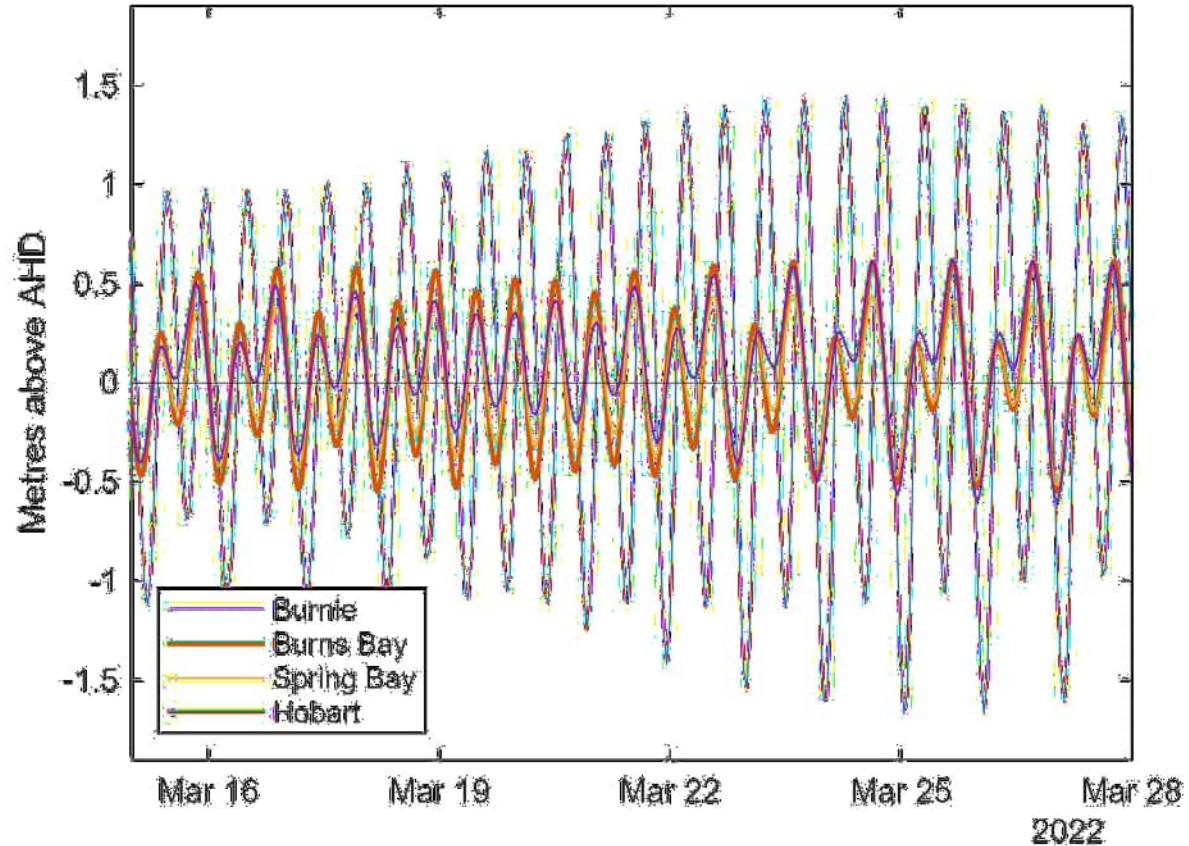
Tasmania Tide Monitoring Project

Macquarie Harbour - Georges Bay – Huon - Derwent



Tasmania Tide Monitoring Project

Burns Bay compared with long-term tide gauges



Ocean conditions at
Burns Bay are
closest to Spring Bay
- but not the same

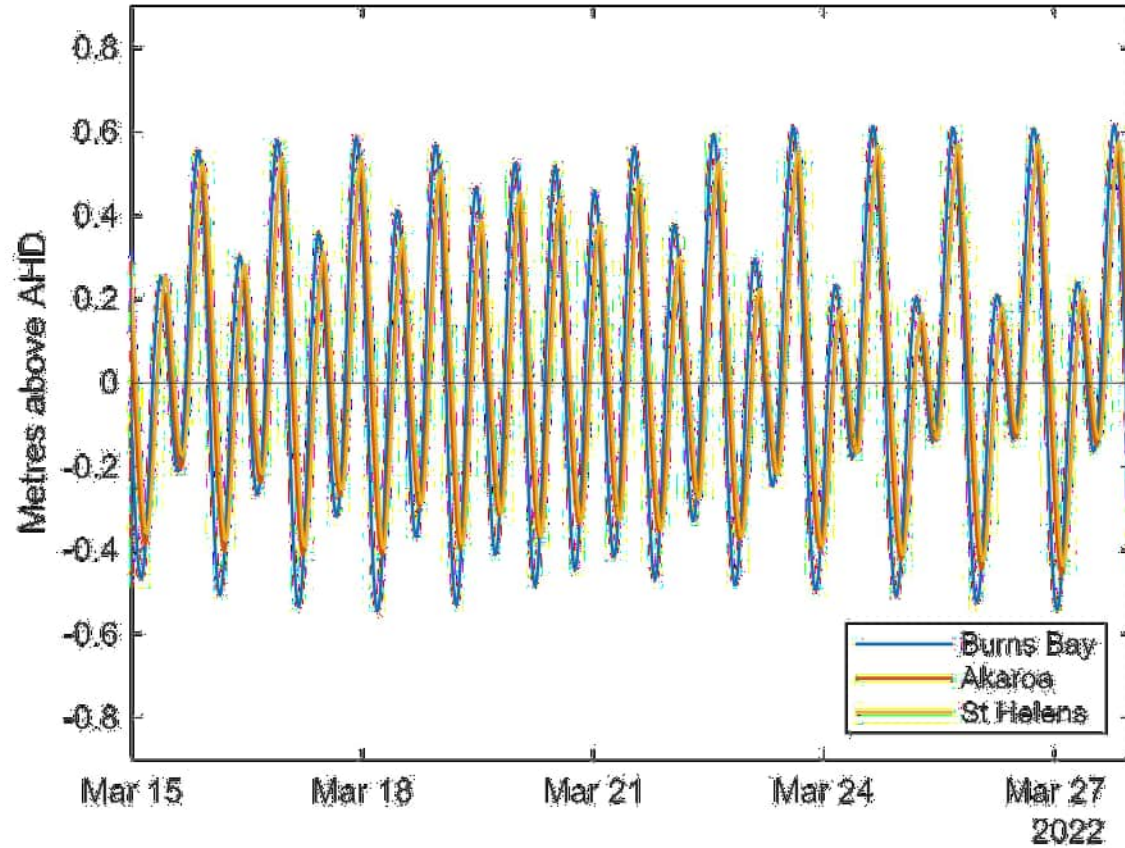


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Tasmania Tide Monitoring Project

