How can our communities know, assess and prepare for climate change? NSW Government programs

Understanding Climate Variability, Hovells Creek August 2019

Melinda Hillery, Senior Project Officer, Climate Change and Sustainability Division
NSW Dept Planning, Industry and Environment
August 2019

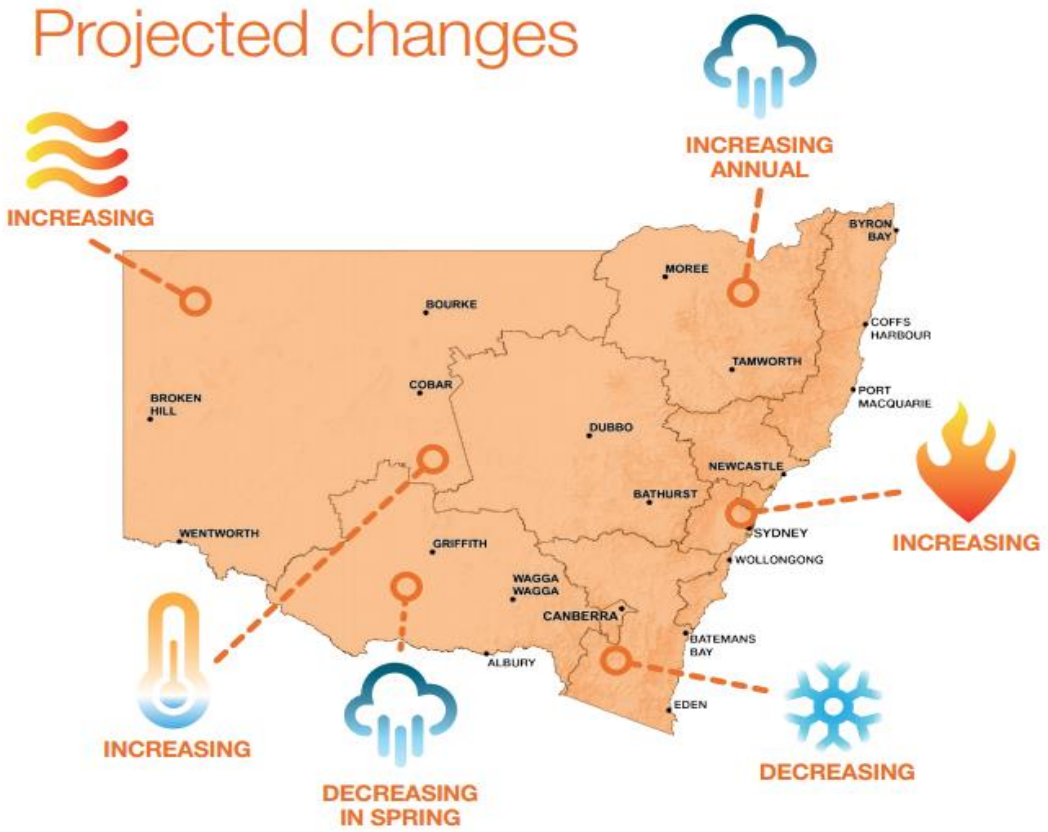
Goulburn flood after storm, Goulburn Post, Jan 11 2019

Mop up from three fires in Harden, Twin Town Times, Jan 13 2017

Wine grapes ripening earlier Guardian Australia Feb 2016

Drought - Bombala Times June 2018

KNOW



1. **KNOW: Regional climate snapshots and local climate projections**
2. ASSESS: Regional vulnerabilities and priorities for change
3. RESPOND: Case studies from the SE & Tablelands

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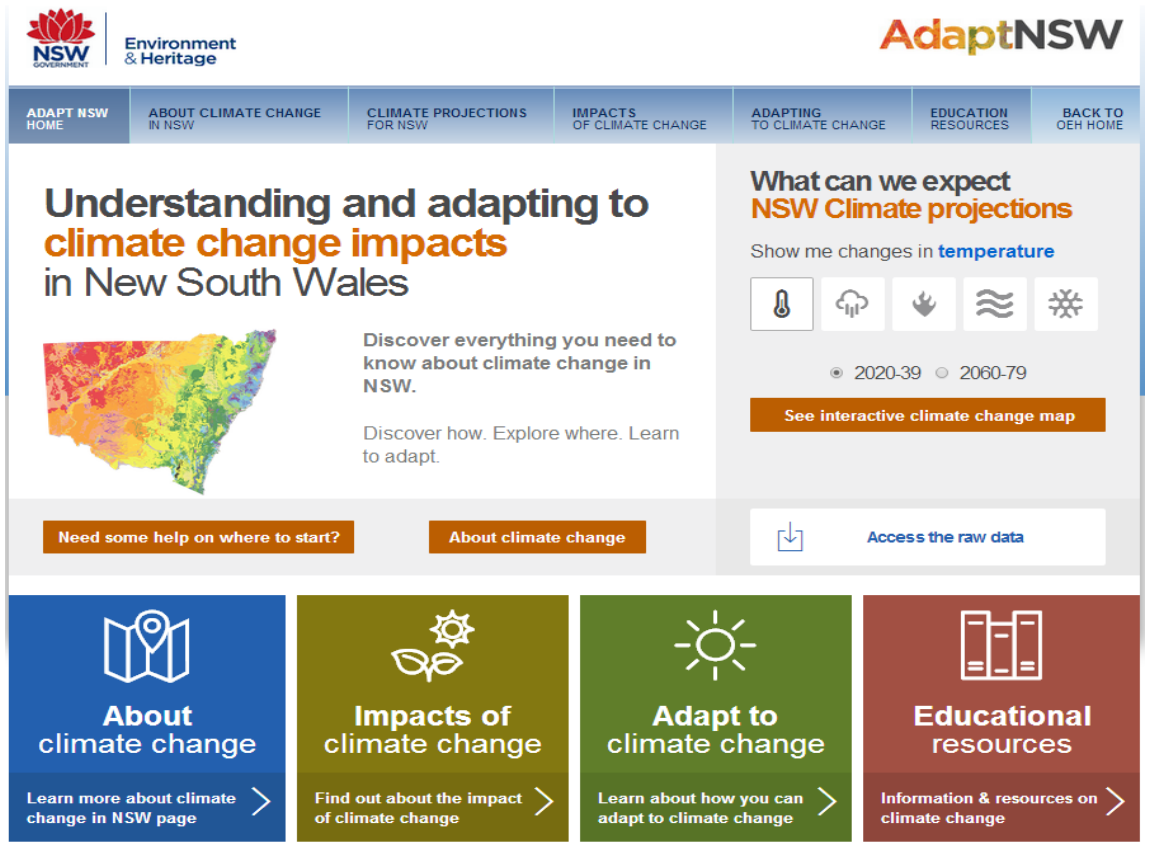
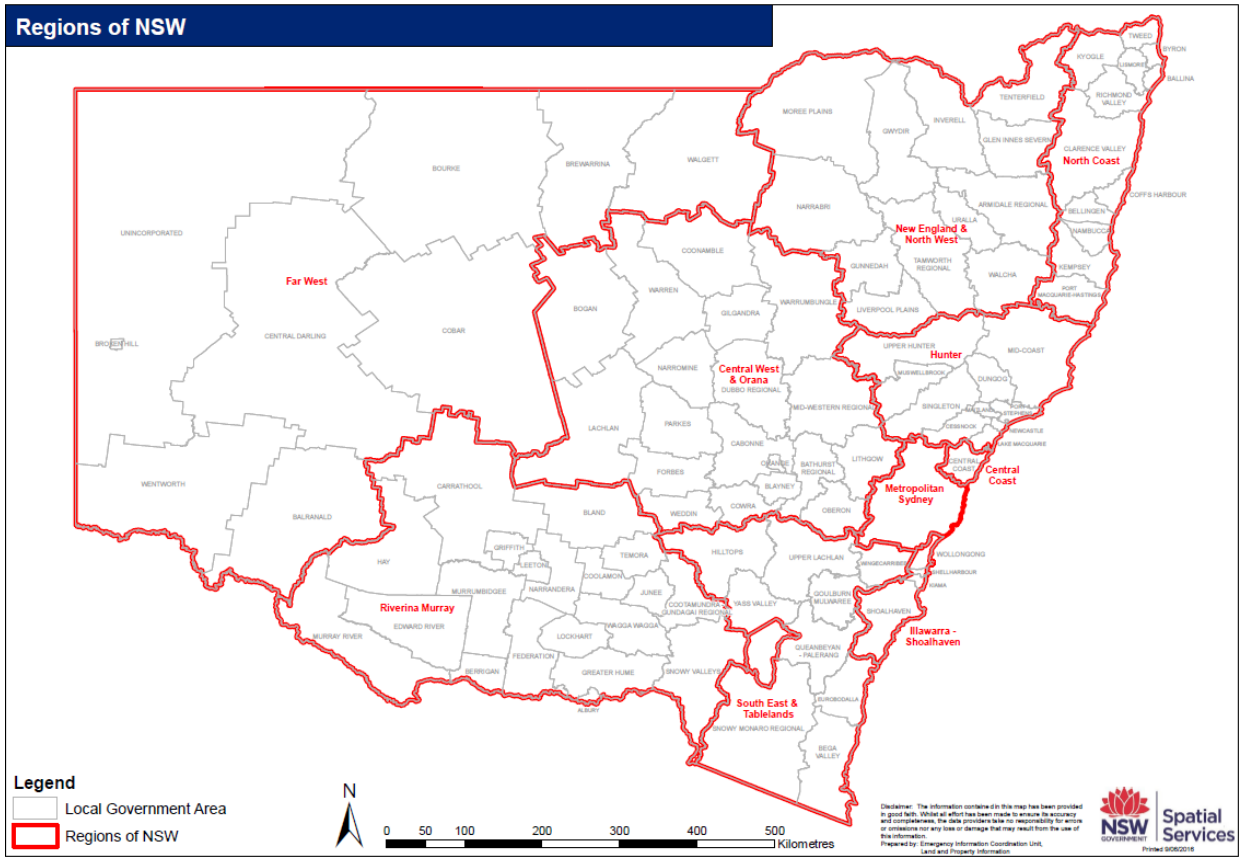
Adapt NSW website





