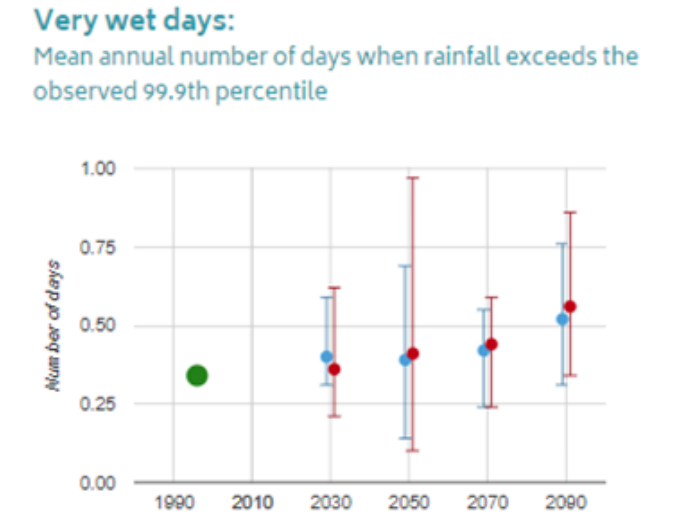

Climate change data for water modelling and decision making. What data are available and from where?

Dave Rissik

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@drissik

Acknowledgements

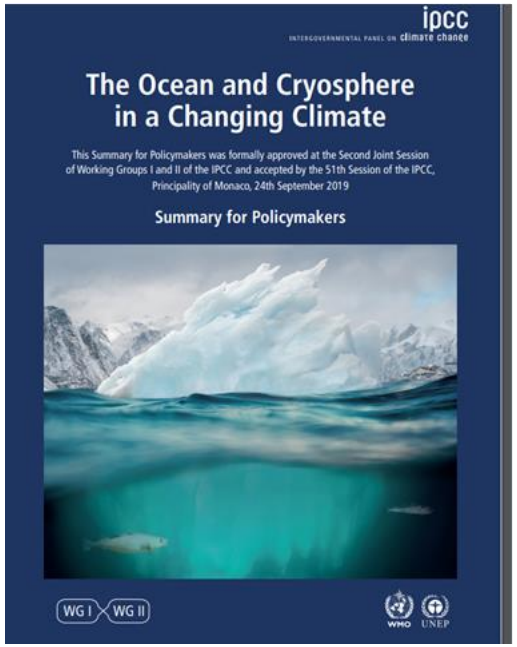
- Fahim Tonmoy (BMT)
- John Clarke (CSIRO)
- Acacia Pepler (BoM)
- Ralph Trancoso (DES)
- Kathleen Beyer (NSW DPIE)

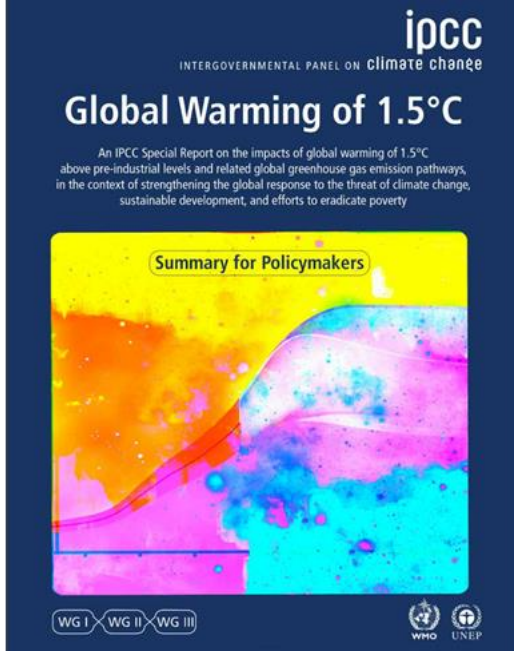
Credible

Trusted

Authoritative

other explanations for climate change other than man-made CO2 and here we look at some of the arguments put forward by those who believe that global warming is all a hoax.





International

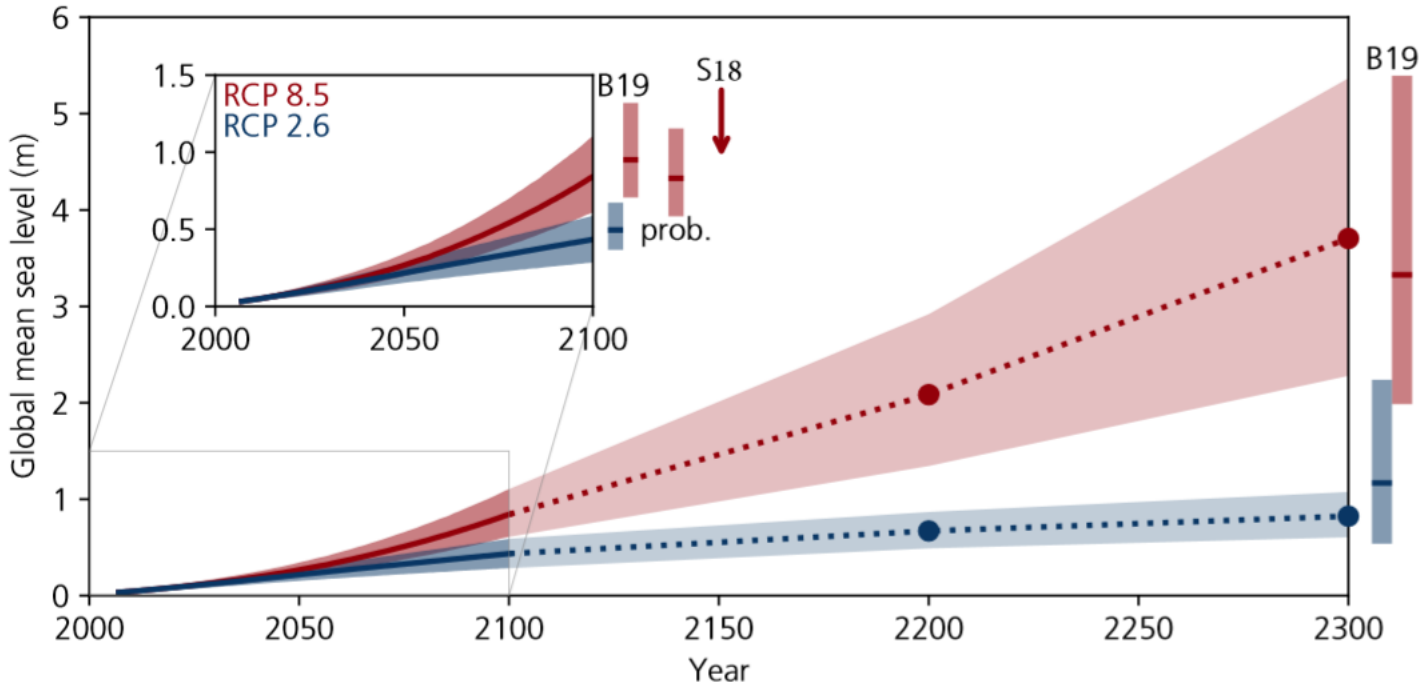


Figure 4.2: Projected sea-level rise until 2300. The inset shows an assessment of the *likely* range of the projections for RCP2.6 and RCP8.5 up to 2100 (*medium confidence*). Projections for longer time scales are highly uncertain but a range is provided (4.2.3.6). For context, results are shown from other estimation approaches in 2100. The two sets of two bars labelled B19 are from an expert elicitation for the Antarctic component (Bamber et al., 2019), and reflect the *likely* range for a 2 and 5°C temperature warming (*low confidence*; details section 4.2.3.3.1). The bar labelled "prob". indicates the *likely* range of a set of probabilistic projections (4.2.3.2). The arrow indicated by S19 shows the result of an extensive sensitivity experiment with a numerical model for the Antarctic ice sheet combined, like the results from B19 and "prob.", with results from Church et al. (2013) for the other components of sea level rise. S19 bars also show the *likely* range.

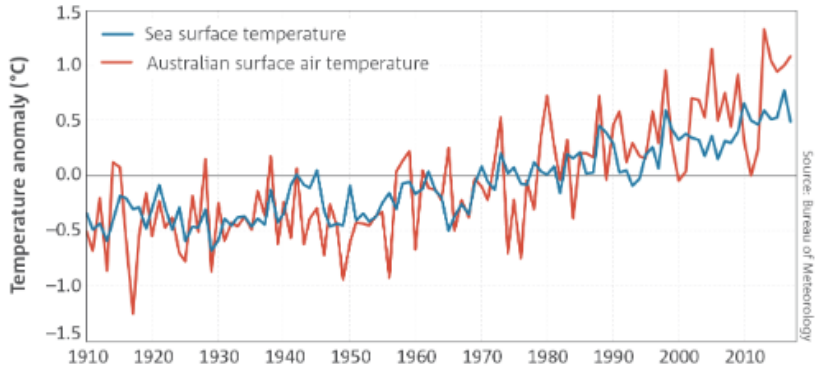
National data

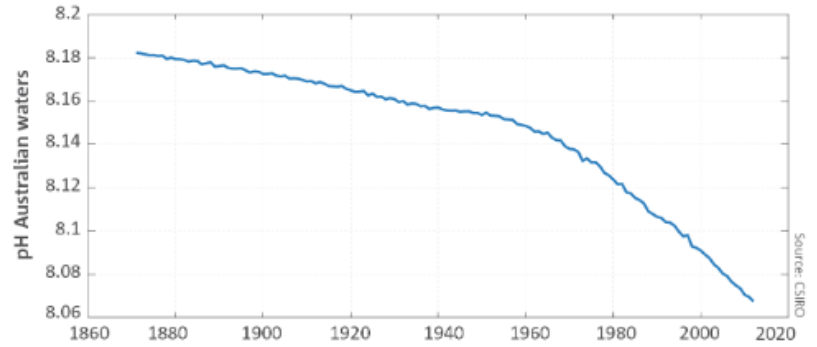
http://www.bom.gov.au/state-of-the-climate/