Tides within Georges Bay

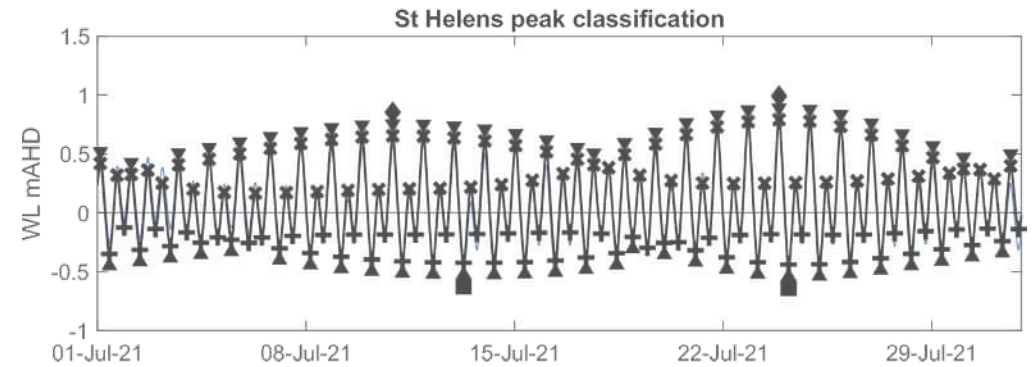
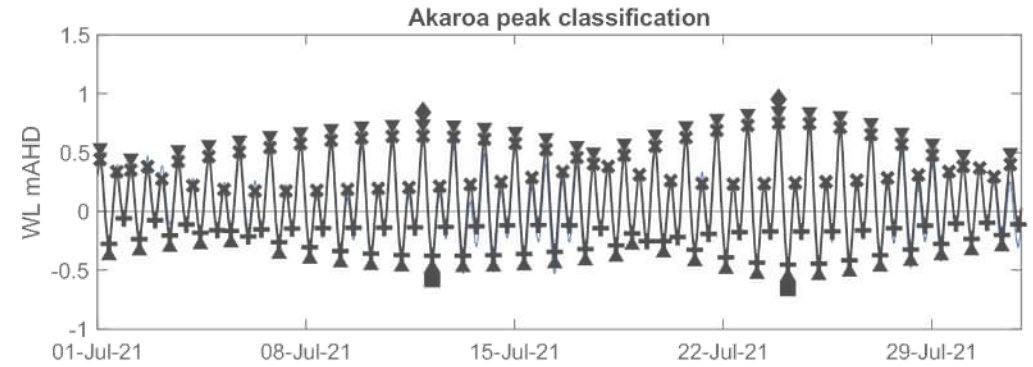
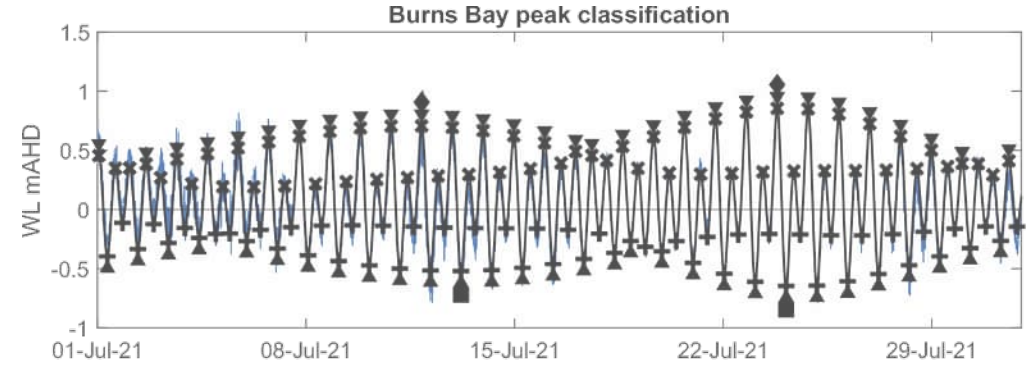
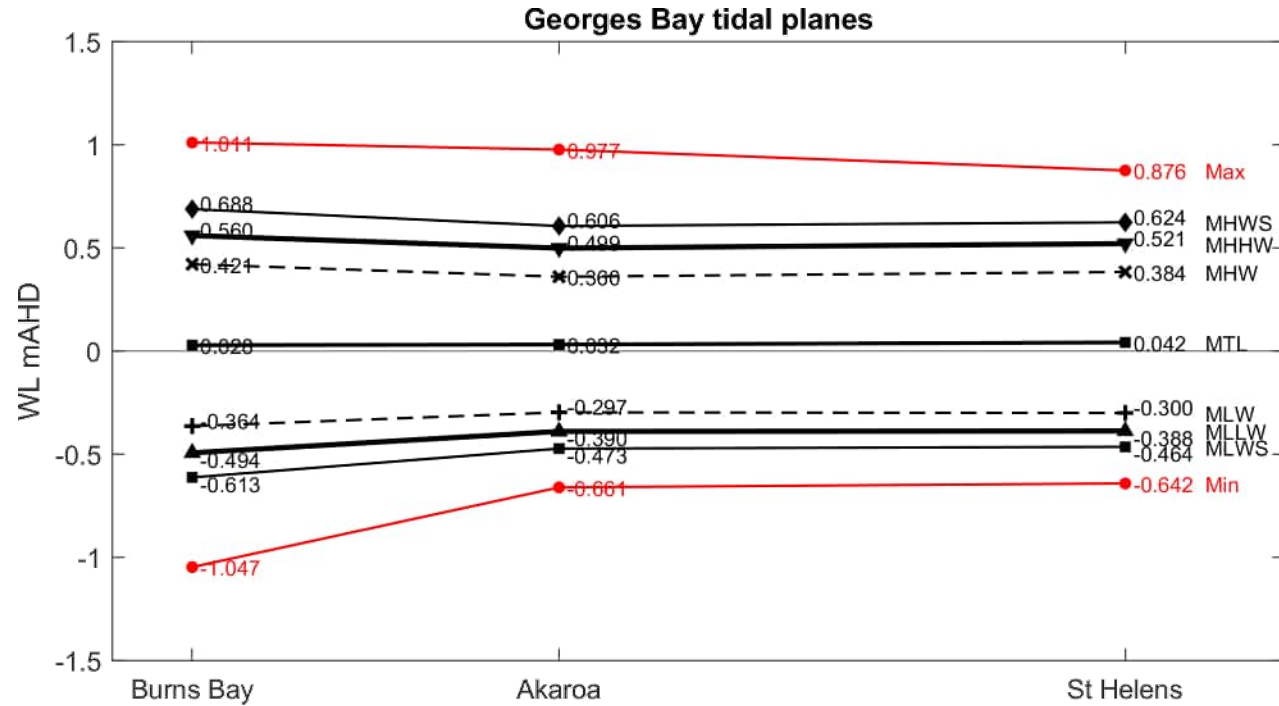


Tides and surges are reduced by the constricted entrance into Georges Bay - but not by much