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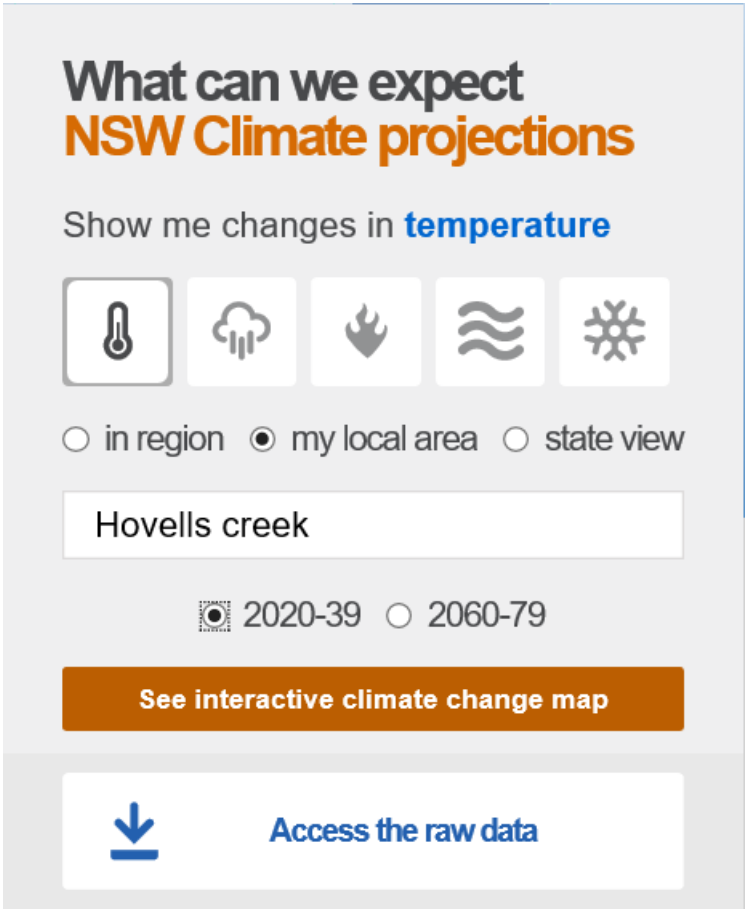
http://climatechange.environment.nsw.gov.au/

Adapt NSW: How to find local climate projections



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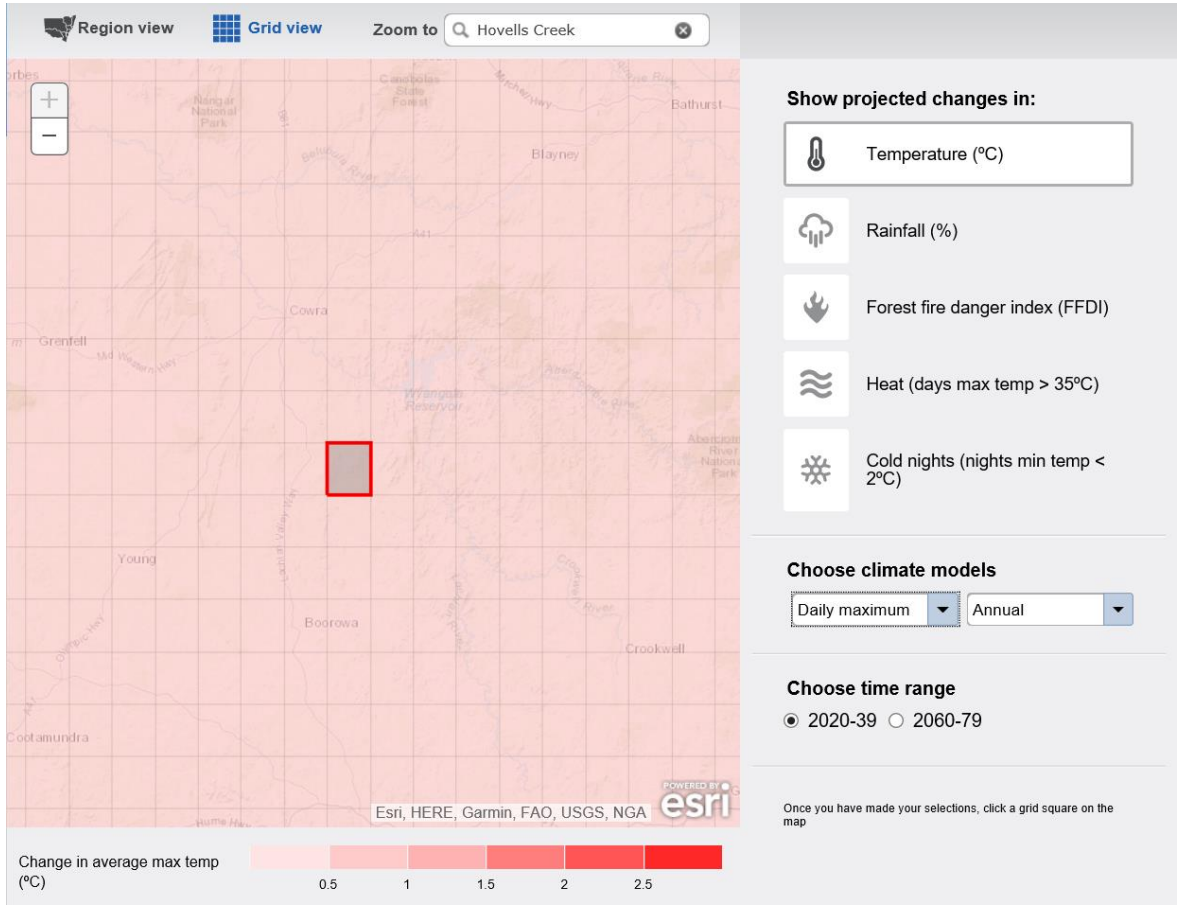
http://climatechange.environment.nsw.gov.au/