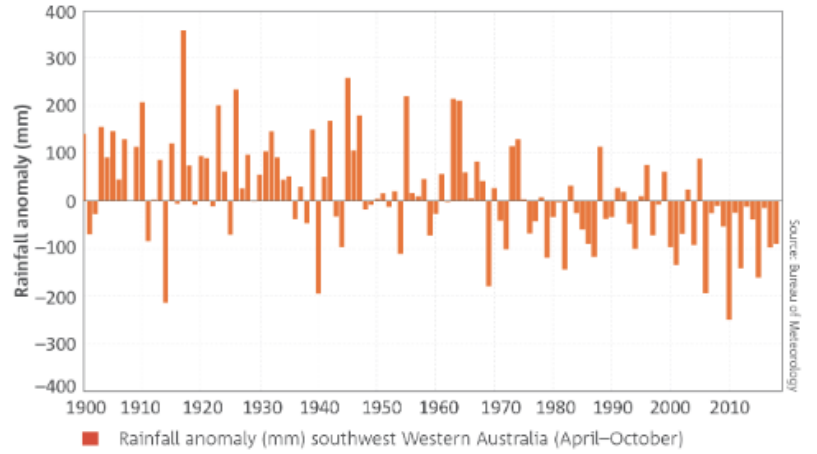
Key points

Australia

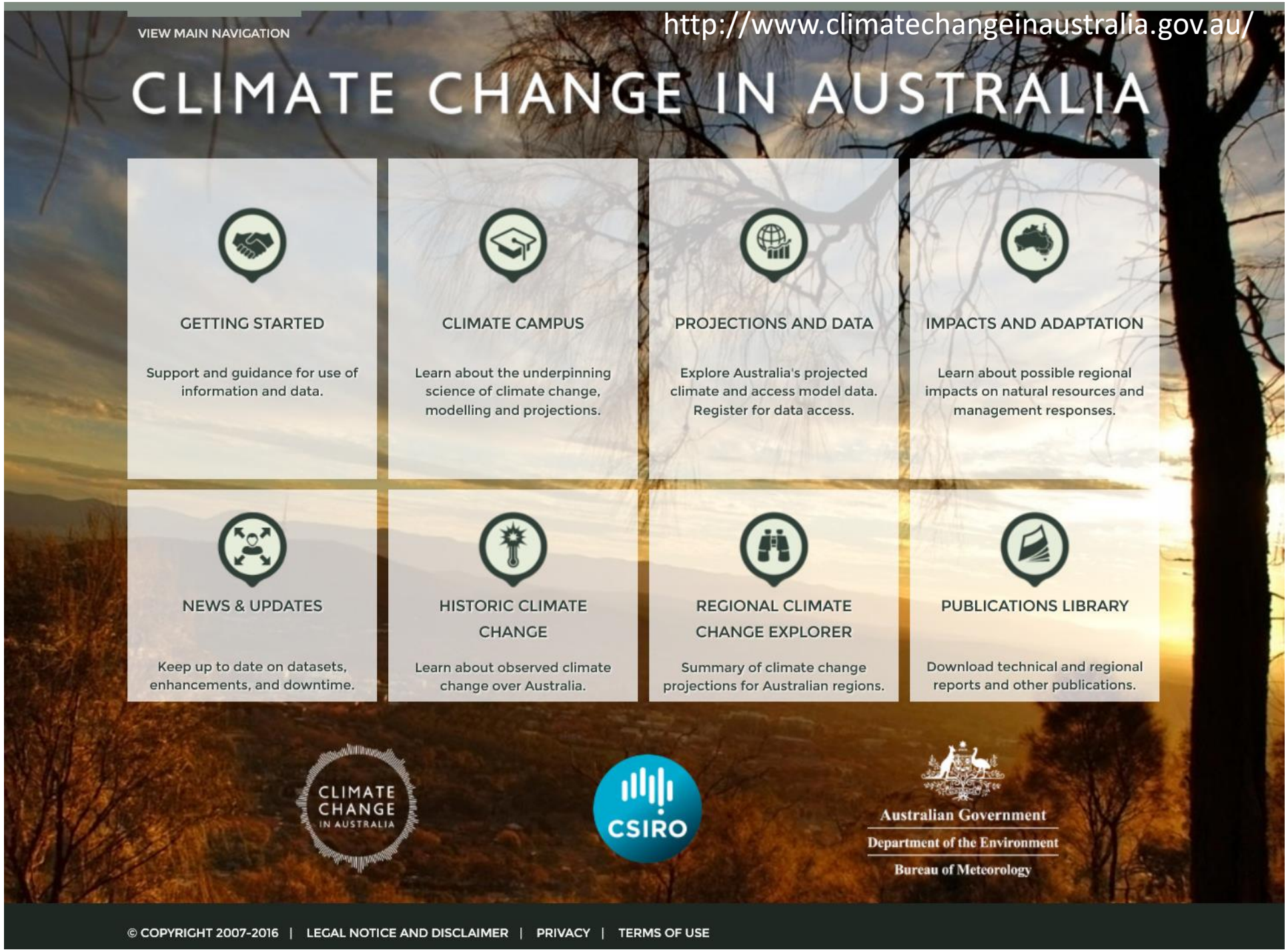
- Australia's climate has warmed just over 1 °C since 1910 leading to an increase in the frequency of extreme heat events.
- Oceans around Australia have warmed by around 1 °C since 1910, contributing to longer and more frequent marine heatwaves.
- Sea levels are rising around Australia, increasing the risk of inundation.
- The oceans around Australia are acidifying (the pH is decreasing).
- April to October rainfall has decreased in the southwest of Australia. Across the same region May–July rainfall has seen the largest decrease, by around 20 per cent since 1970.
- There has been a decline of around 11 per cent in April–October rainfall in the southeast of Australia since the late 1990s.
- Rainfall has increased across parts of northern Australia since the 1970s.
- Streamflow has decreased across southern Australia. Streamflow has increased in northern Australia where rainfall has increased.
- There has been a long-term increase in extreme fire weather, and in the length of the fire season, across large parts of Australia.







http://www.climatechangeinaustralia.gov.au/



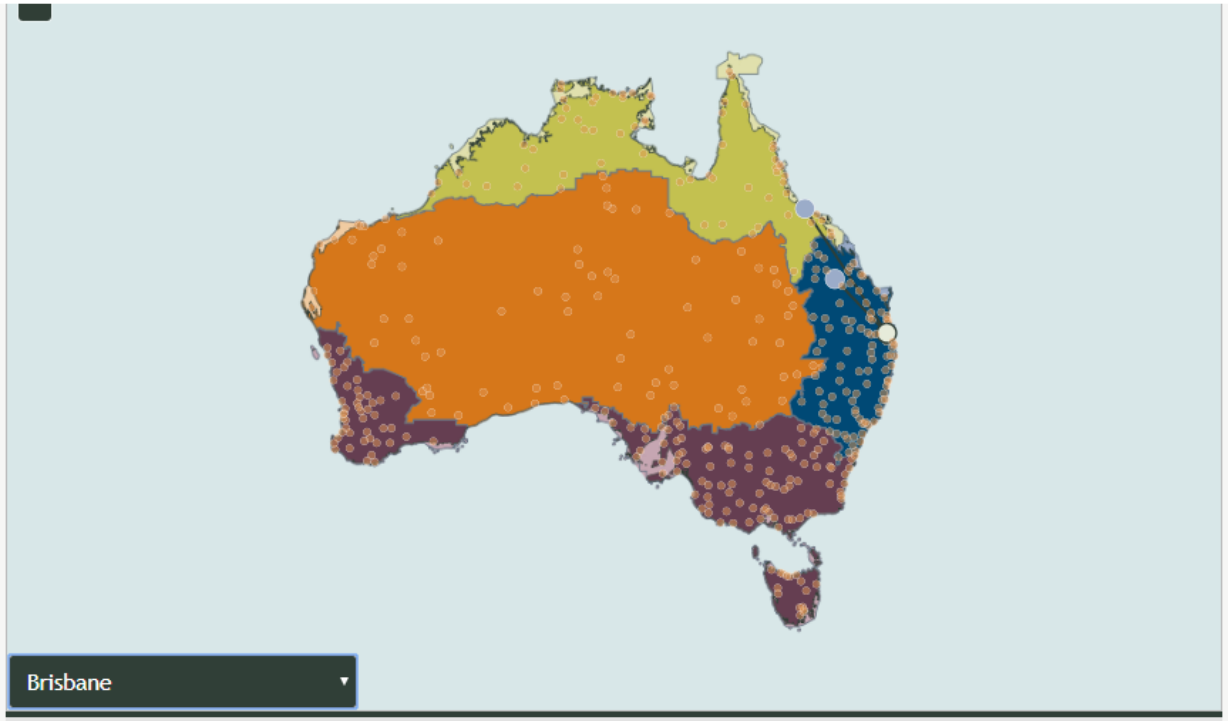
TOOL RATINGS

The range of tools allow access to information of differing levels of complexity. Each tool is rated according to the complexity of the information provided and the level of climate science knowledge needed to fully understand the information and how best to use it. This is shown by the complexity icon displayed on each tool. The three ratings are described below:

This is an entry-level tool requiring no prior understanding of climate projections science. However, a general familiarity with weather and climate terminology will assist understanding. This type of information can be found in the climate campus as well as on the Bureau of Meteorology's website.

Intermediate tools are designed for users with a good fundamental understanding of climate and weather and some understanding of climate science. To get the maximum value from these tools, users are strongly encouraged to complete the online training .

Advanced tools are designed for users with a good understanding of climate science, particularly climate projections science. In particular, a working knowledge of the Climate Futures Framework and the 'key cases' approach to impact assessment is assumed. Much of this information is available from the climate campus and online training . To make the most of Advanced tools however, face-to-face training is recommended.