Tasmania Tide Monitoring Project

Georges Bay

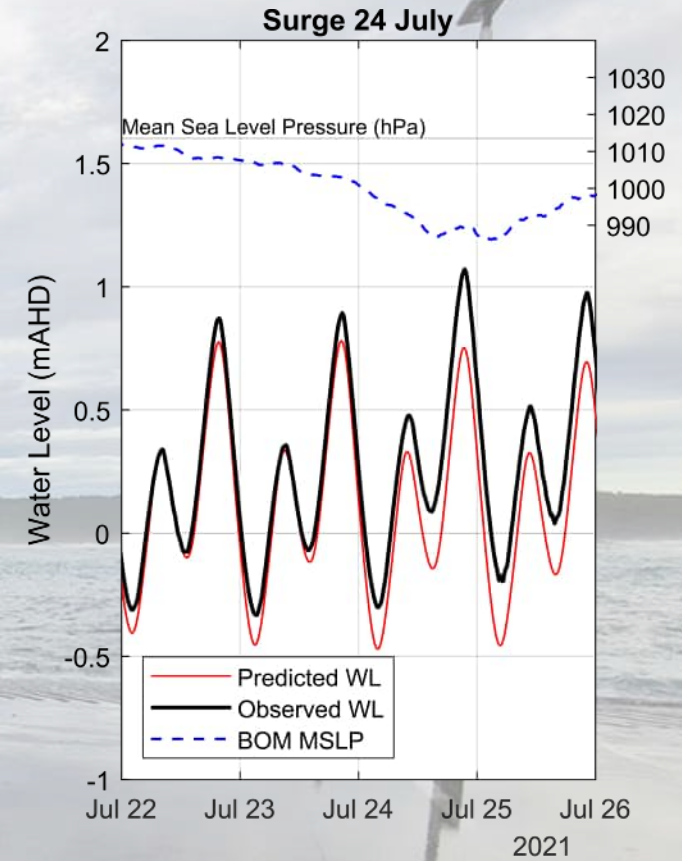
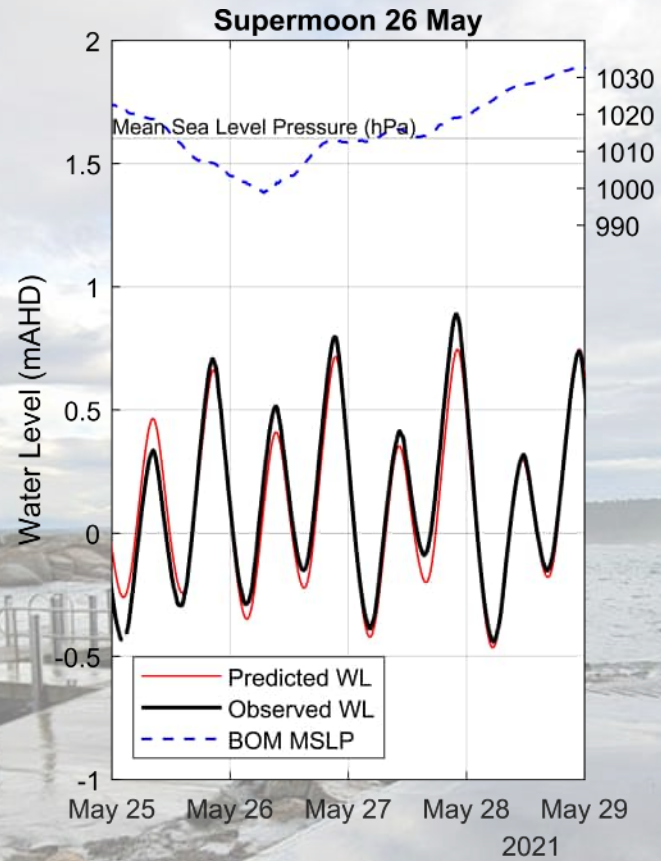
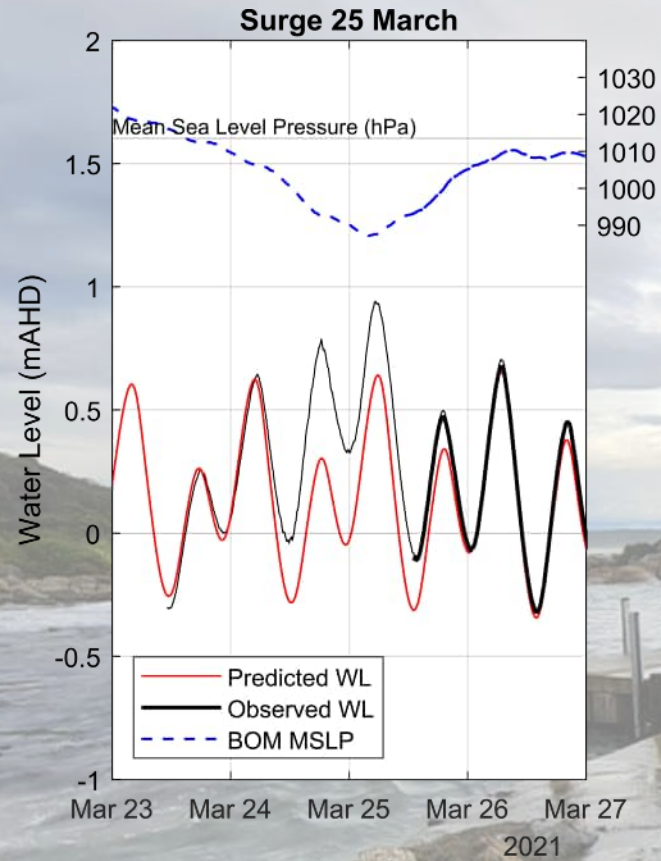


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Surge events observed

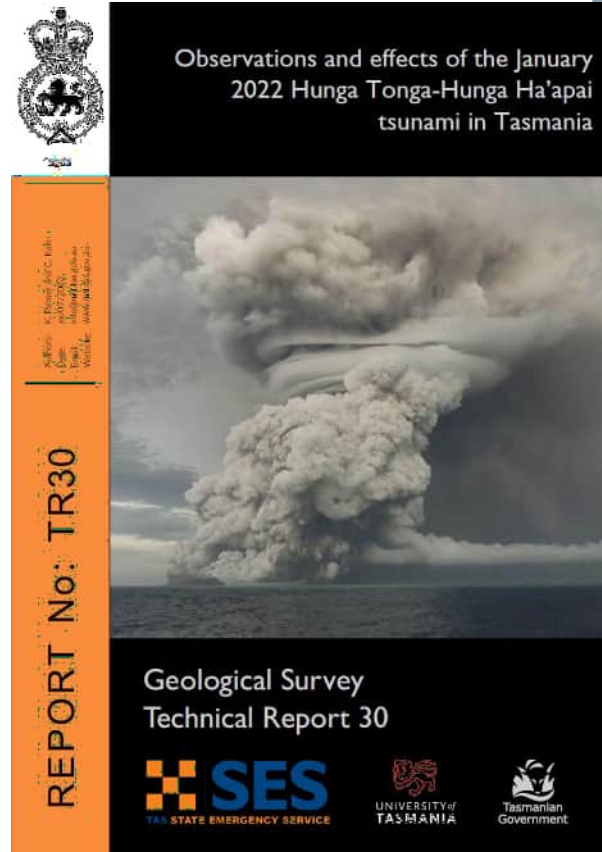


Tasmania Tide Monitoring Project

Further information



data.imas.utas.edu.au



mrt.tas.gov.au

With thanks to

Break O'Day Council

Tasmanian SES

St Helens Marine Rescue

Akaroa Body Corporate

University of Newcastle

GPSS University of Tasmania

MAST

Friends & Volunteers



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Davies, G., Wilson, K., Hague, B. *et al.* Australian atmospheric pressure and sea level data during the 2022 Hunga-Tonga Hunga-Ha'apai volcano tsunamis. *Sci Data* **11**, 114 (2024). <https://doi.org/10.1038/s41597-024-02949-2>