Hovells creek daily max temperature 2030



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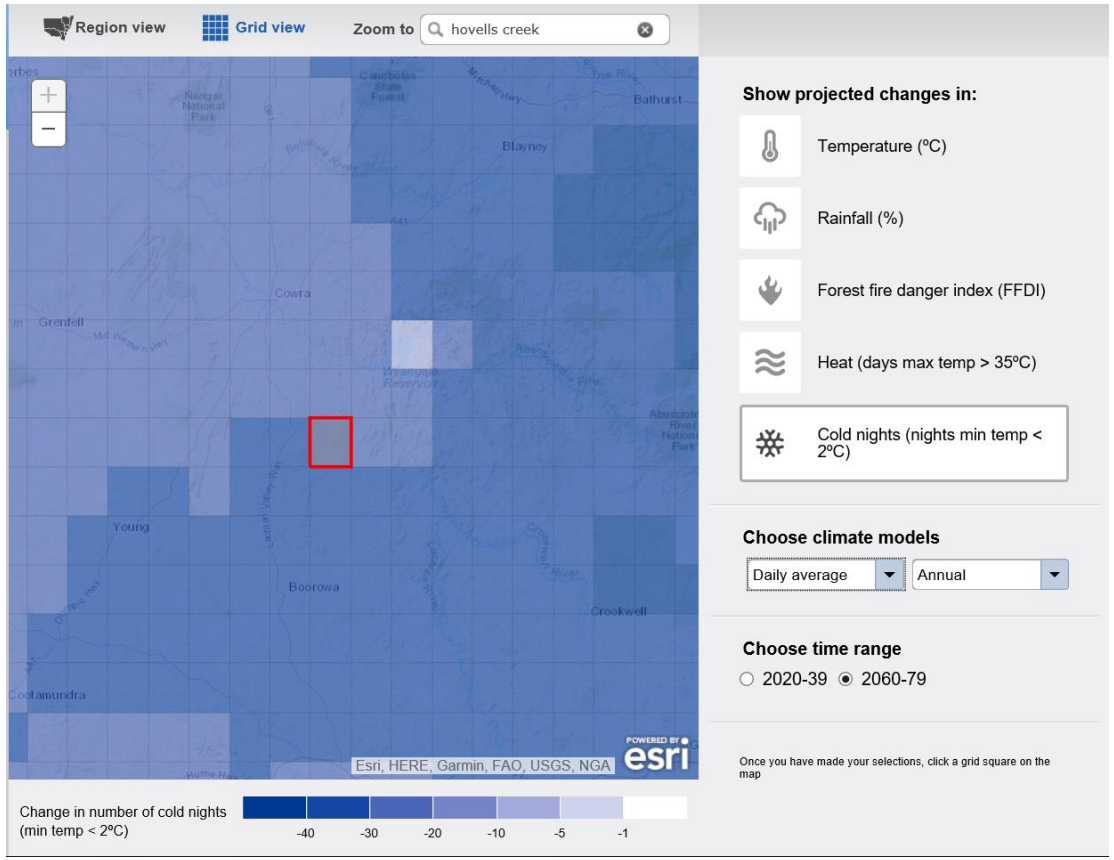
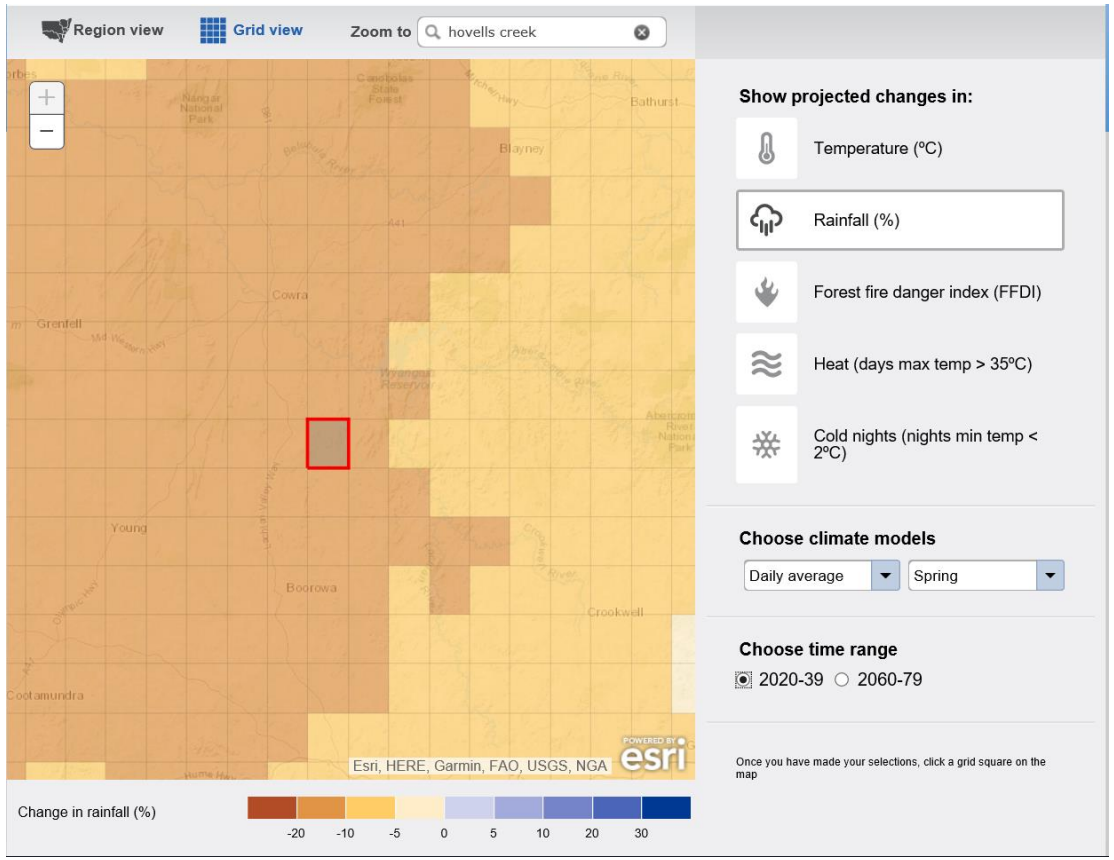
http://climatechange.environment.nsw.gov.au/