Brisbane

Preset Scenarios

EMISSIONS SCENARIO: RCP 8.5

DESCRIPTION: Maximum Consensus

TIME PERIOD: 2090

Configure Data

TEMPERATURE CHANGE: 4.2 °C

-1.3 -0.6 0.1 0.8 1.5 2.2 2.9 3.6 4.3

RAINFALL CHANGE: -23 %

-32.0 -24.0 -16.0 -8.0 0.0 8.0 16.0 24.0 32.0

ANALOGUE TOWNS

Woorabinda, Home Hill,

EAST COAST CLIMATE FUTURES

Go back

Change scenario: RCP 8.5

Change time period: 2090

		December - February (DJF) Maximum Daily Temperature (C)			
		Slightly Warmer < 0.50	Warmer 0.50 to 1.50	Hotter 1.50 to 3.00	Much Hotter > 3.00
December - February (DJF) Maximum Daily Temperature (C)	Much Hotter > 3.00				+ 53 of 67 (79%)
	Hotter 1.50 to 3.00			+ 14 of 67 (21%)	
	Warmer 0.50 to 1.50				
	Slightly Warmer < 0.50				

Consensus	Proportion of models
Not projected	No models
Very Low	< 10%
Low	10% - 33%
Moderate	33% - 66%
High	66% - 90%
Very High	> 90%

Earth Systems and Climate Change Hub

National Environmental Science Programme

WWW.NESPCLIMATE.COM.AU

HOME ABOUT CLIMATE CHALLENGES OUR SCIENCE SCIENCE IMPACT RESOURCES NEWS CONTACT

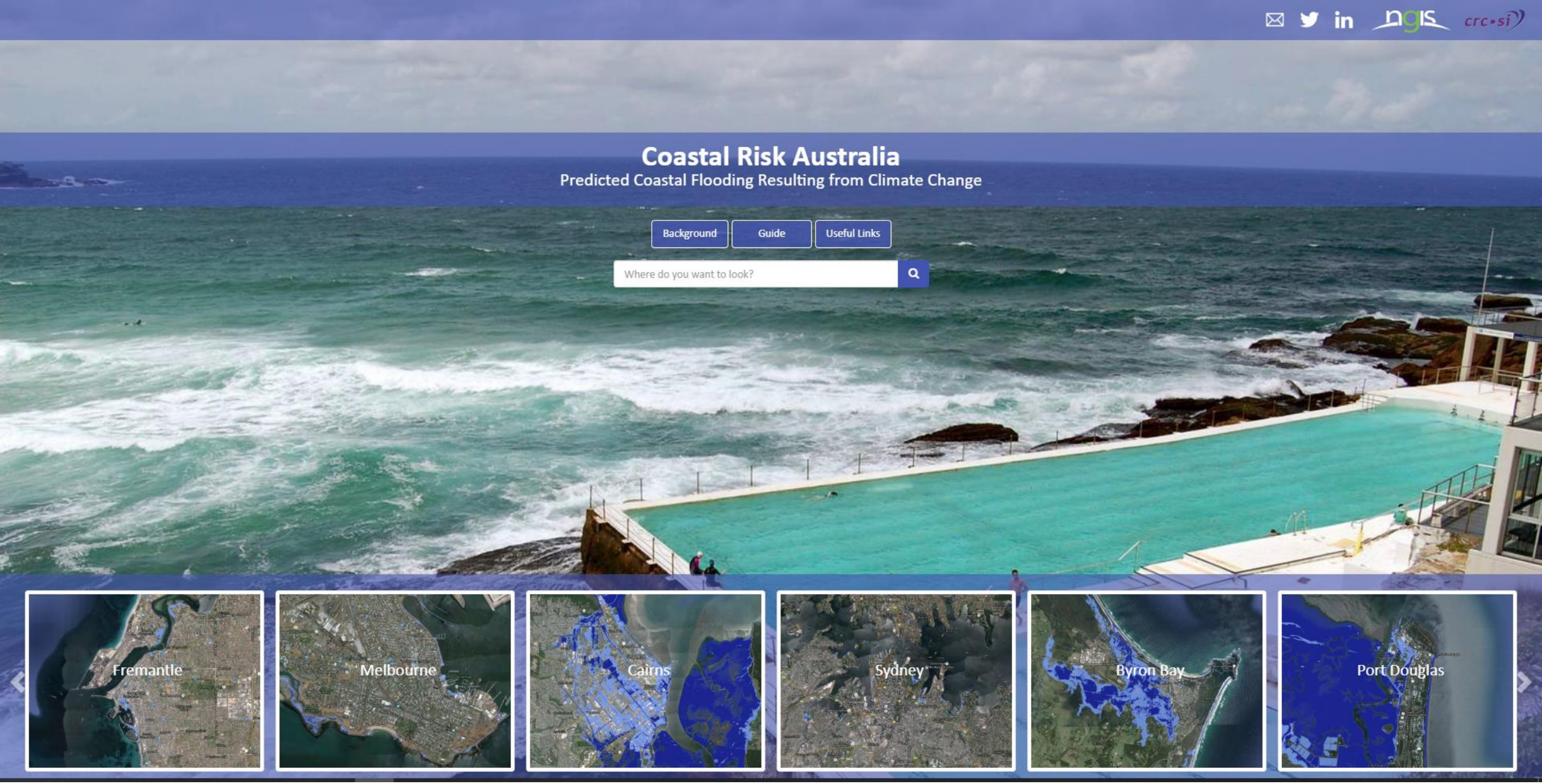
NEWS

Nitrogen fertilisers are incredibly efficient, but they make climate change a lot worse

IPCC flags risks and response options for polar and ocean environments in latest report

WELCOME TO THE EARTH SYSTEMS AND CLIMATE CHANGE HUB

We're building our world-leading climate and Earth systems science capability and using our understanding of Australia's past, present and future climate to supply useful and accessible climate information for Australia.



WWW.COASTALRISK.COM.AU

Climate change data for water m | earth systems hub - Google Sear | Coastal Risk Australia