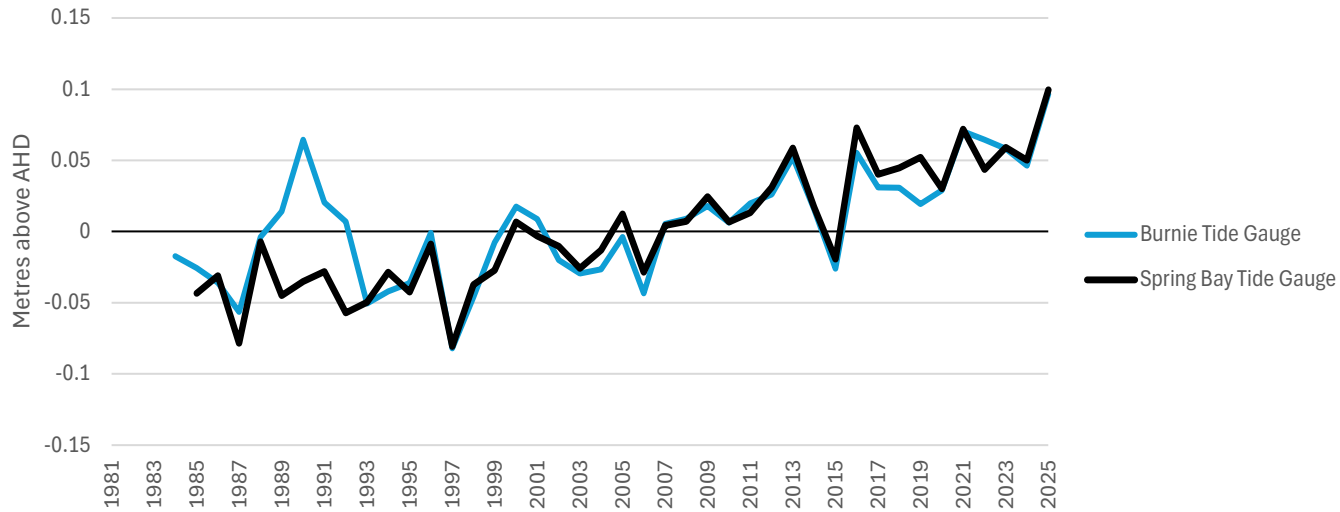
SEA LEVEL CHANGES

Future projections for Georges Bay

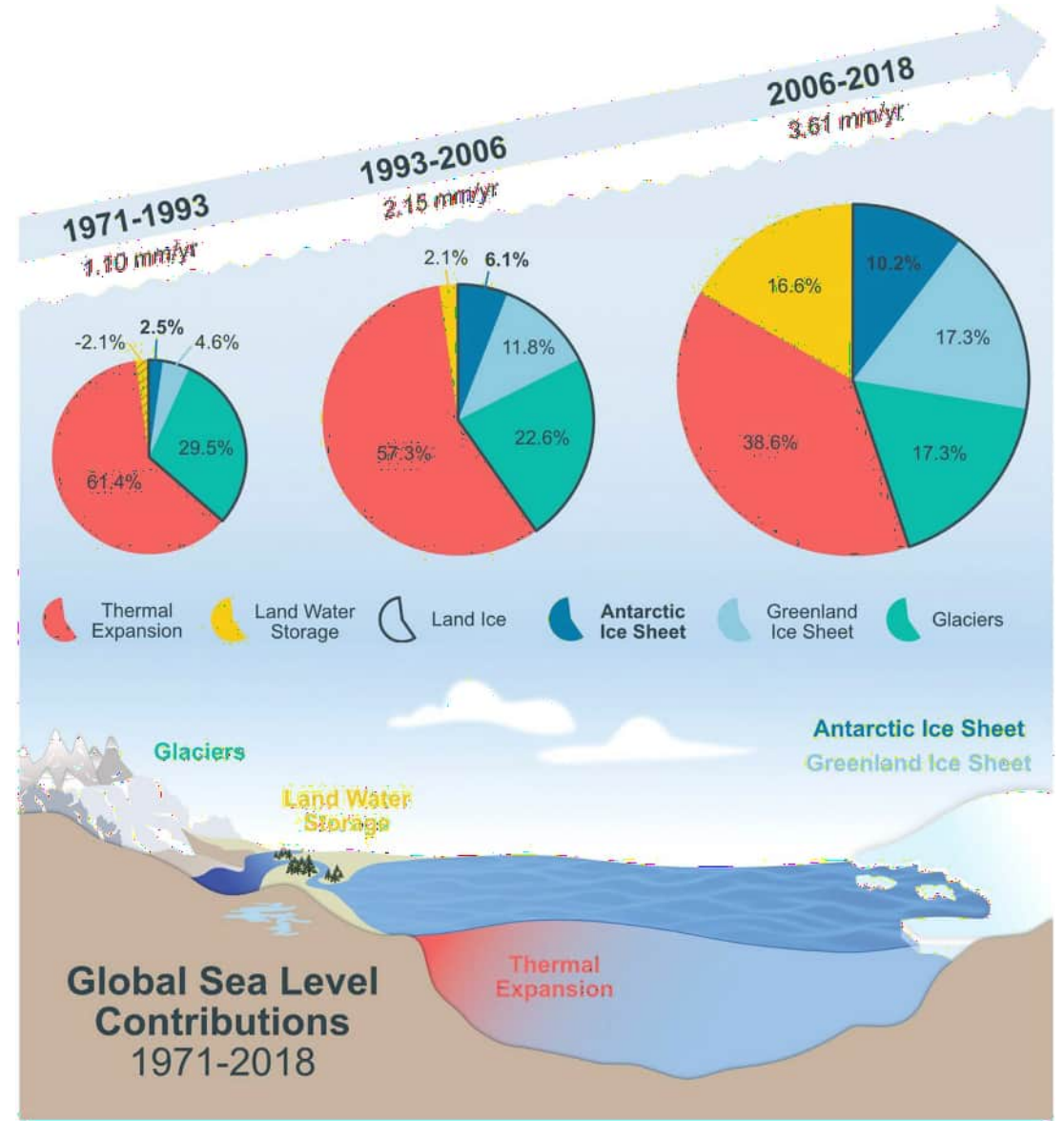
Sea Level Changes

Australian Baseline Sea Level Monitoring in Tasmania

Annual Mean Sea Level



Sea level trends in Tasmania are comparable with global averages



Source: Fricker et al., 2025. Antarctica in 2025: Drivers of deep uncertainty in projected ice loss. *Science* 387