Hovells creek: cold nights (2070) and Spring (2030) rainfall





NSW GOVERNMENT

http://climatechange.environment.nsw.gov.au/

SE and Tablelands rainfall projections: variation between models

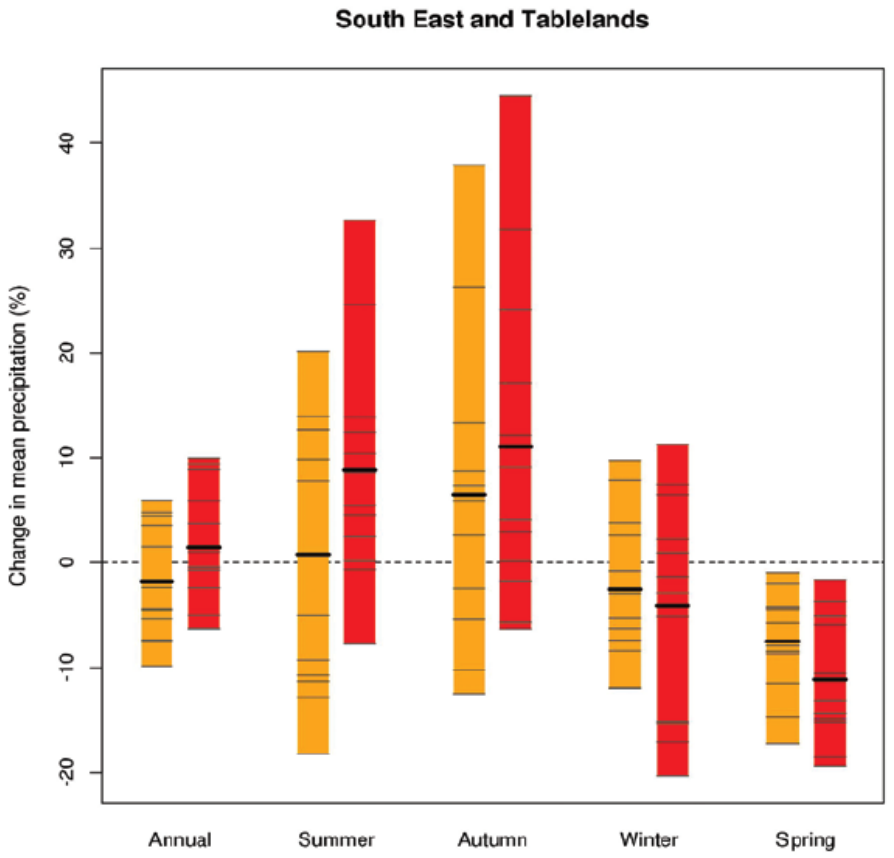


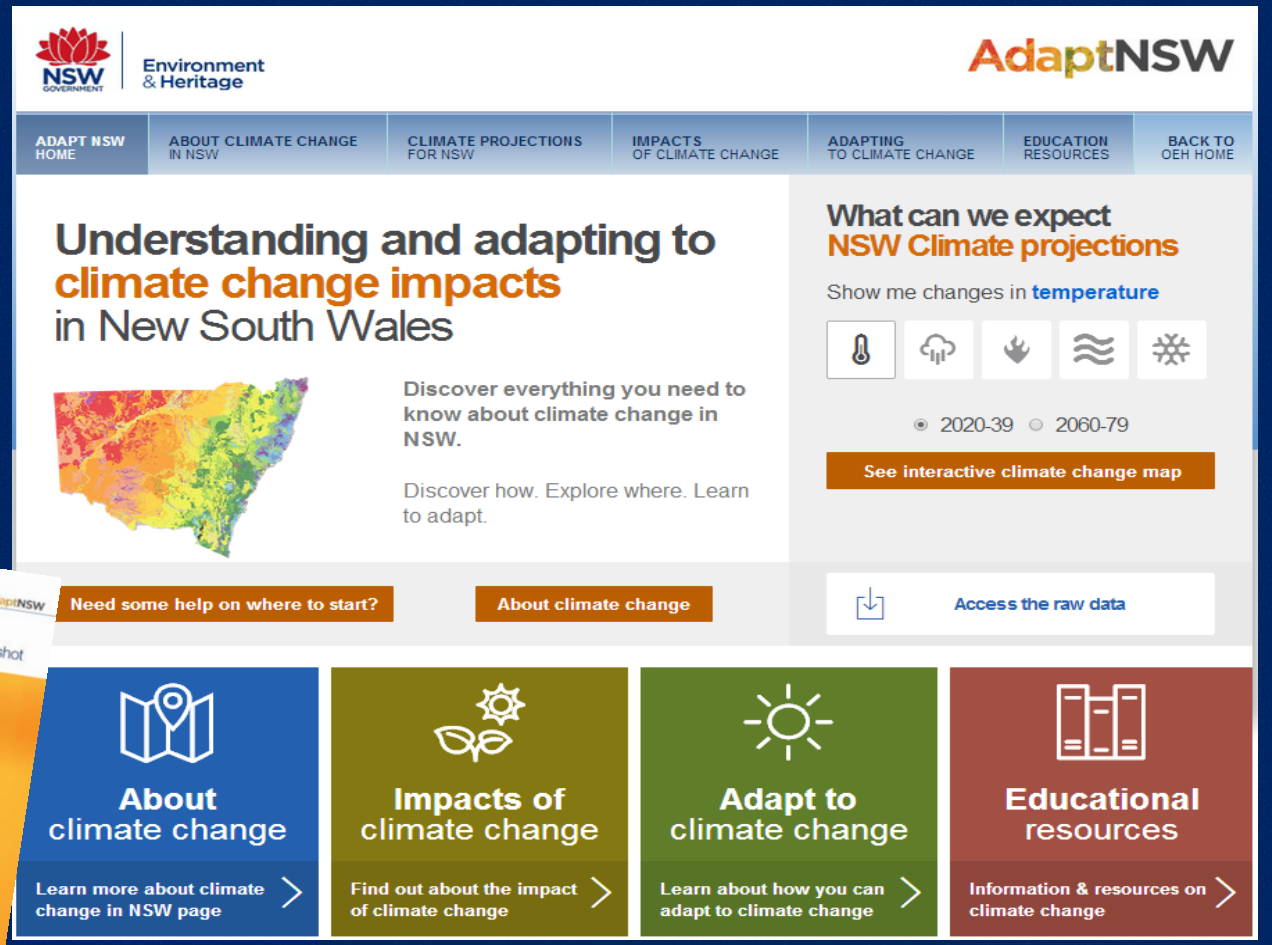
Figure 13: Projected changes in average rainfall for the South East Tablelands Region, annually and by season (2030 yellow; 2070 red). (Appendix 1 provides help with how to read and interpret these graphs).

Information delivery

sims
sydney institute of marine science
Coastal Processes and Responses Node

MACQUARIE University
The Biodiversity Node

UTS
Adaptive Communities Node



THE UNIVERSITY OF SYDNEY
CLIMATE CHANGE, HUMAN HEALTH AND SOCIAL IMPACTS RESEARCH NODE

ASSESS

1. KNOW: Regional climate snapshots and local climate projections
2. **ASSESS: Regional vulnerabilities and priorities for change**
3. RESPOND: Case studies from the SE & Tablelands

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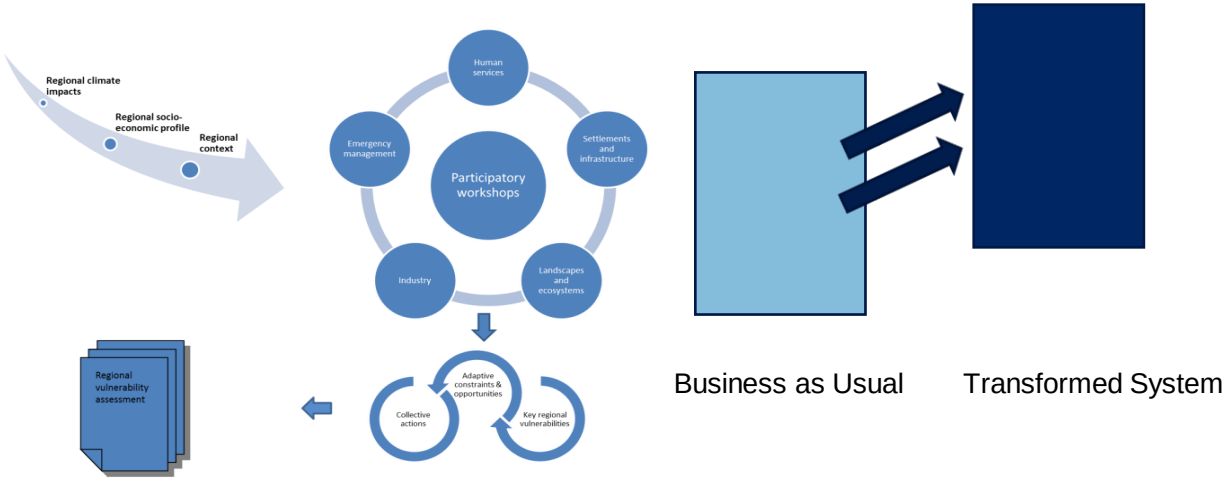
Vulnerability assessment and adaptation pathways (South East and Tablelands region)


Image: John Spencer/OEH

Two phases of work

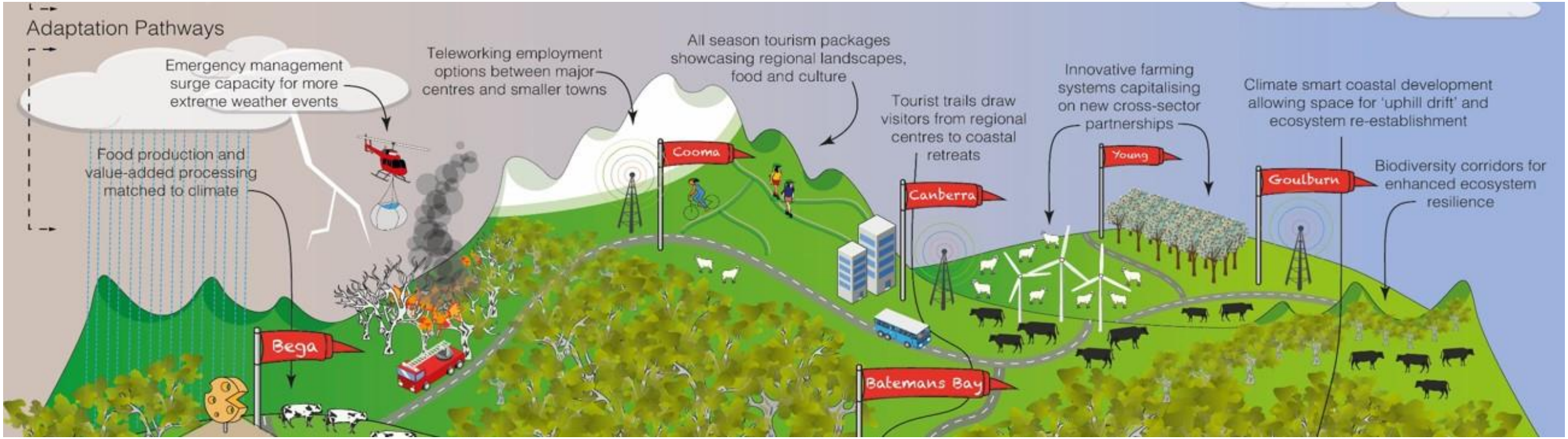


Integrated Regional Vulnerability Assessment (IRVA)

Adaptation Pathways (Enabling Adaptation in the South East –EASE)