Not secure | coastalrisk.com.au/viewer

Coastal Risk Australia 2100

Place Search

Predicted | Manual

Predicted Inundation Scenario

1.High

Current Day Highest Tide | 2100 | + 0.74m Highest Tide

Virtual Tide Gauges

DEM

Background

Guide

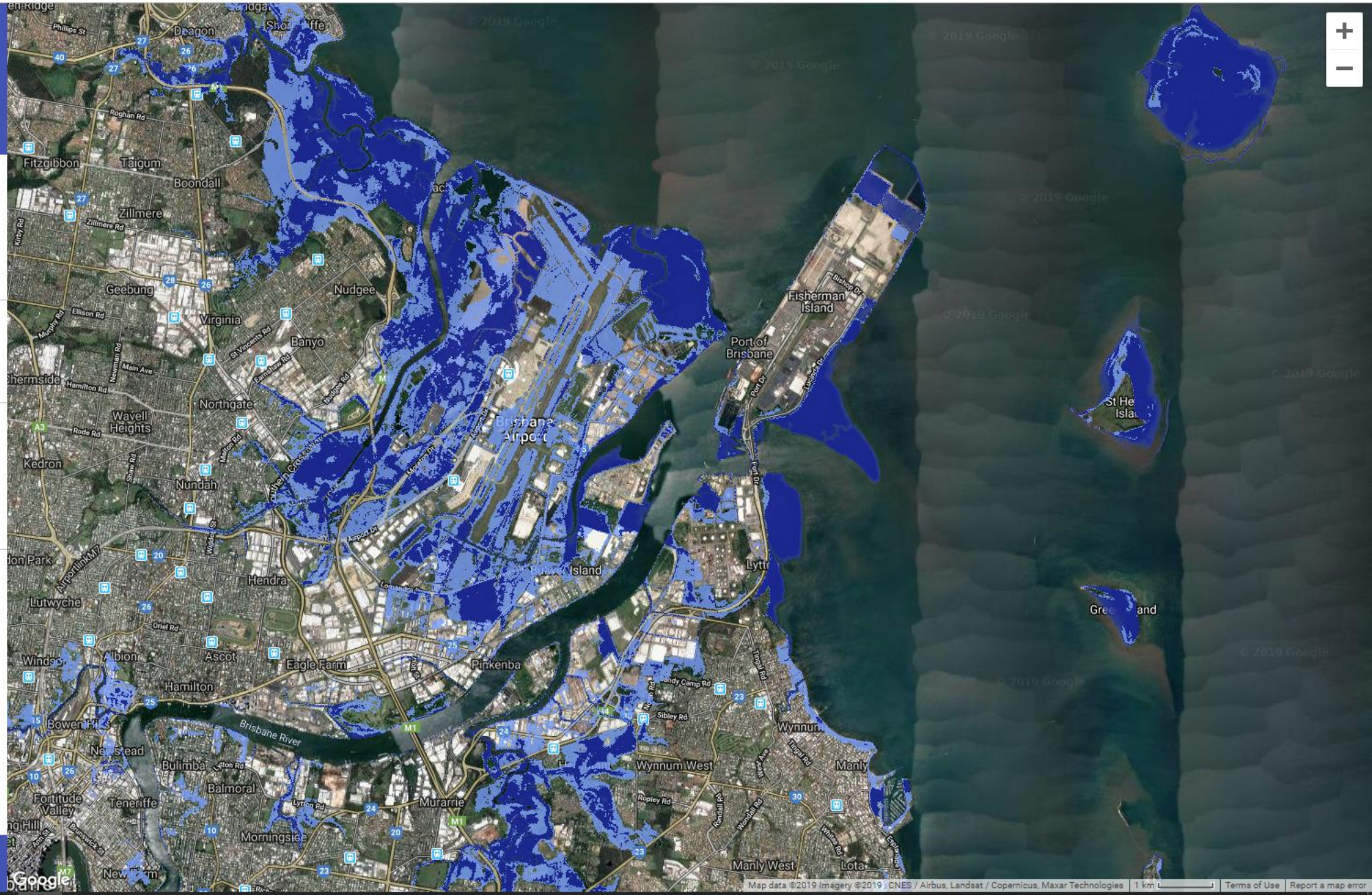
Useful Links

Send Feedback

Share via Twitter

Share via Linked In

ngis crc·si



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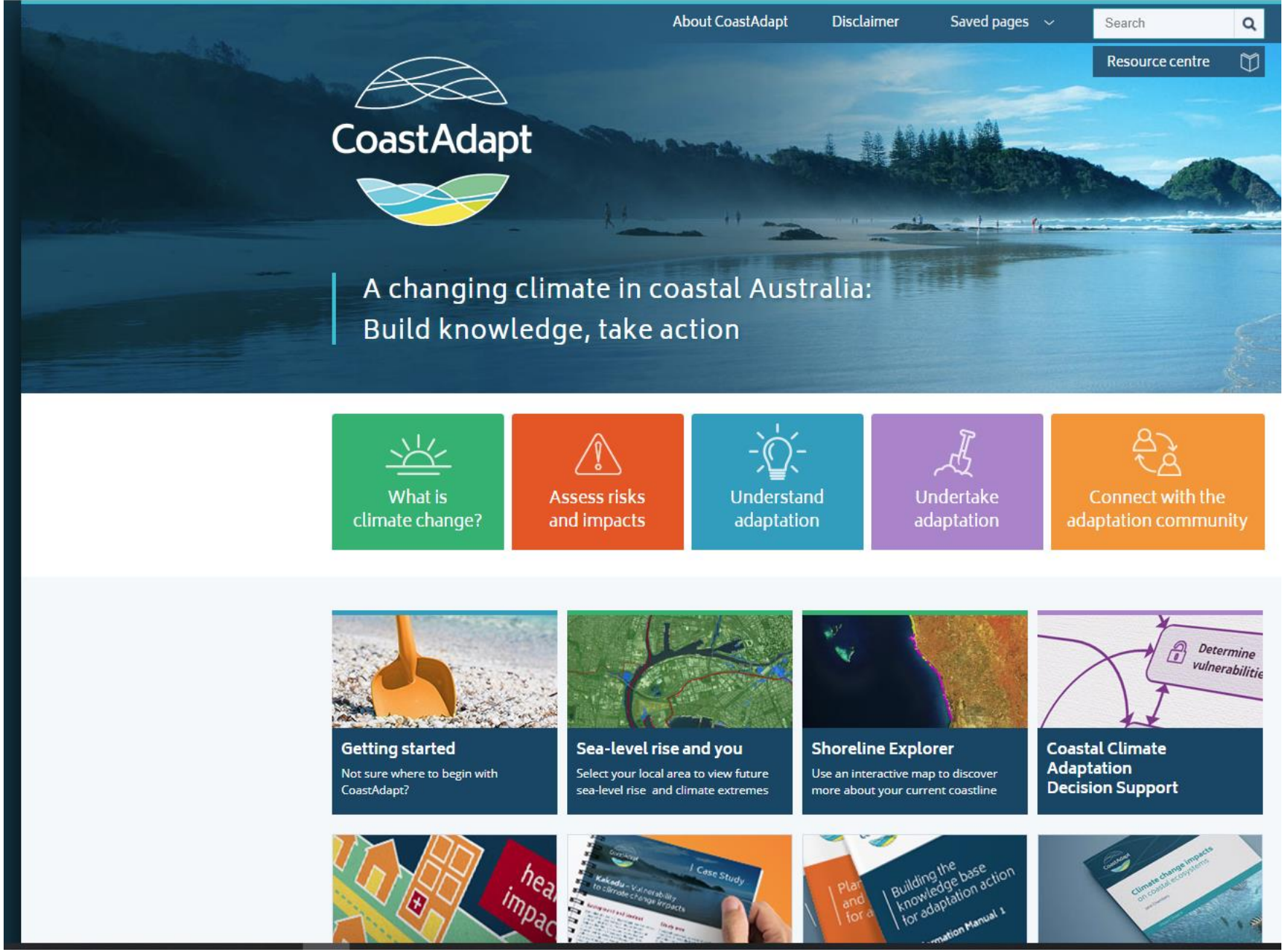


WWW.COASTADAPT.COM.AU

Sea-level rise and future climate information for coastal councils

Search for your Local Government Area by keyword or postcode to view sea-level rise information.

Brisbane

Print Save

« return to datasets page

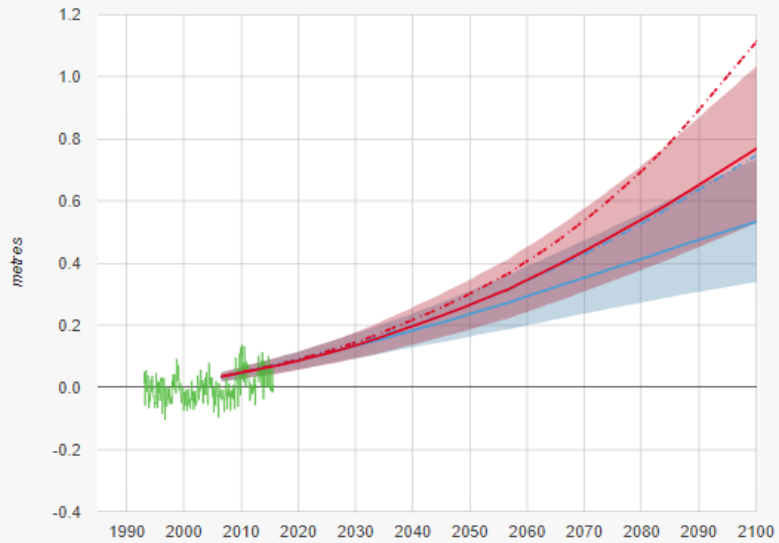
Brisbane, Qld

Sea-level rise | Inundation maps | Temperature | Rainfall

Select greenhouse gas scenarios

What are RCP scenarios?

- Very low greenhouse gas scenario (RCP2.6)
- Low greenhouse gas scenario (RCP4.5)
- High greenhouse gas scenario (RCP6.0)
- Very high greenhouse gas scenario (RCP8.5)



Observed data (Satellite)

Solid lines show median sea-level rise relative to

Dashed lines show allowances for each

Shaded areas show the *likely* range for each

Brisbane, Qld

Sea-level rise | **Inundation maps** | Temperature | Rainfall

Map 1 of 2

Year 2050

Very high greenhouse gases

Satellite base map
Very high greenhouse gas scenario (RCP8.5 2050)

Topographic base map
Very high greenhouse gas scenario (RCP8.5 2050)

Year 2100

Low greenhouse gases

Satellite base map
Low greenhouse gas scenario (RCP4.5 2100)

Topographic base map
Low greenhouse gas scenario (RCP4.5 2100)

Very high greenhouse gases

Satellite base map
Very high greenhouse gas scenario (RCP8.5 2100)

Topographic base map
Very high greenhouse gas scenario (RCP8.5 2100)

Map 2 of 2

Year 2050

Very high greenhouse gases

Year 2100

Low greenhouse gases

Very high greenhouse gases

« return to datasets page

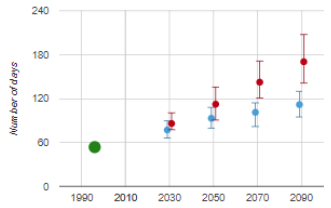
Brisbane, Qld

Sea-level rise | Inundation maps | **Temperature** | Rainfall

Observed average (1981-2010) | Low greenhouse gas scenario (RCP4.5) | Very high greenhouse gas scenario (RCP8.5) | Range between highest and lowest model estimates

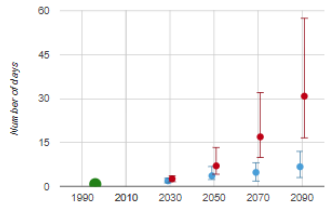
Hot days:

Mean annual number of days with maximum temperature greater than 30°C



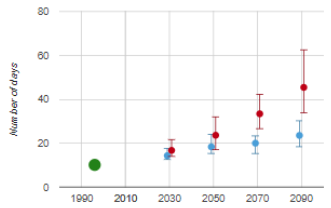
Warm nights:

Mean annual number of nights with minimum temperature greater than 25°C



Heatwaves:

Average of longest run of days in each year with maximum temperature greater than 30°C



« return to datasets page

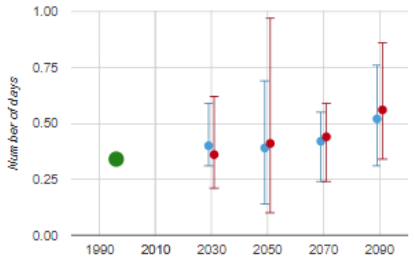
Brisbane, Qld

Sea-level rise | Inundation maps | Temperature | **Rainfall**

Observed average (1981-2010) | Low greenhouse gas scenario (RCP4.5) | Very high greenhouse gas scenario (RCP8.5) | Range between highest and lowest model estimates

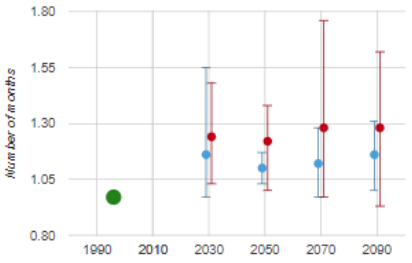
Very wet days:

Mean annual number of days when rainfall exceeds the observed 99.9th percentile



Dry conditions:

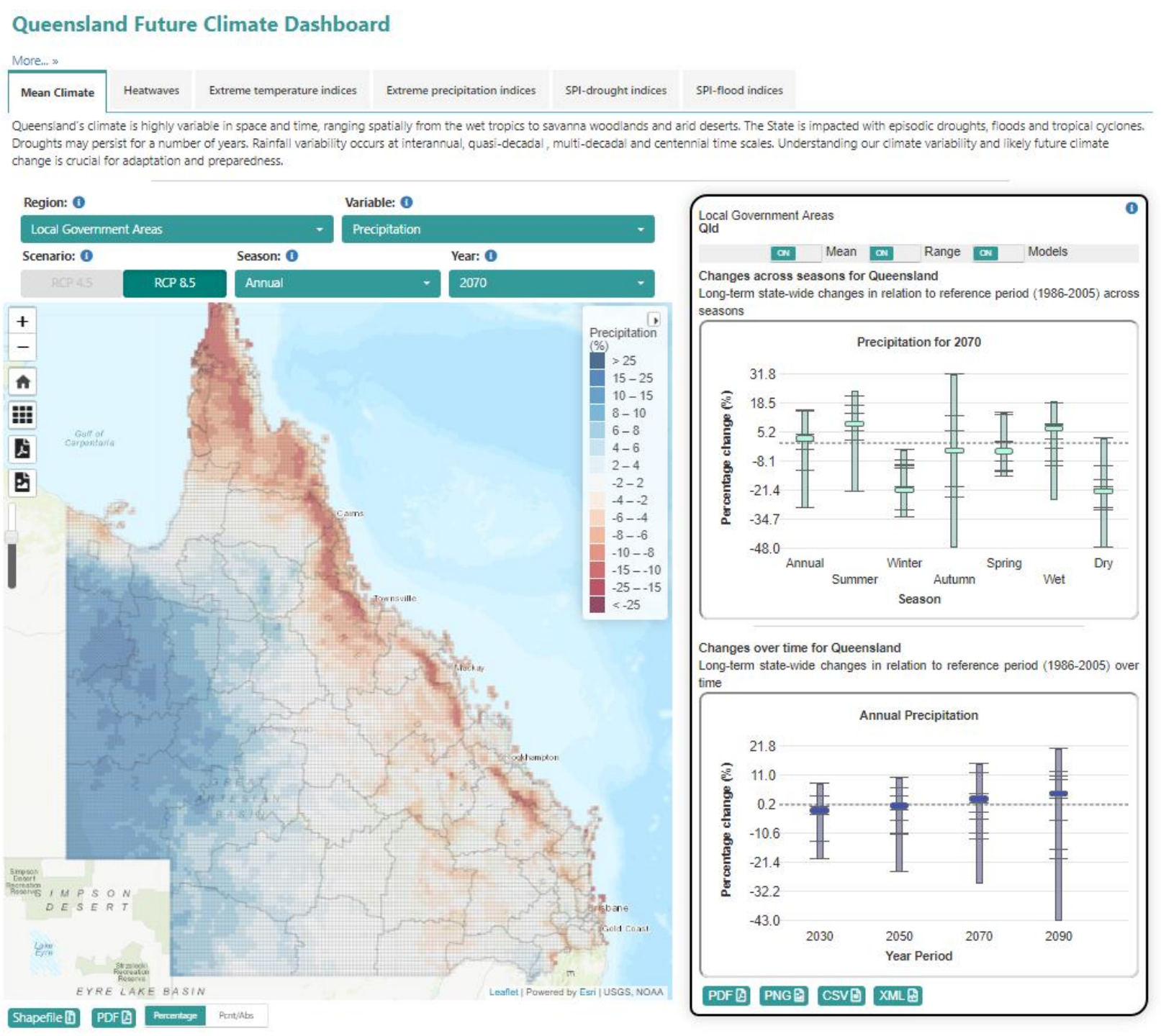
Mean annual (May to Apr) number of months when total rainfall is less than the historic 10th percentile