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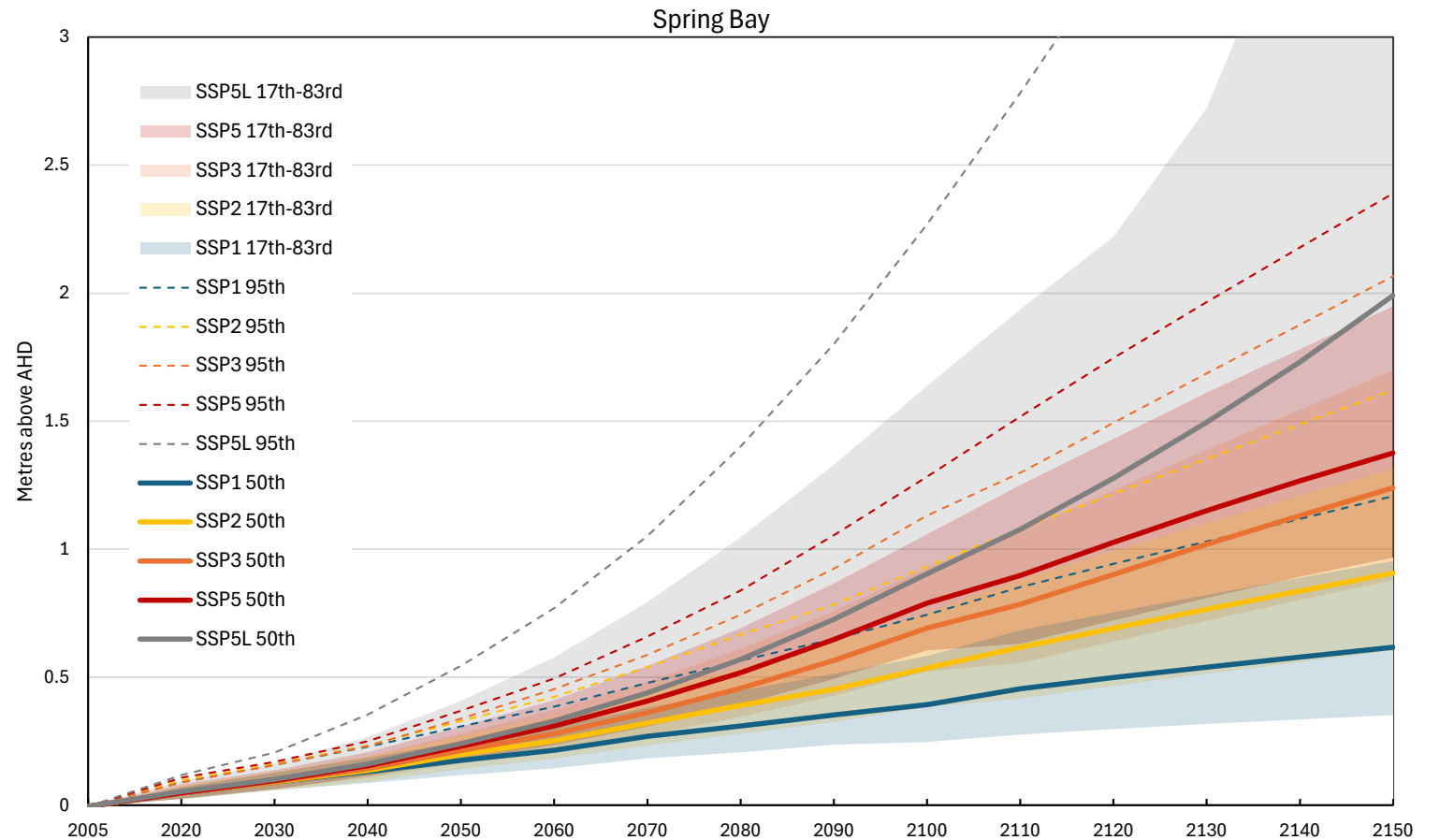
Sea Level Changes

Future projections from IPCC AR6 (2021)

Sea level rise estimates only consider those processes for which projections can be made with at least **medium confidence**.

Ice-sheet futures, including disintegration, instability, and faster than projected ice mass loss, are characterised by **deep uncertainty** and may lead to higher amounts of global mean sea level rise before 2100.

IPCC AR6 Chapter 9: Ocean, cryosphere and sea level change



SSP5-8.5 VERY HIGH: CO₂ emissions roughly double from current levels by 2050

SSP3-7.0 HIGH: CO₂ emissions roughly double from current levels by 2100

SSP2-4.5 INTERMEDIATE: CO₂ emissions remaining around current levels until 2050

SSP1-2.6 LOW: CO₂ emissions decline to net zero by 2050 with some net negative CO₂ emissions

SSP1-1.9 VERY LOW: CO₂ emissions decline to net zero by 2050 with greater net negative CO₂ emissions