Over 130 participants across 3 subregions

Priority systems and adaptation pathways

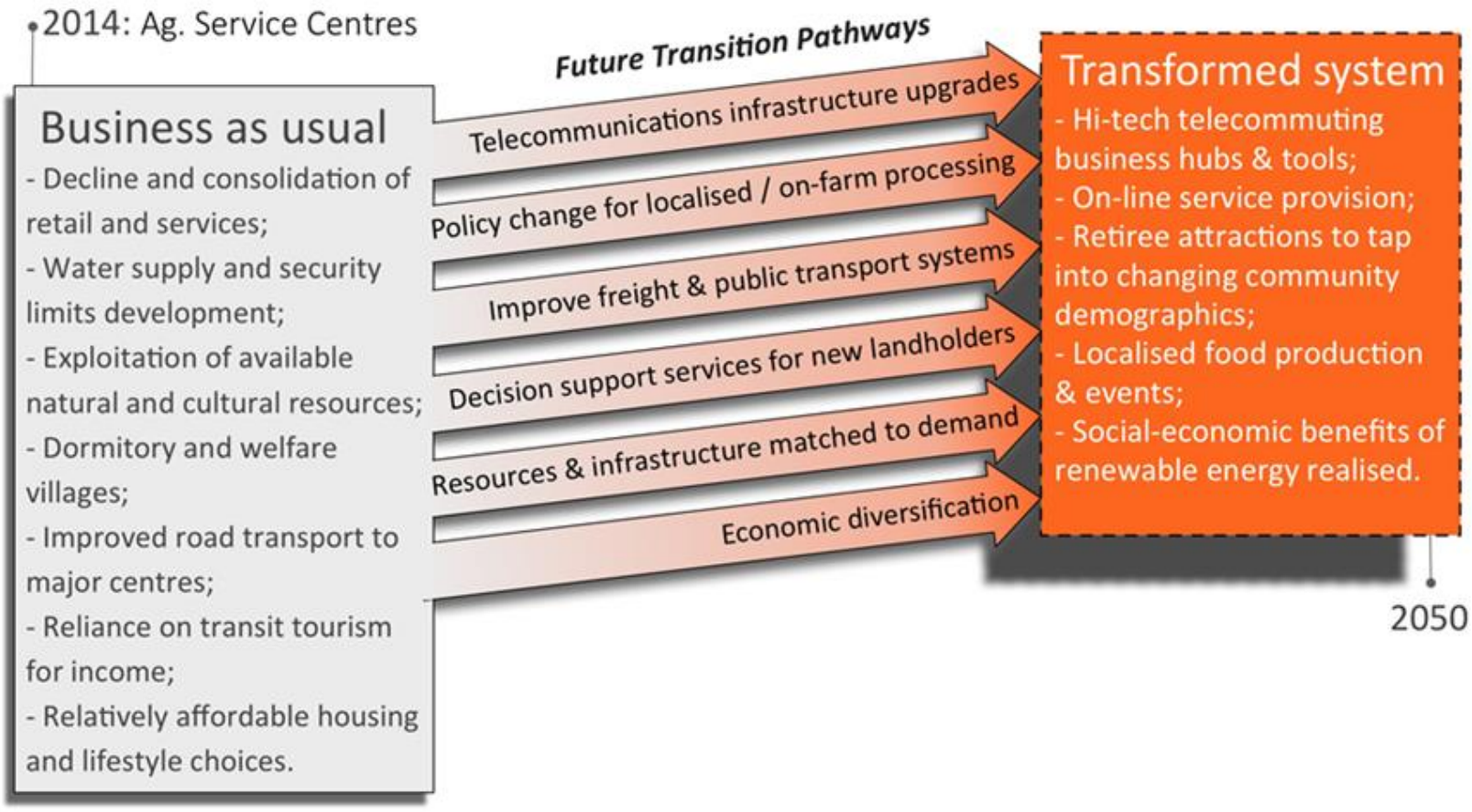


- large regional towns
- agricultural service centres
- coastal development
- potable water supply

- emergency management
- alpine tourism
- beach tourism
- public land management

- coastal ecosystem management
- off-reserve conservation
- extensive grazing
- dairy farming

Priority systems and adaptation pathways



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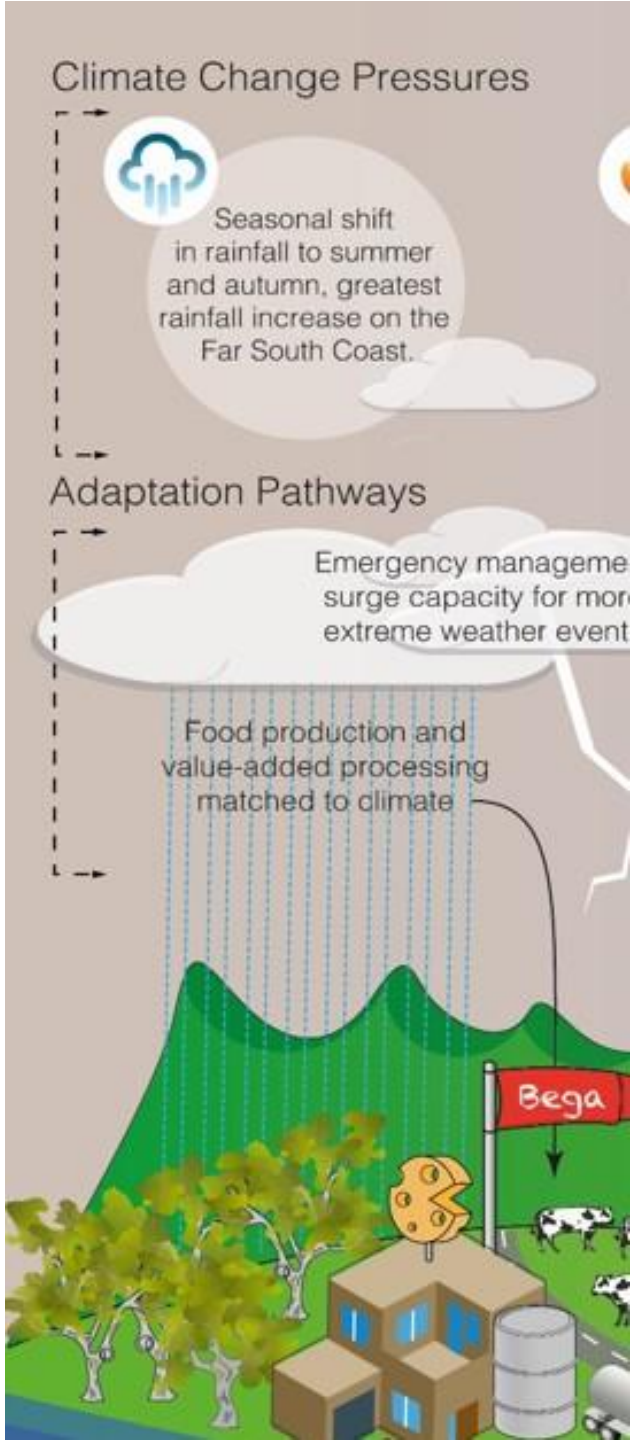
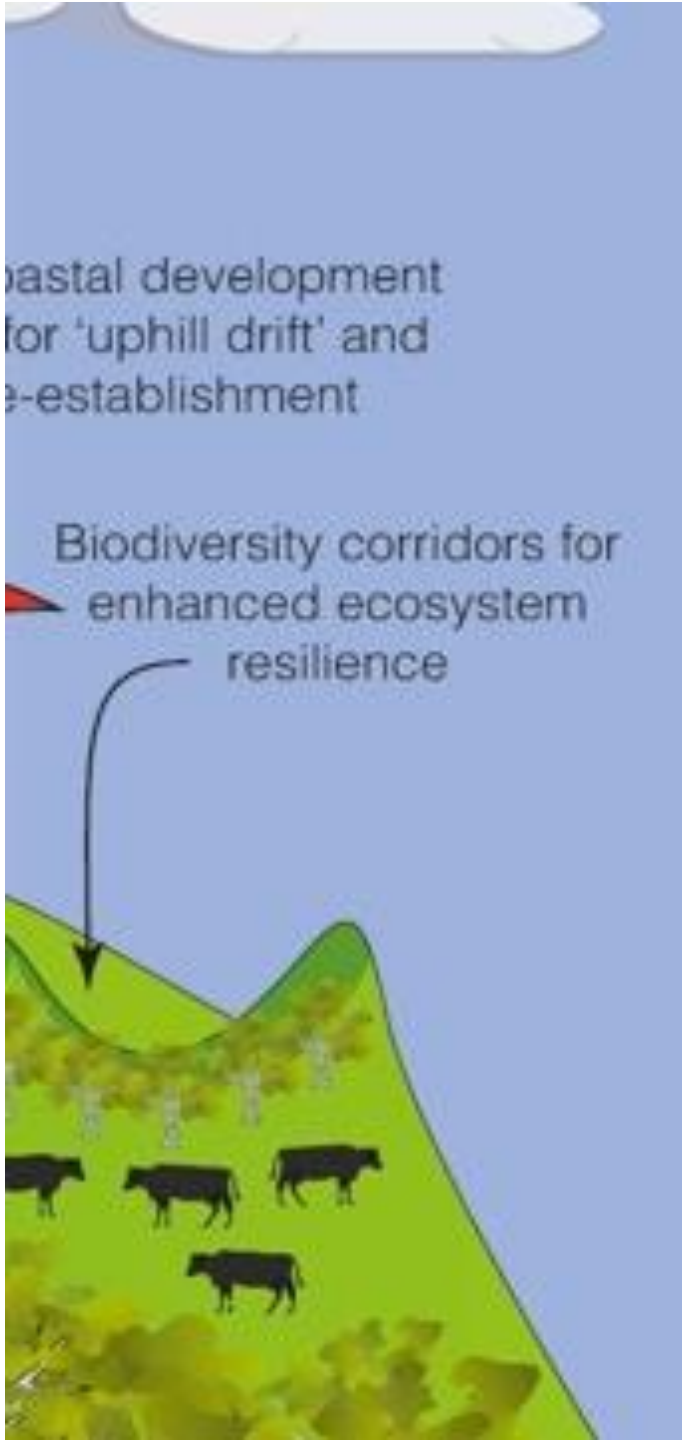
Priority: Potable water