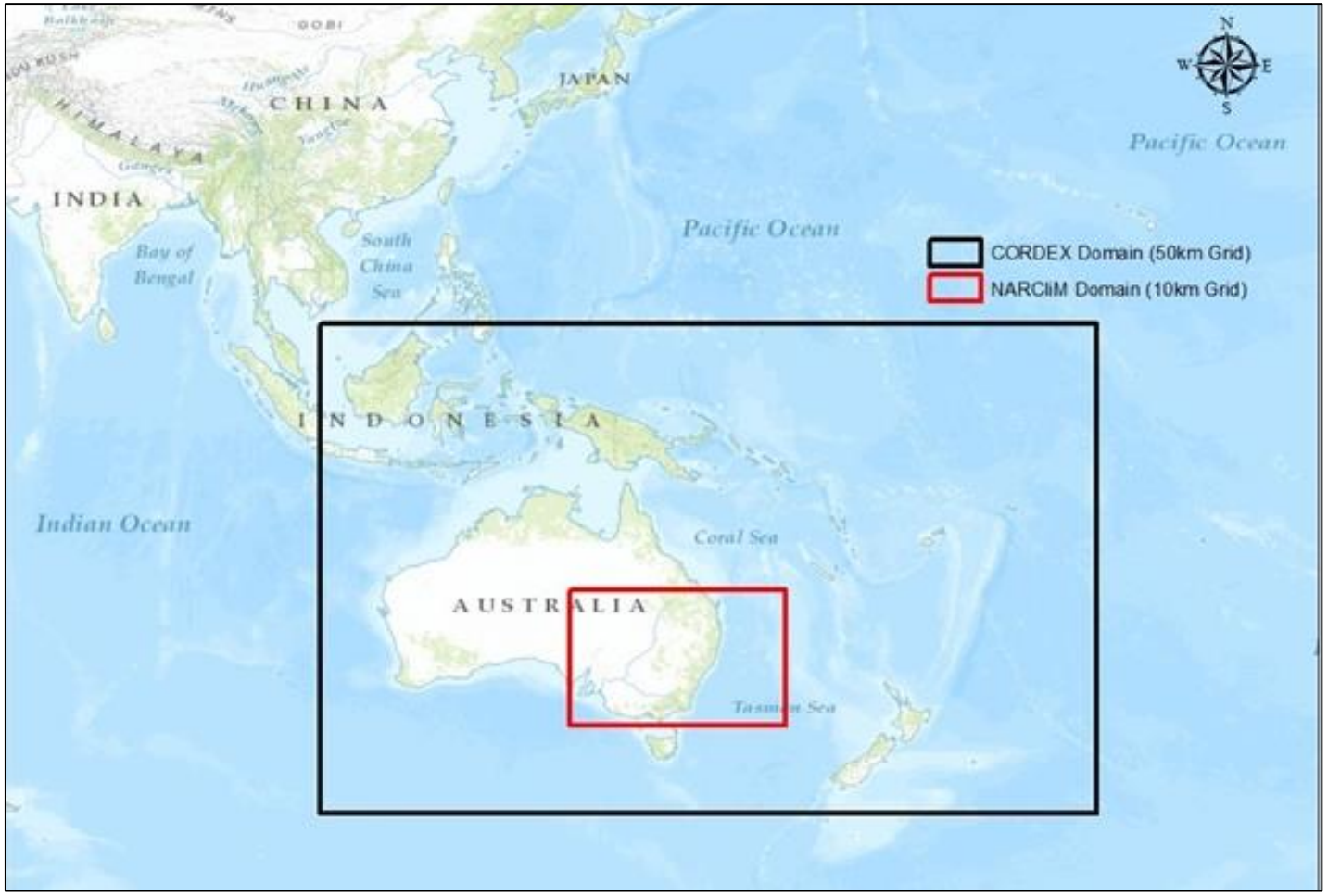
State data

Queensland Future Climate Dashboard

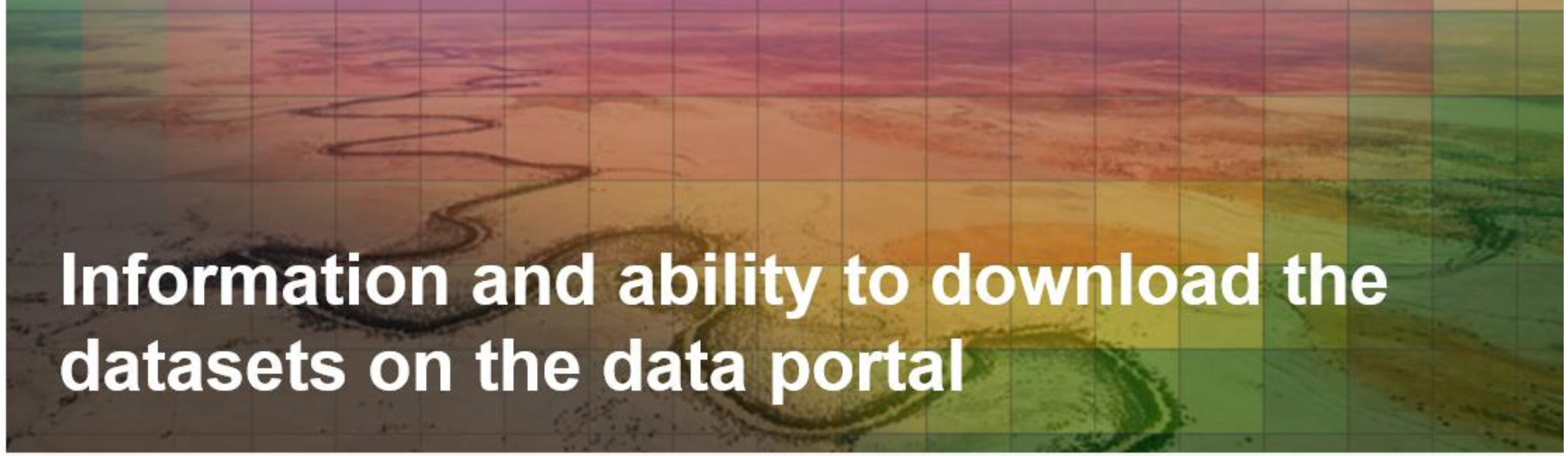
- **Fully interactive online platform providing climate change simulations at regional scale;**
- **6 climate themes;**
- **32 variables;**
- **Calendar seasons as well as wet, dry and annual periods.**



NSW/ACT Regional Climate Modelling: NARCliM 1.0 (2014)



- 10 km dynamically downscaled projections
- 12 regional climate models
- 3 x 20-year periods: 1990-2009, 2020-2039, 2060-2079
- 60 year NCEP reanalysis forced 3 RCMs (1950-2009)
- SRES A2 “BAU” future scenario
- Climate information on temperature, rainfall, evaporation, winds, humidity, snow, radiative heat fluxes, and more



Information and ability to download the datasets on the data portal

Data available from the Climate Data Portal

Users of the Climate Data Portal are able to construct and submit data requests to extract Regional Climate Model (RCM) data for the simulations, locations, time periods and climate variables that are of interest to them. Additional Information is provided for the data sets.

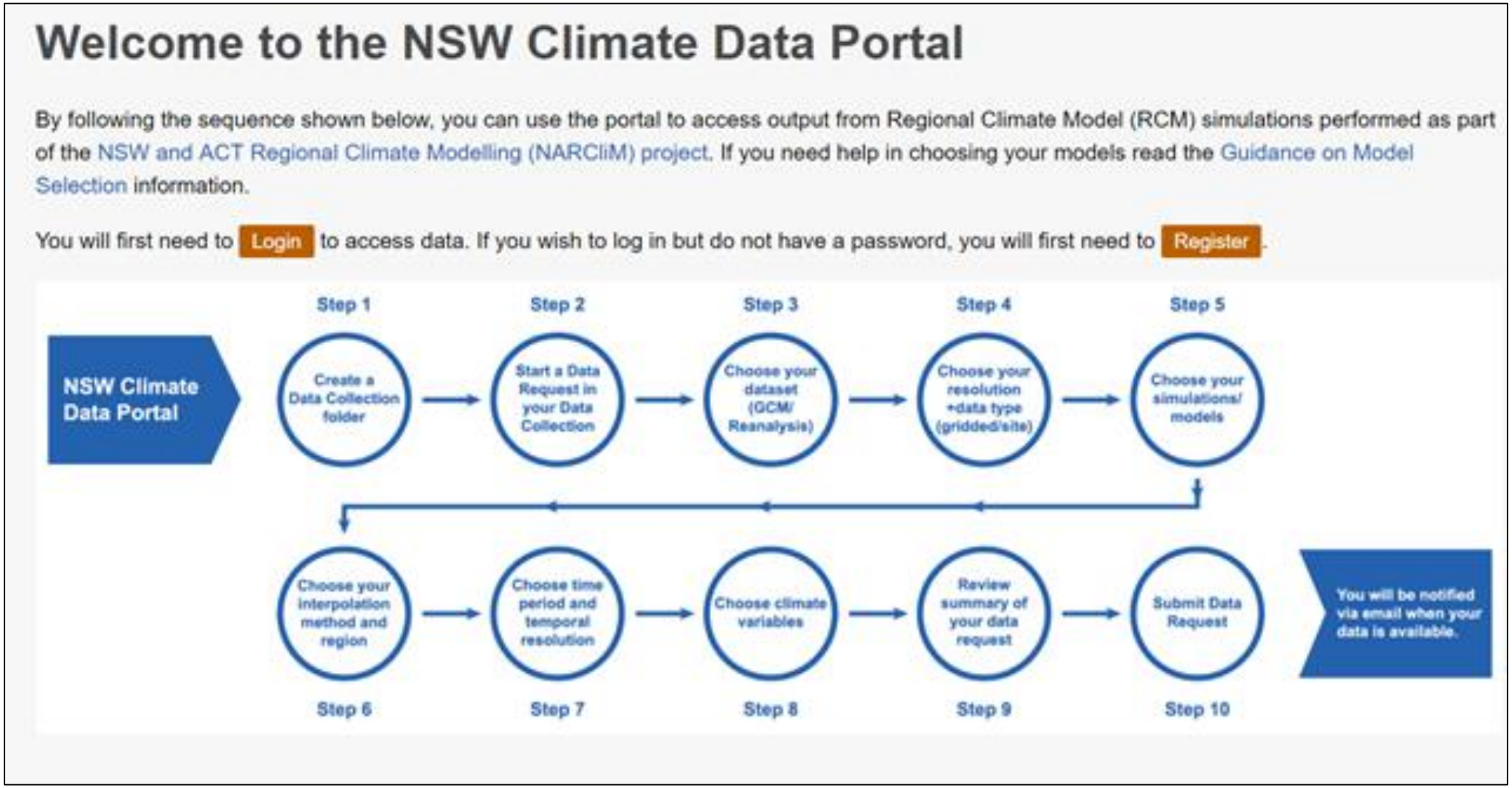
Please contact us if you need further advice on how to use the Climate Data Portal or the data available from it.