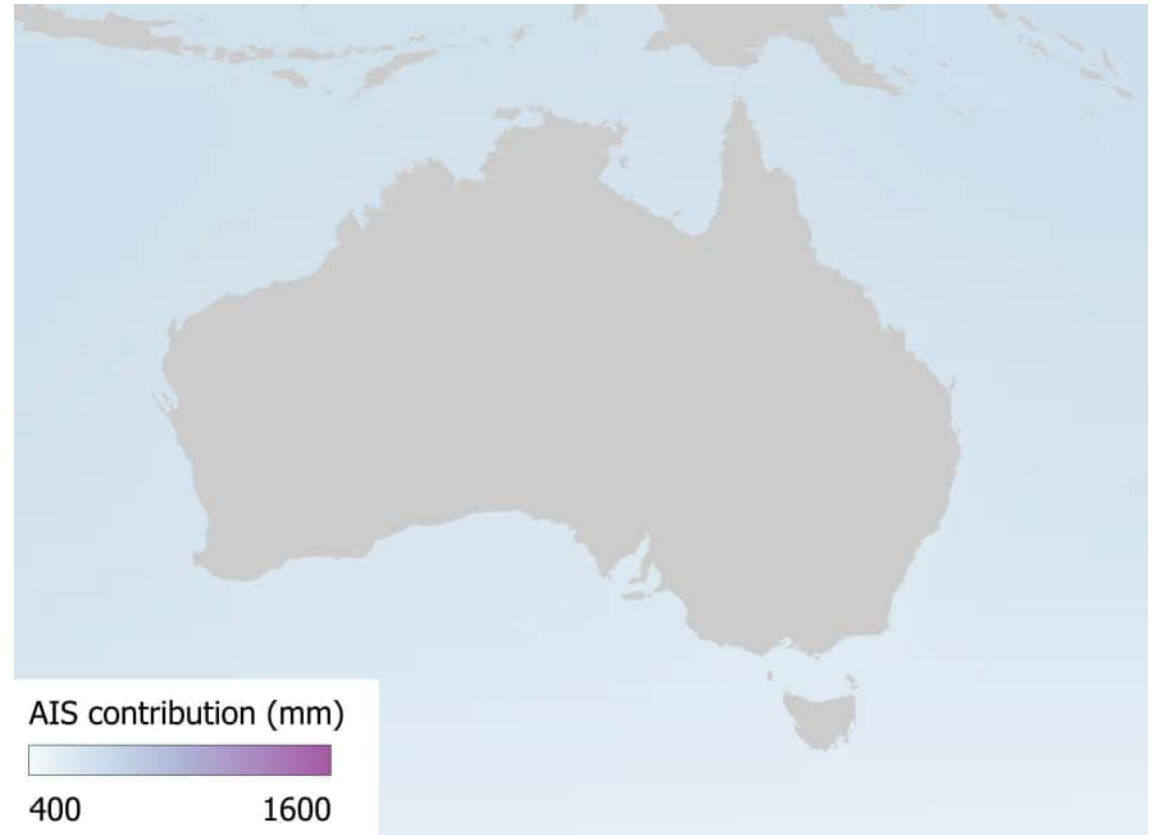
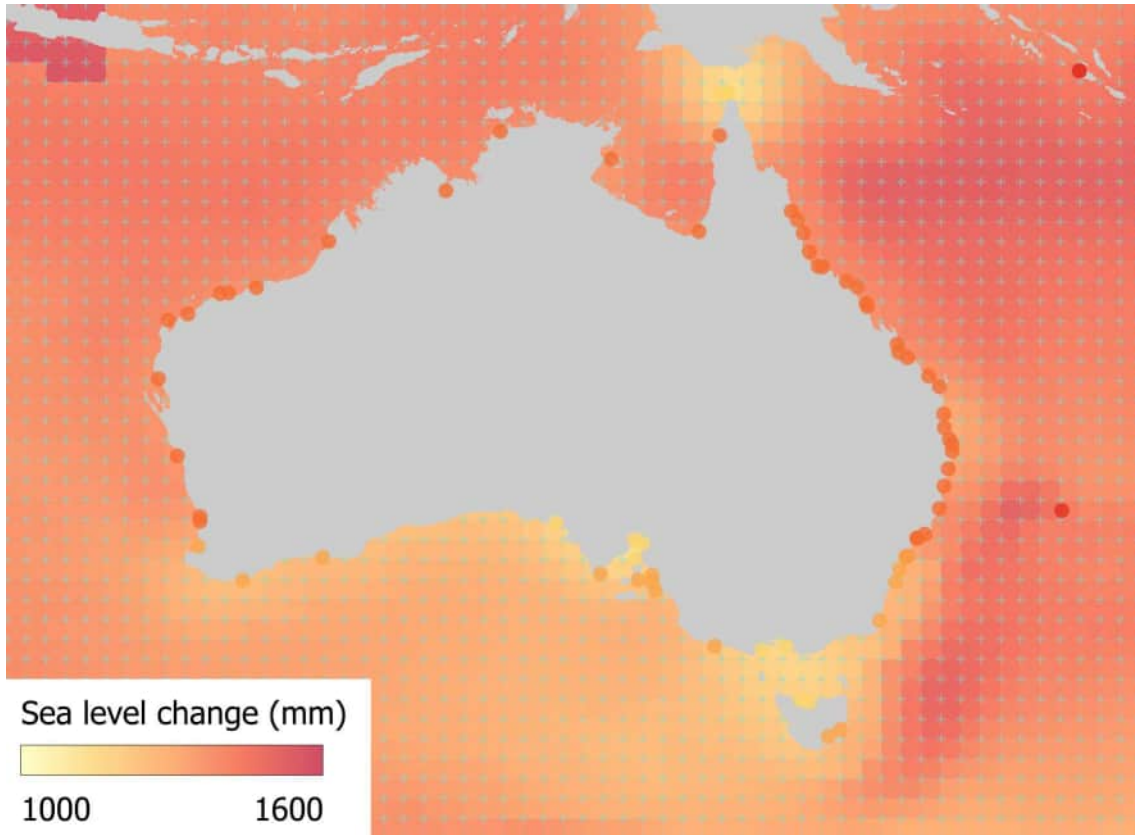