- Recent years have included both drought declarations and flash flooding
- Priority pathways focus on:
  - Supply: drought planning and proofing, water sharing plans, alternative water sources
  - Quality: engineering landscapes to improve functionality, environmental flows and monitoring
  - Storage: improved agricultural storage, water smart town planning and development
  - Efficiency: improved agricultural application, improved water efficiency and re-use, incentives and education
  - Recycling: stormwater diversion and harvesting



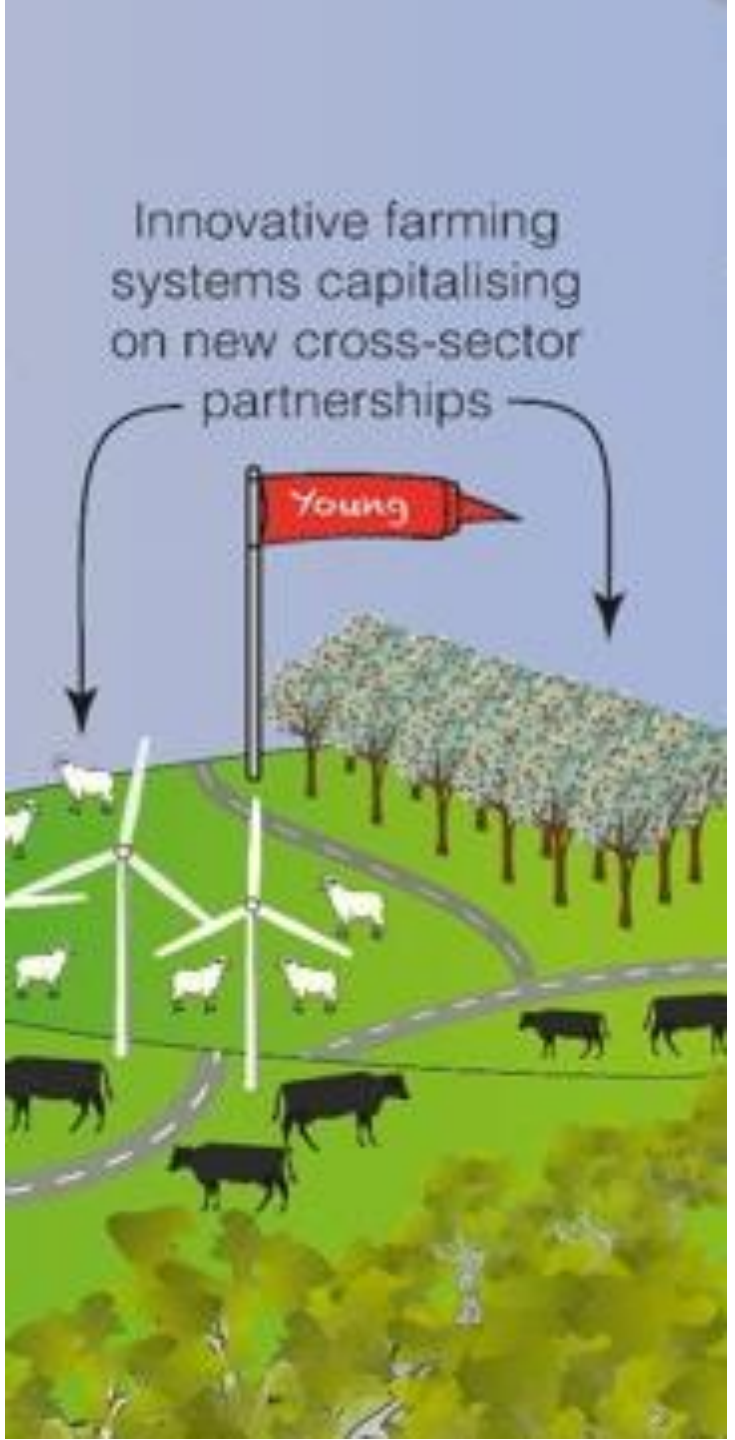
Priority: Public land management and Off-reserve conservation

- Currently seeing species increases/decreases, body size changes and movements e.g. Superb Parrots, Coolathai grass, changes in body size for honey eaters
- Public land management: key theme is public private partnerships and integrated public private landscape management
    - Also management adaptations for ecosystem change and regional planning for conservation
- Off-reserve conservation: key theme is financial mechanisms to support the value of natural resources and ecosystems
    - Also better integrating this with other landscape management to produce multifunctional landscapes

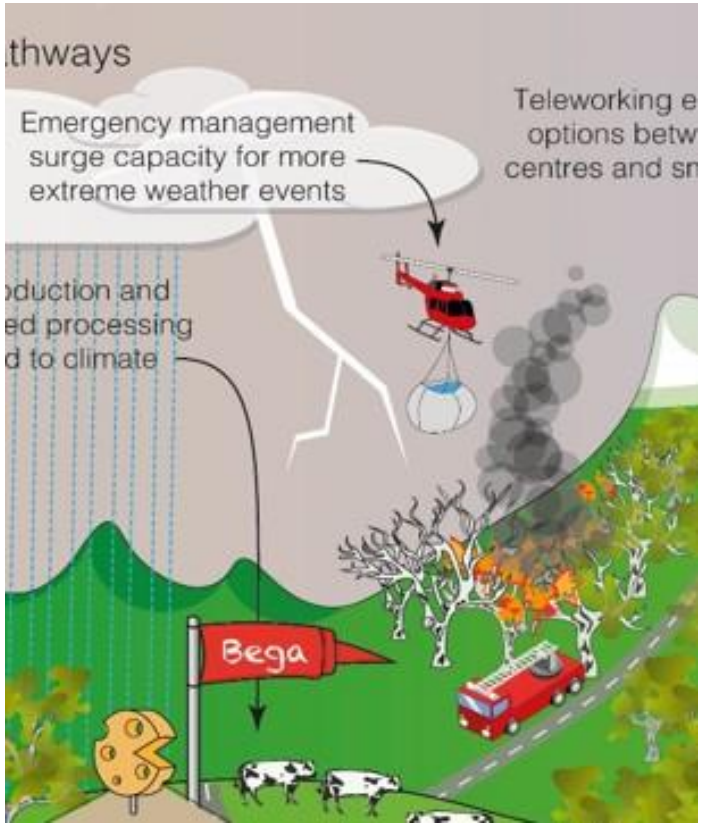


Priority: Extensive grazing

- Recent years have seen low dam levels, low soil moisture and heatwaves
- Priority pathways focus on:
  - Diversification for multiple niches and new farm enterprises
  - Rationalizing inputs
  - Protection and consolidation of prime agricultural land



Priority: Emergency management



- Recent years have included minor fires at Harden and major fires in the SE & Tablelands Region; flash flooding across Hilltops Shire; heatwaves
- Priority pathways focus on:
  - Agencies enabling innovation and community led initiatives
  - Embedding resilience into planning controls
  - Levelling the playing field for vulnerable groups
  - Providing resources and accountability – supporting the Local Emergency Management Officer role within LG
  - Community engaged with Local Emergency Management Committee and involved in practice events
  - Better alignment between EM agencies
  - Support to LG to provide consistent emergency management information via council websites

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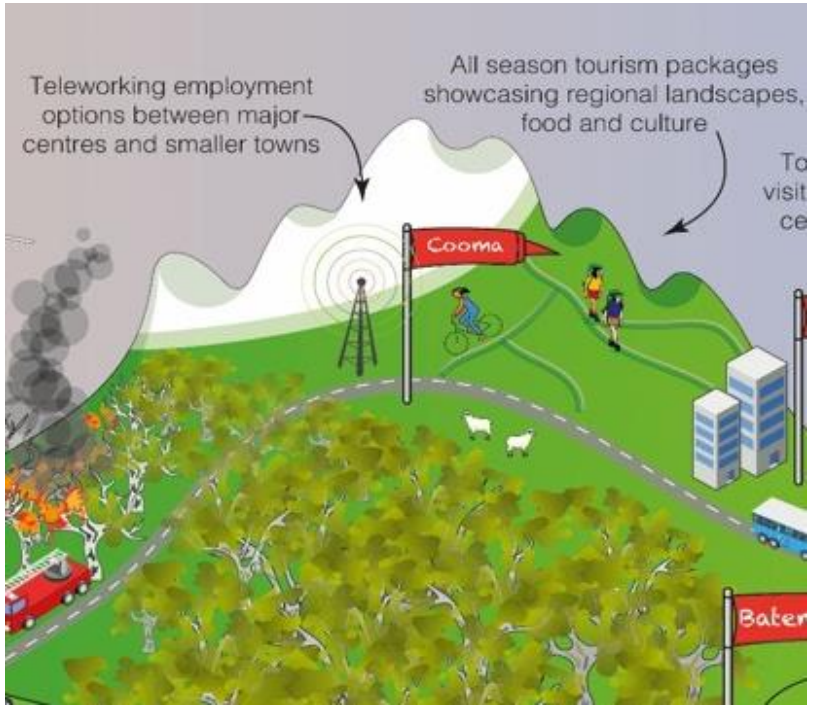
Priority: Agricultural service centres