Domain and resolution

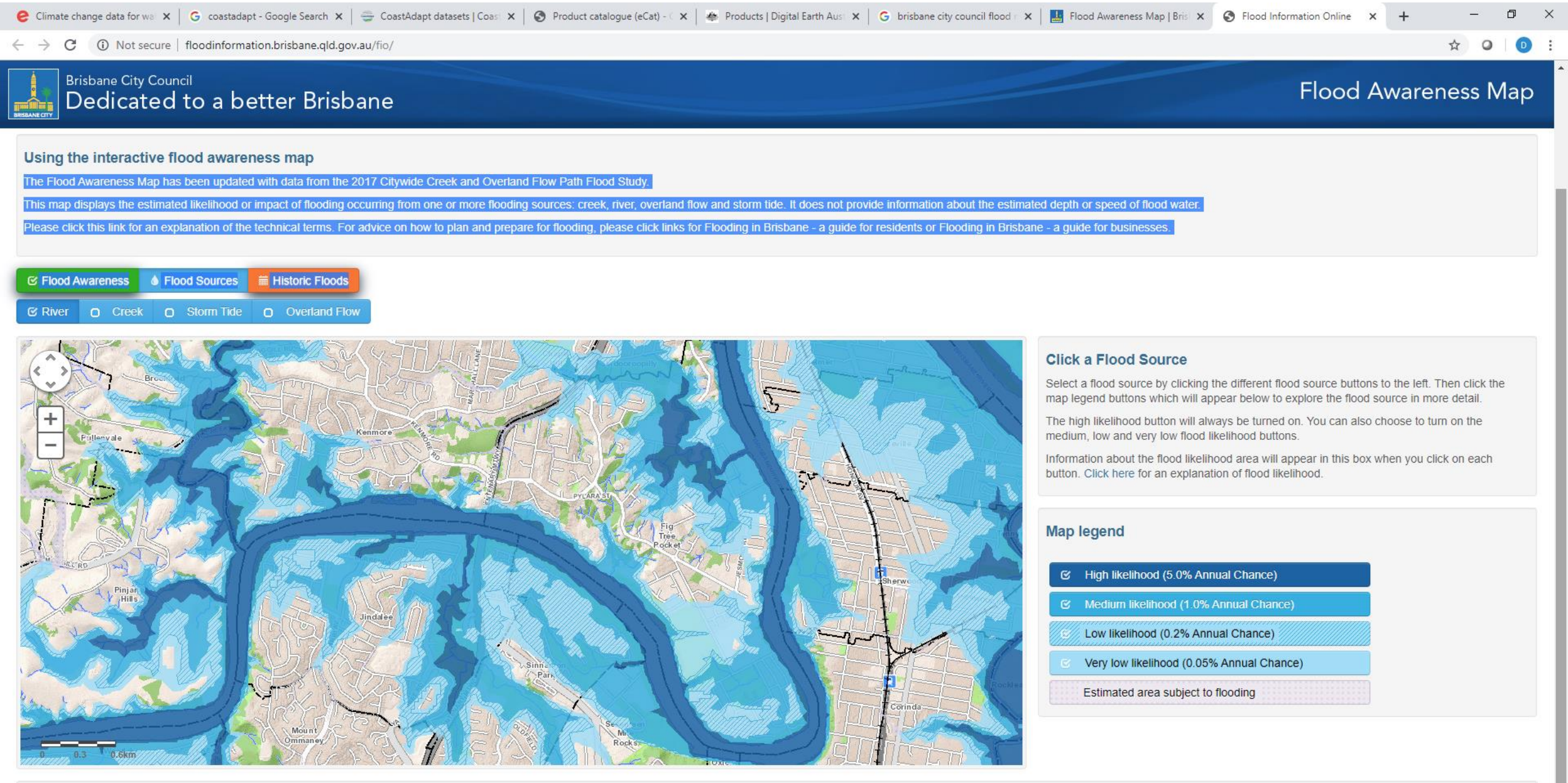
All of the data available from the Climate Data Portal is available over two domains and at two resolutions. The NARCliM domain covers southeast Australia at a horizontal resolution of ~10 kilometres. The Coordinated Regional Climate Downscaling Experiment (CORDEX) domain covers Australia and surrounds at a resolution of ~50 kilometres (See About NARCliM).

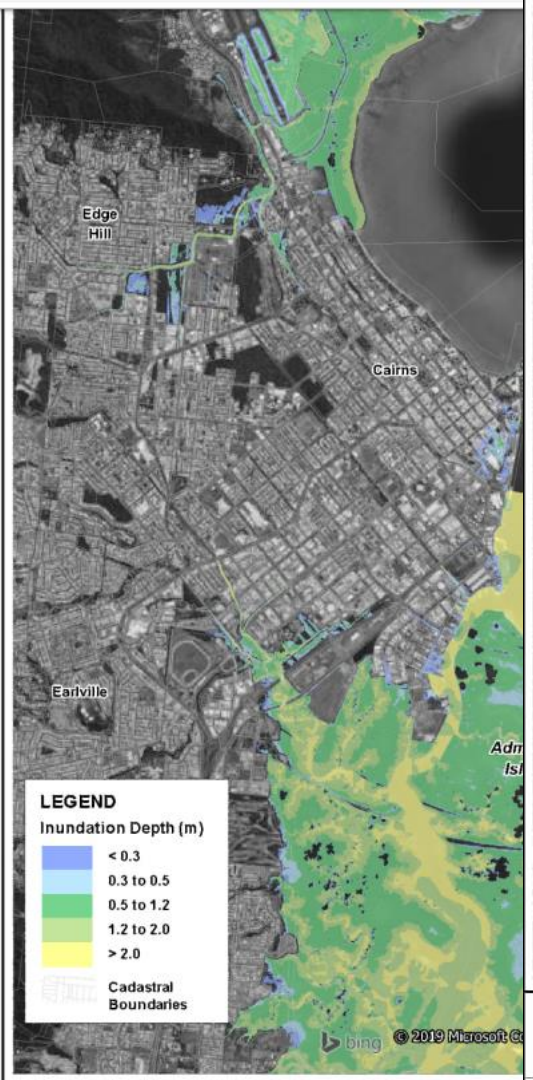
NSW Government Climate Data Portal

narclim@environment.nsw.gov.au



Local government data





Title:
Sea Level Rise Inundation Hazard in 2020

BMT WBM endeavours to ensure that the information provided in this map is correct at the time of publication. BMT WBM does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

N

0 1 2km
Approx. Scale

BMT
www.bmt.org

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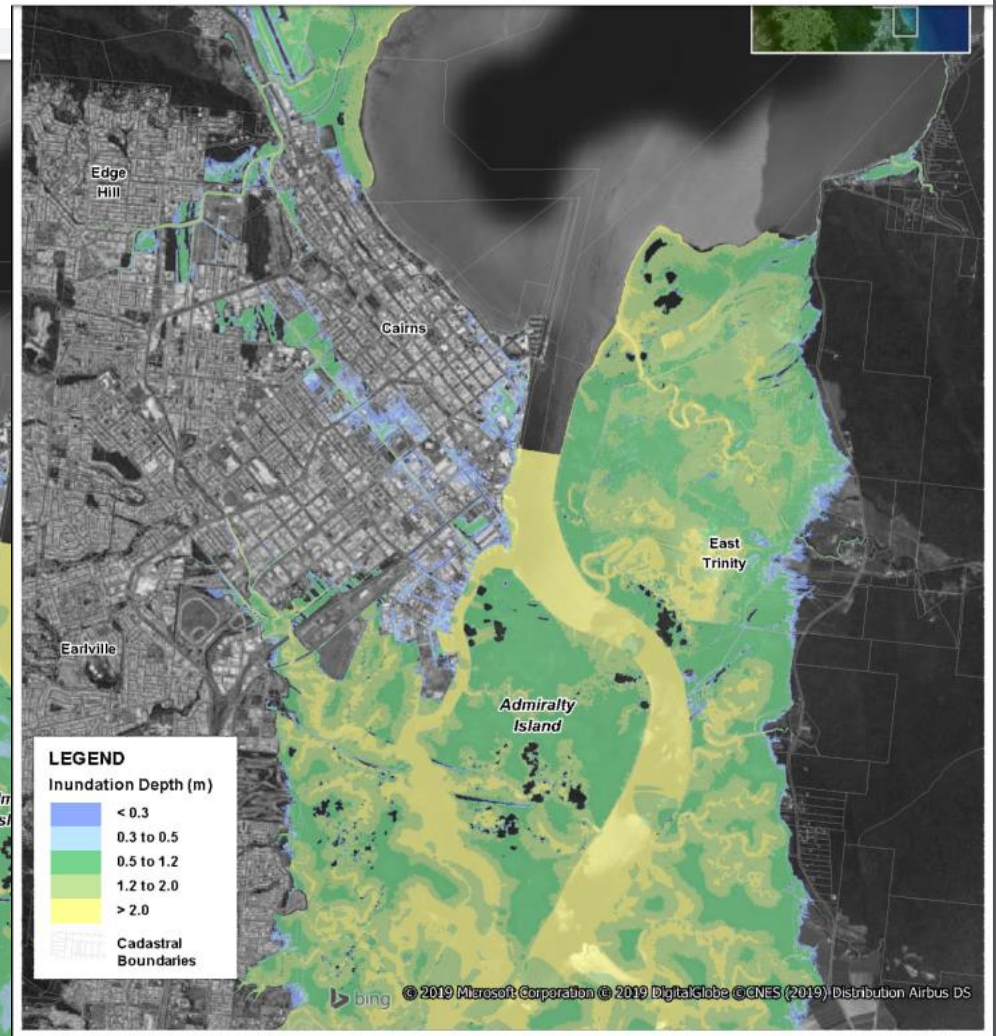