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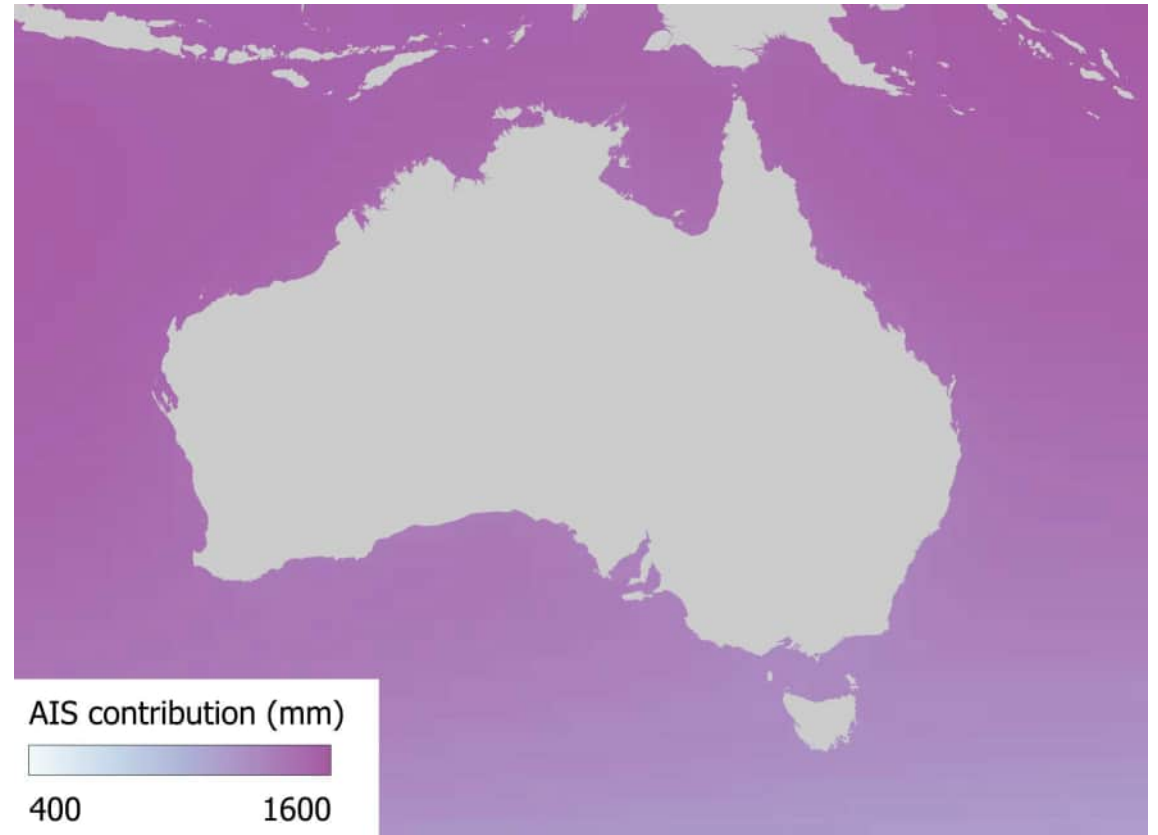
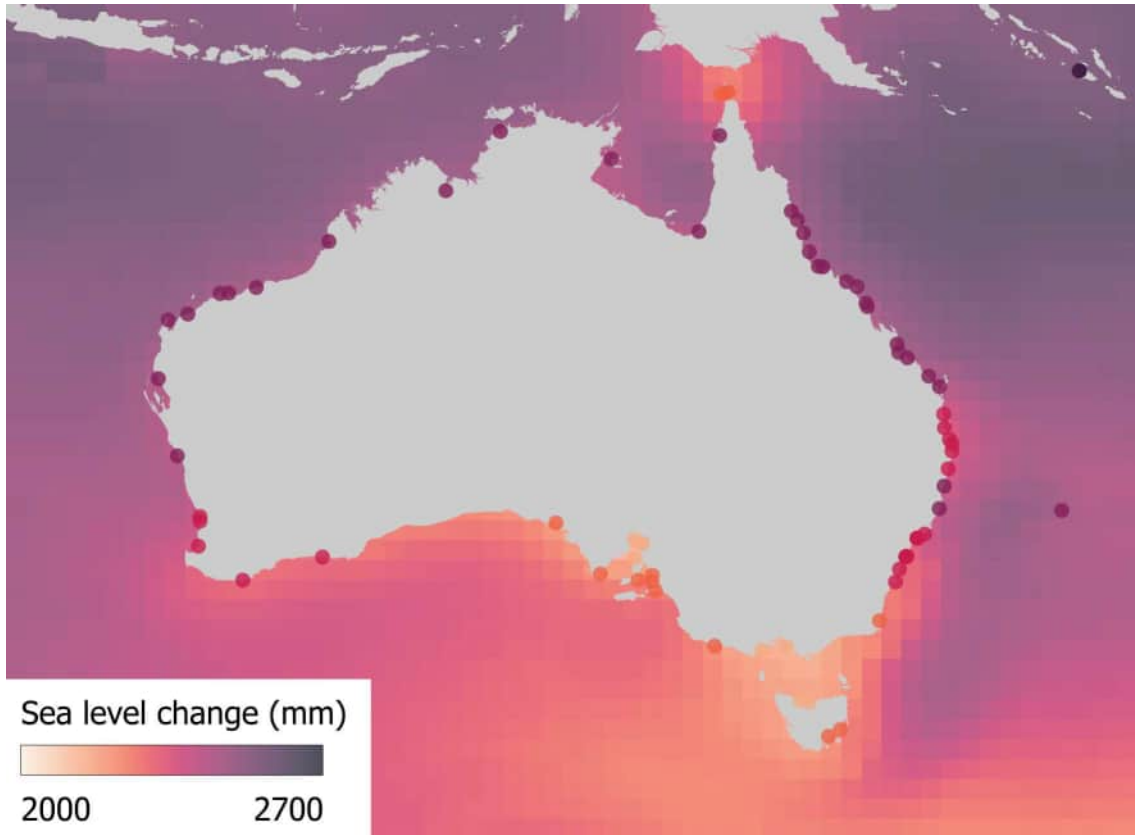
Sea Level Changes

VERY HIGH projections by 2100



Sea Level Changes

VERY HIGH/LOW CERTAINTY projections by 2100



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Sea Level Changes

Preparing for uncertainty

Ice sheet, sea ice, and ocean circulation observations indicate a potential for abrupt changes in Antarctica, **even if warming is limited to 2°C.**

Low certainty projections indicate that **more evidence** is needed to understand how likely those outcomes are to occur.

Extreme estimates of sea level rise of up to 3m by 2100 (relative to 1995-2014) are considered unlikely but **cannot be ruled out.**



*Urgency alone
does not translate
to action*

Kopp et al., 2024. 'Tipping points' confuse and can distract from urgent climate action. Nature Climate Change.



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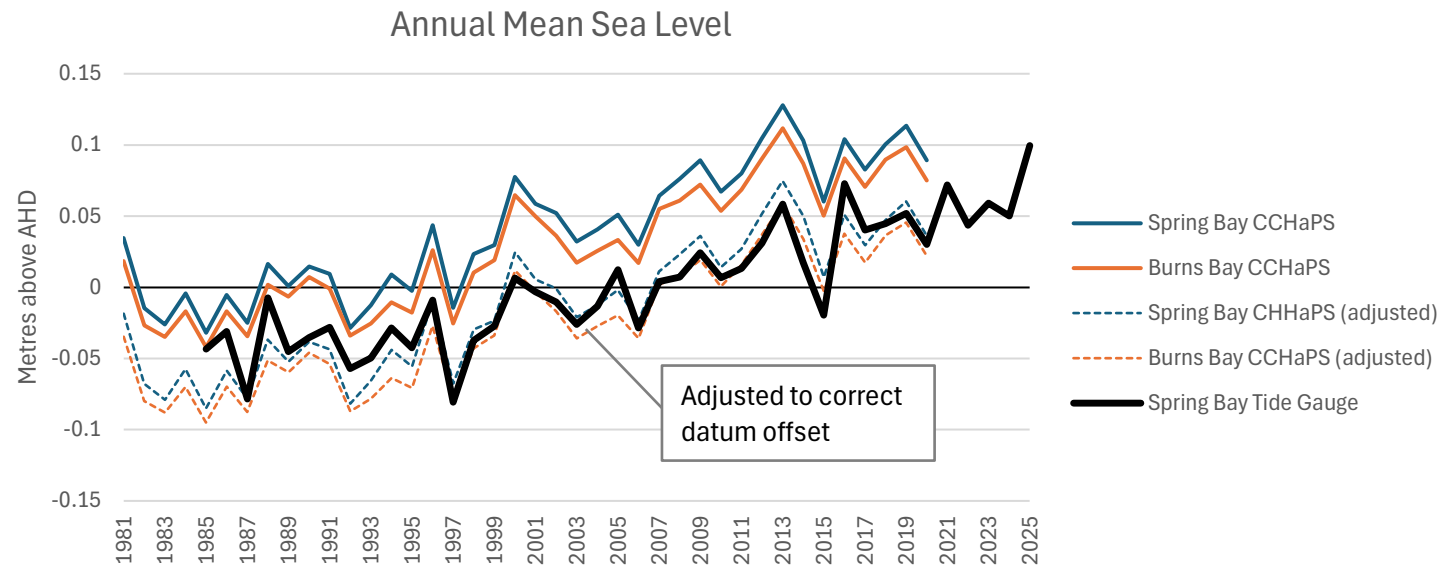


COASTAL RISK

Exposure and vulnerability around Georges Bay

Coastal Risk

Estimating future tidal datums and storm tide levels for Georges Bay



CCHaPS: Coupled circulation-wave Coastal Hazards Prediction System (Australian Climate Service; Hernaman et al., 2025)