- Recent years have included water insecurity, degrading roads and expanding renewable energy
- Priority pathways focus on:
  - Service delivery – water, transport, housing, telecommunications, renewable energy
  - Economic diversification to counter retail decline
  - Focus on cultural and natural resources, and local food production/processing and events



RESPOND


3am sheep pregnancy testing to beat the heat

1. KNOW: Regional climate snapshots and local climate projections
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3. **RESPOND: Case studies from the SE & Tablelands**

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Case study: Potable water

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Wingecarribbee Shire Council:
Portable Water Treatment Feasibility Study to Increase Water Supply Resilience

Climate ready re-vegetation case study: Yass Area Network Landcare group (YAN)

Objective: Build climate resilience of plants chosen for revegetation projects to improve the survivability of species in the YAN Landcare region.

Activities

A two day workshop was held with the members of the Yass Area Network Landcare group. The group was taken through tasks to identify native plant species and the applying a climate–ready provenance and seed sourcing strategy. The project utilises the best available climate projections and flora adaptation research.

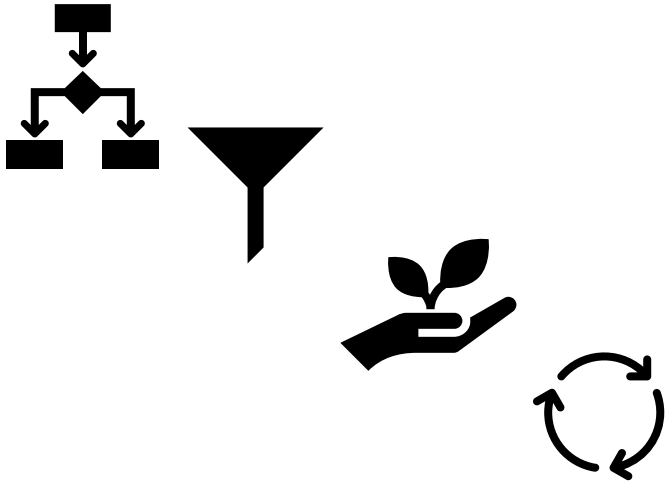
Next steps:

- Develop and implement a planting design
- Plant climate-ready seeds
- Monitor survivability at revegetation sites

Opportunity available for engagement in further climate-ready revegetation projects – please contact;
Isobel: Isobel.Cummings@environment.nsw.gov.au OR
Mel: Melinda.Hillery@environment.nsw.gov.au

Case study: Climate change risk assessment for farmers

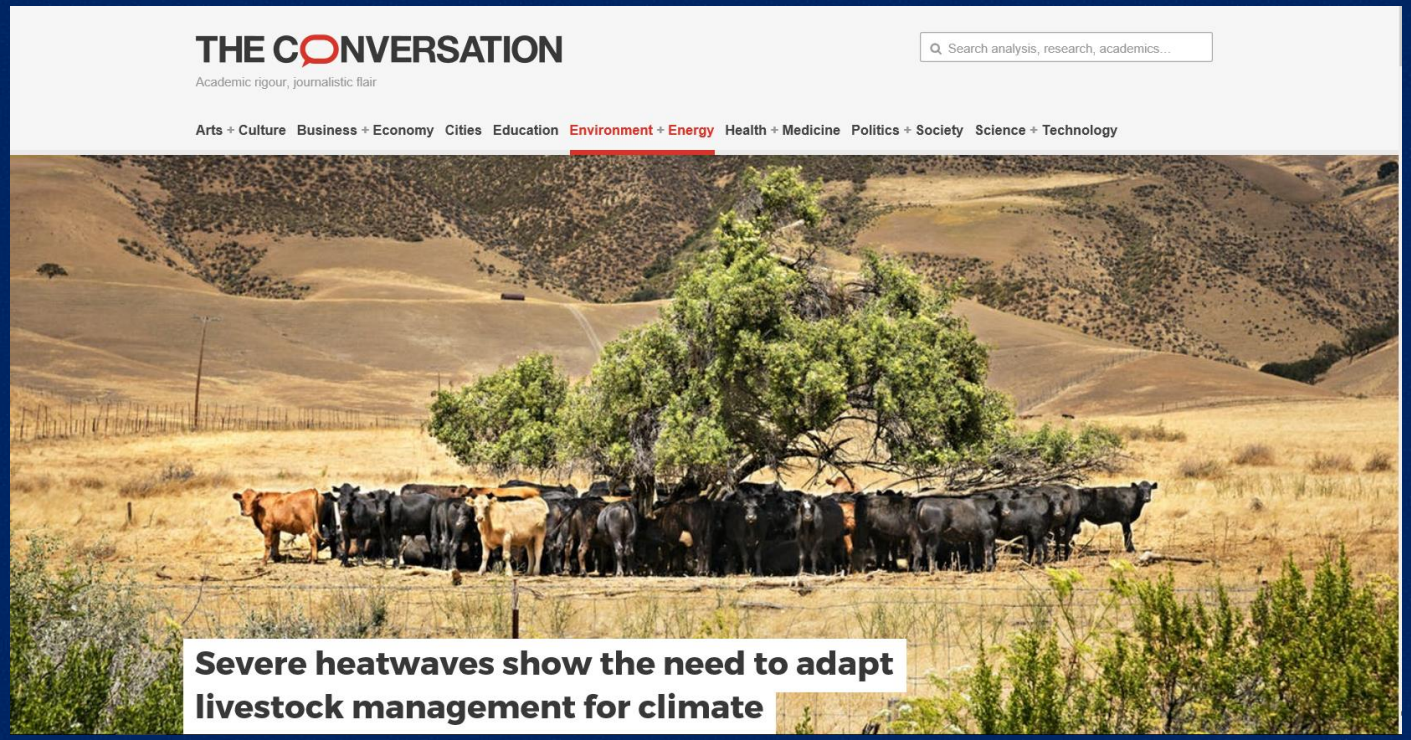
Climate Risk assessment



Risk assessment

1. My climate risks and impacts are…
2. My current climate risk ratings are…
3. My risk control plan is….
4. My climate opportunities are..
5. Monitor and Review

Case study: grazing



A legacy of research on grazing and climate change in this region….
What would the next adaptation project for graziers in this region look like?
Animal welfare integrated with nutritional management during dry times, fodder protection and/or local processing for a climate adapted premium?