Title:
Sea Level Rise Inundation Hazard in 2060
Trinity Inlet Embayment - Cairns City

Figure: **B-13**

Rev: **A**

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N

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Approx. Scale

BMT
www.bmt.org

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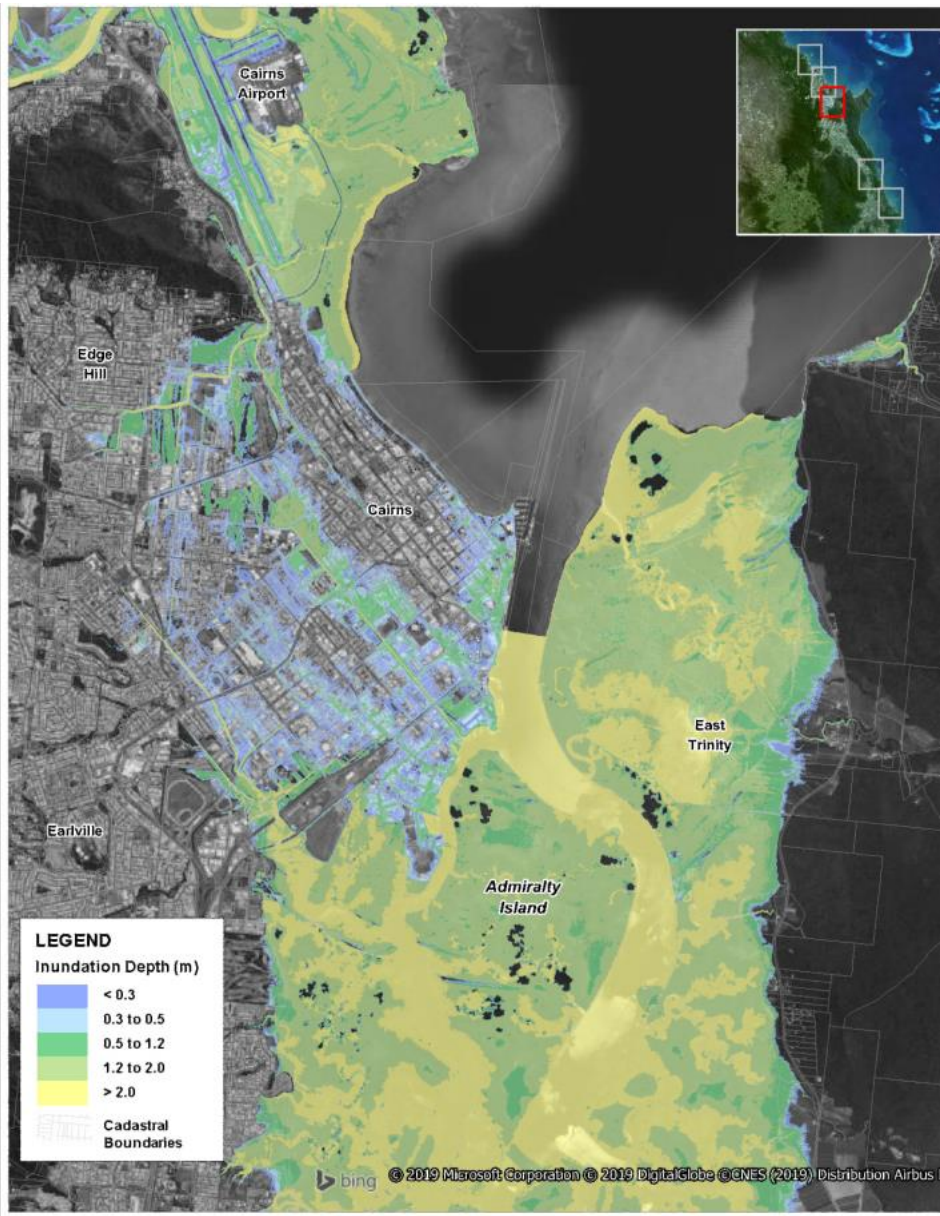
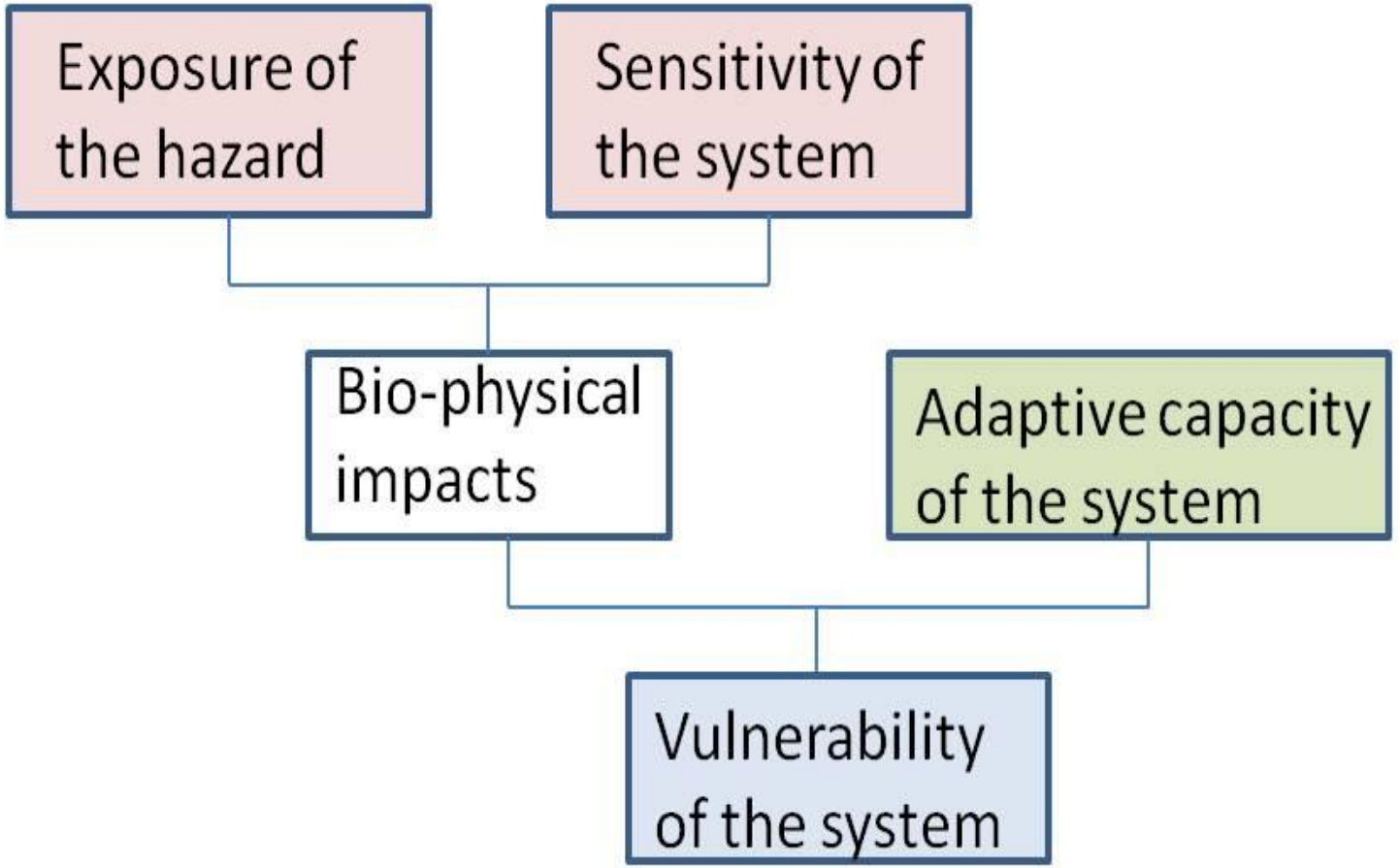


Title:

Figure:

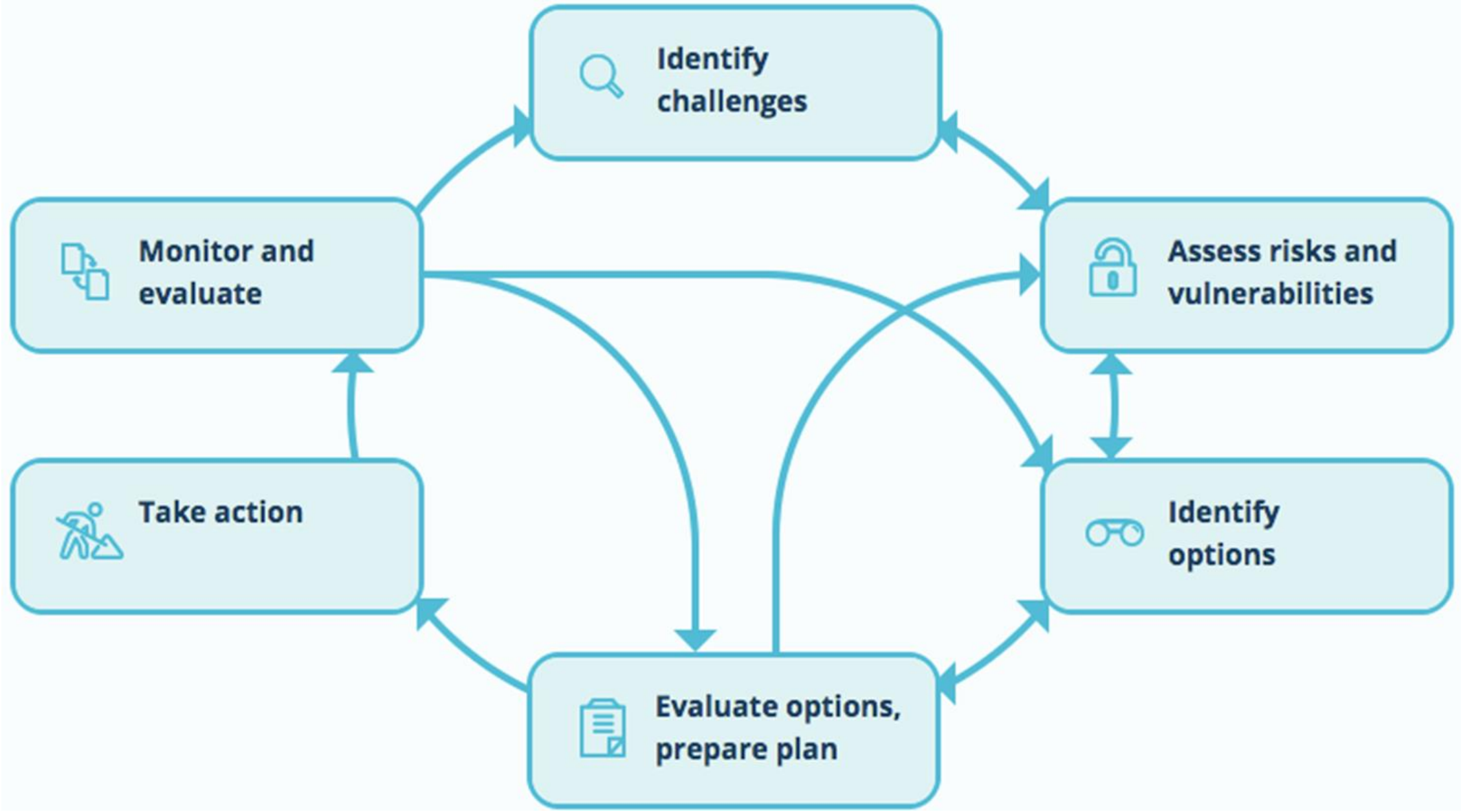
Using climate data in decision making

Concept of vulnerability

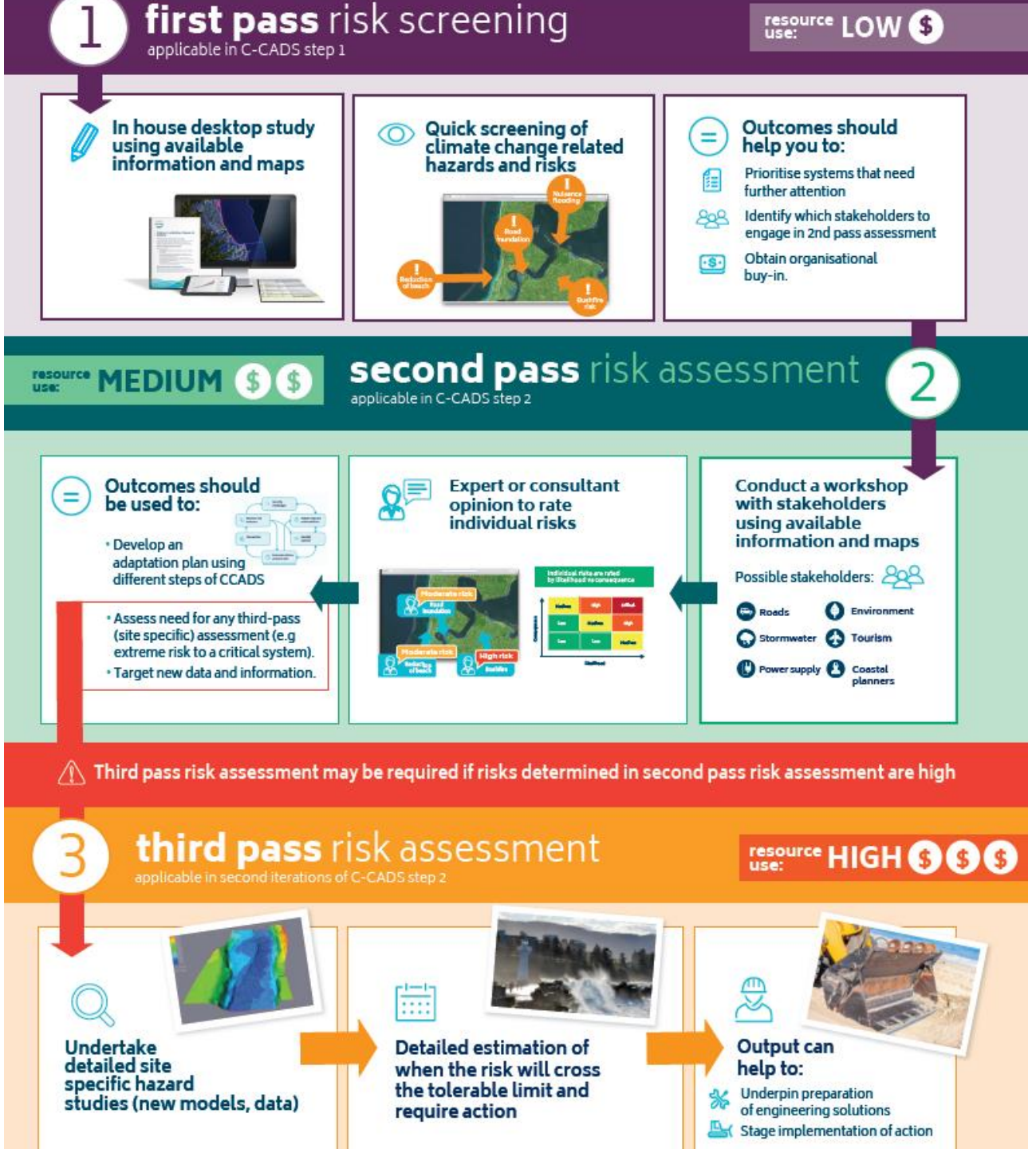


$$V_i = f(E_i, S_i, AC_i)$$

C-CADS Framework (Coastadapt.com.au)



Three phase risk assessment process



Communities of practice

Leadership

Knowledge brokering

Governance

Skilling

Learning

Communication & Engagement

Information and Guidance Products

Sea-level rise and climate change data

Decision support

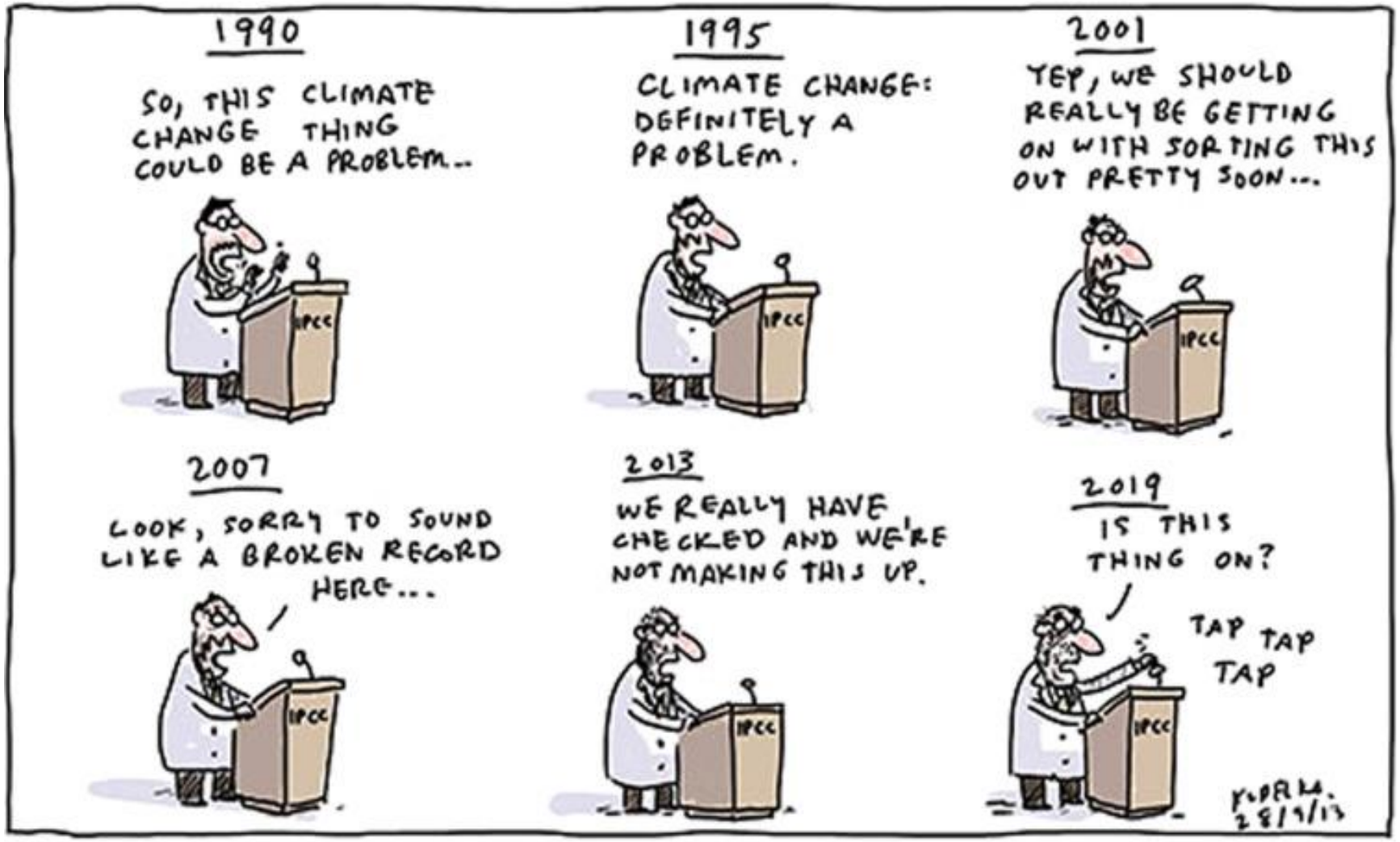
Identify challenges

Assess risks and vulnerabilities

Identify options

Evaluate options, prepare plan

Webb, Rissik, Petheram, Beh and Stafford-Smith, 2019



Thankyou

@drissik
email: david.rissik@bmtglobal.com

David Rissik

BMT