LAT: Lowest astronomical tide
(important for maritime safety)

MHHW: Mean Higher High Water
(approximate position of the coastline)

HAT: Highest astronomical tide
(maximum predictable tidal level)

1%AEP: 1% annual exceedance probability
(100-year average recurrence interval)



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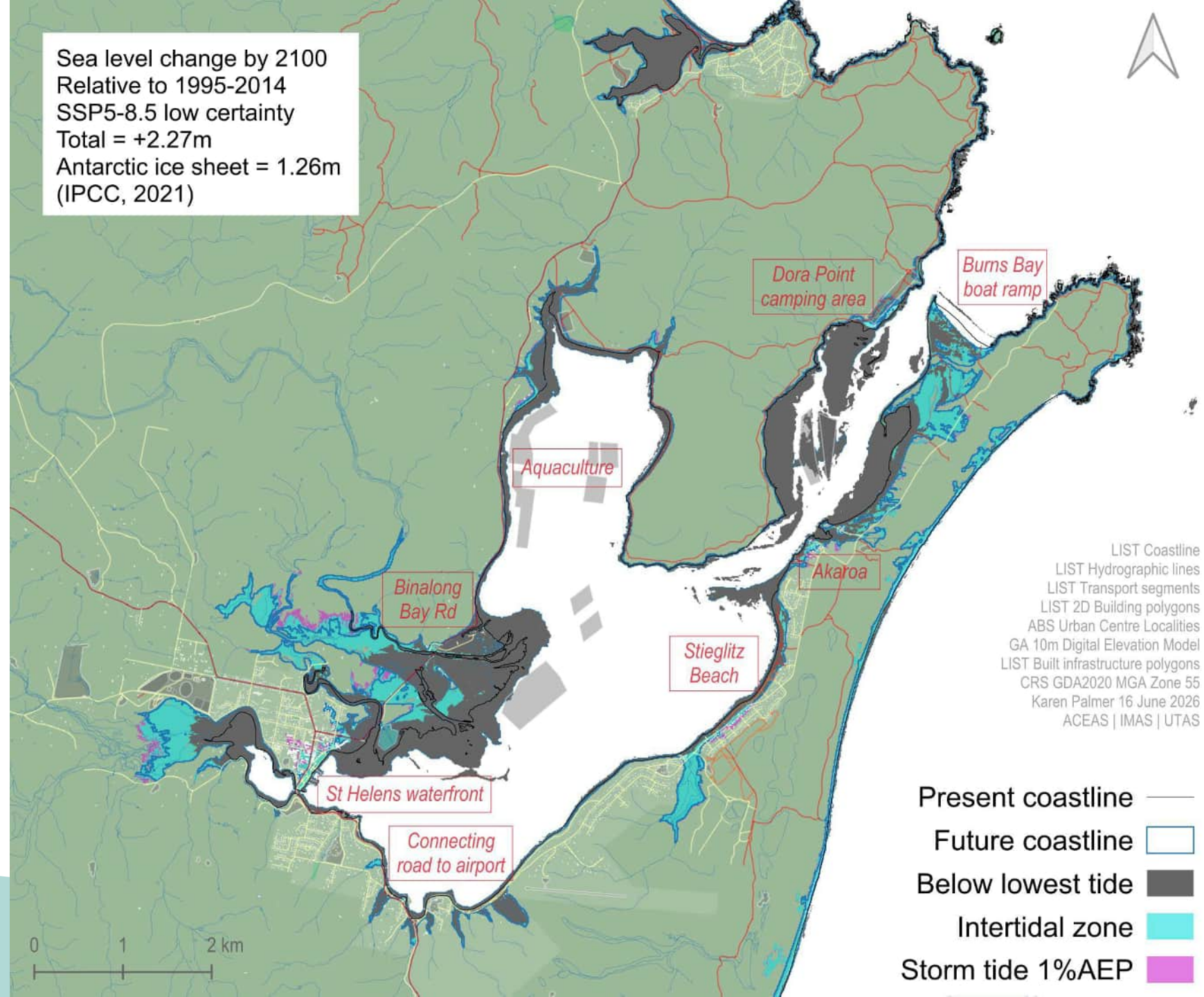
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Exposure and vulnerability around Georges Bay

High impact / unknown likelihood scenario for rapid and unpredictable disintegration of ice sheets in Antarctica:

- Present intertidal areas permanently submerged
- High tide limit extended into low-lying coastal areas
- Storm surge reaching further inland and upstream rivers
- Changes in water chemistry, flow rates, water temperature, erosion and sedimentation
- Change comes with threats and opportunities

Sea level change by 2100
Relative to 1995-2014
SSP5-8.5 low certainty
Total = +2.27m
Antarctic ice sheet = 1.26m
(IPCC, 2021)

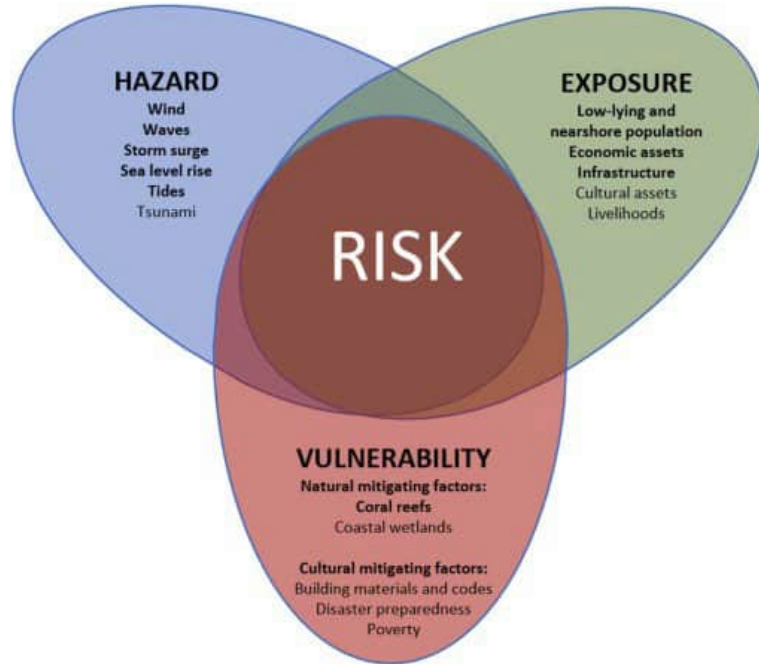


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Coastal Risk

Exposure and vulnerability around Georges Bay



Components of risk based on the risk framework diagrams devised by the Intergovernmental Panel on Climate Change (from Burke & Spalding, 2022).



Coastal hazards include inundation of low-lying areas, coastline erosion, and rising groundwater due to ocean sea level, tides, surges, and waves.



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Preparing for future sea level changes around Georges Bay

Community Discussion

What are the present challenges and threats?

What do communities need to be prepared for change?

What are the potential opportunities for Georges Bay?



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