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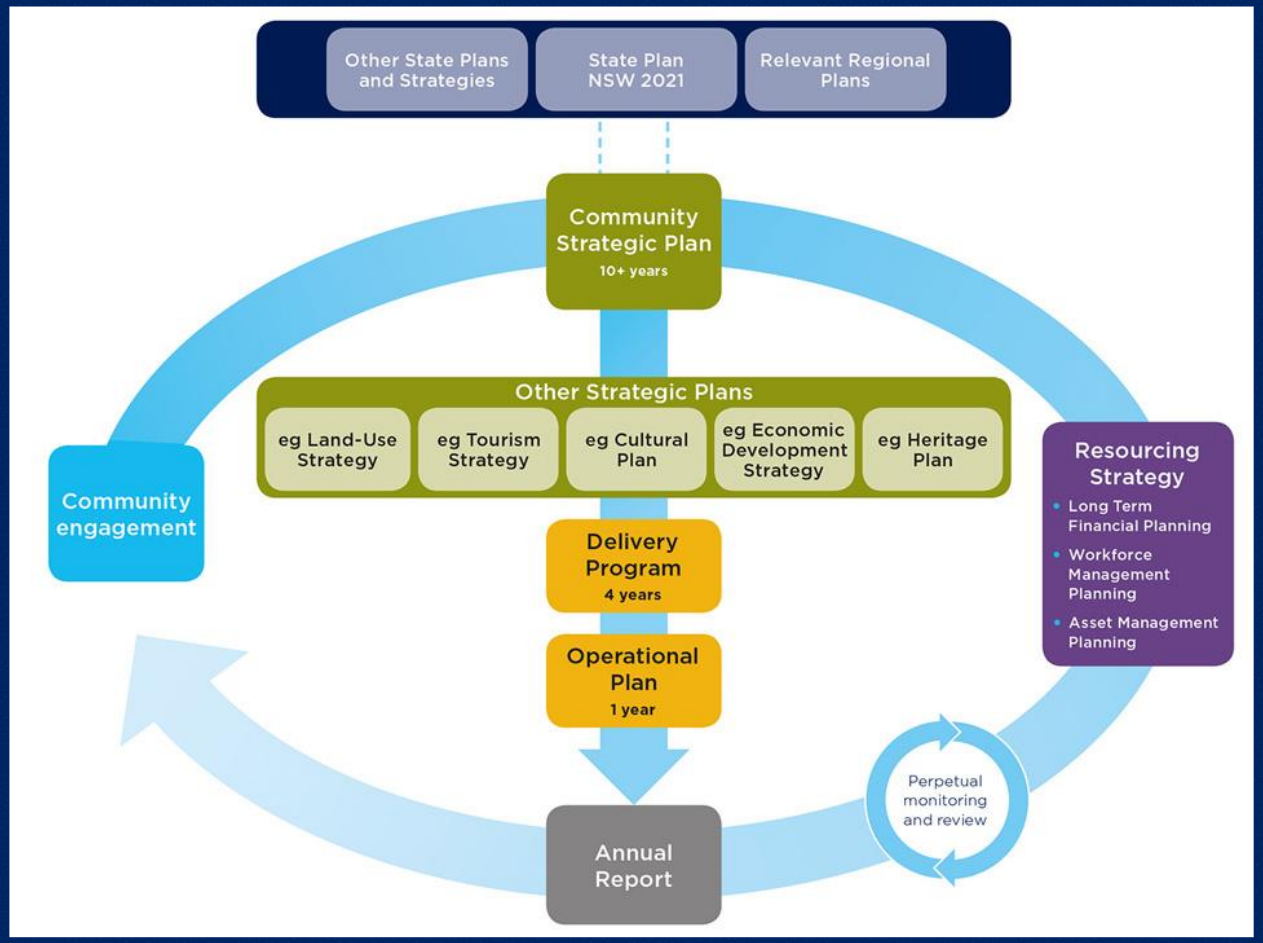
Your farming systems group? Funded by our community grants stream?

Case study: Emergency management

Bega District News December 2018 Chilling out in the heat

Bega Valley Shire Council:
Cooler places for a warmer climate: community hall upgrade in Bemboka, Quaama and Wyndham.

Case study: planning for settlements: local strategic planning statements



- Local Strategic Planning Statements give a 20 year vision for the land use of an LGA
- Regional NSW councils must have their LSPS in place by 1 July 2020
- Integrating climate risk into the IP&R framework
  - Community Strategic Plan- community engagement
  - Delivery program and operational plan via adaptation plan
  - Asset management planning via risk register

Thank you

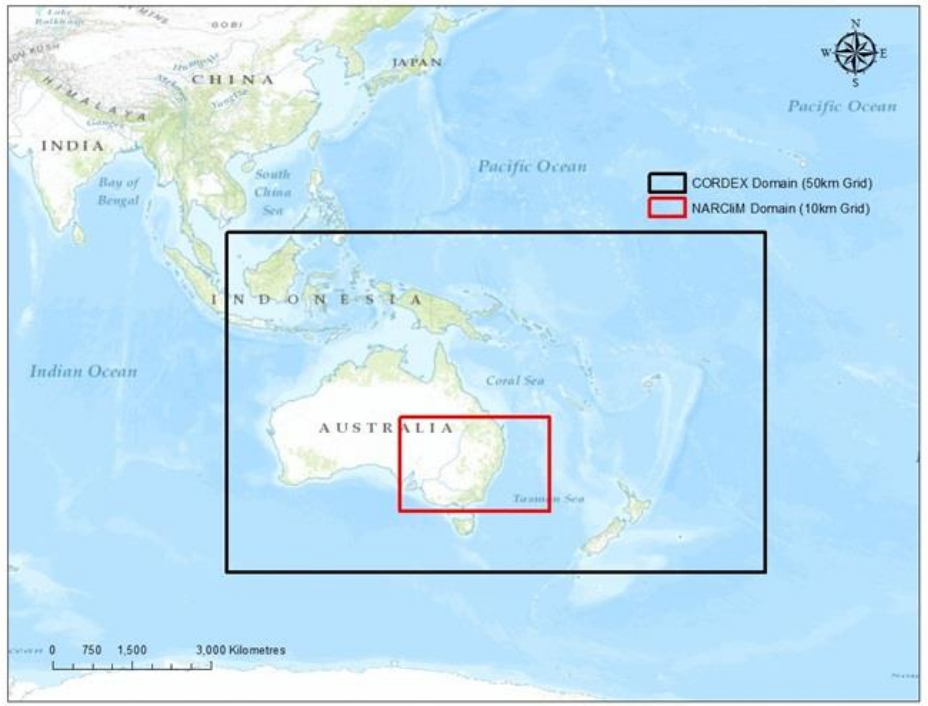
Dr Melinda Hillery, NSW Department of Planning, Industry and Environment

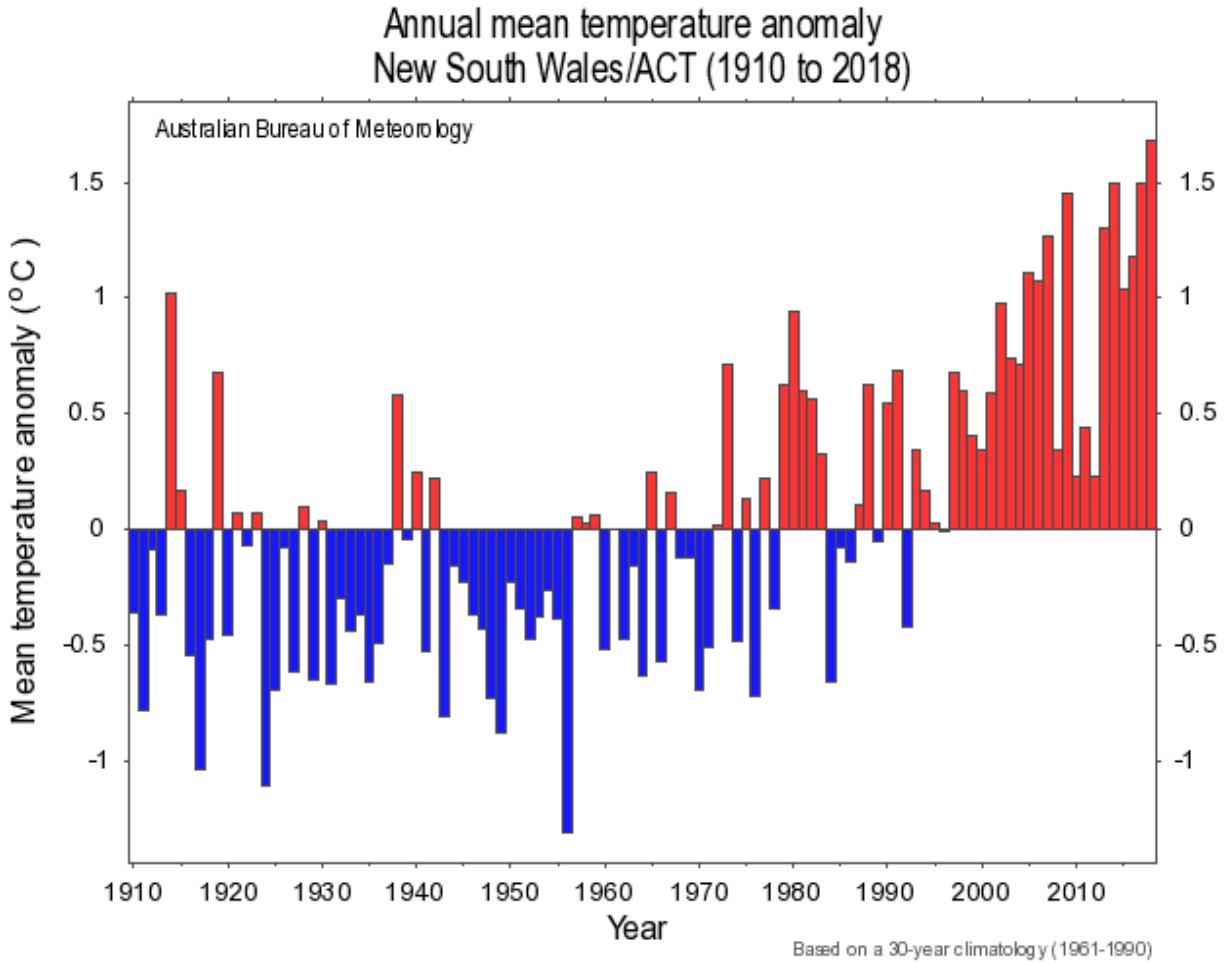
Melinda.Hillery@environment.nsw.gov.au

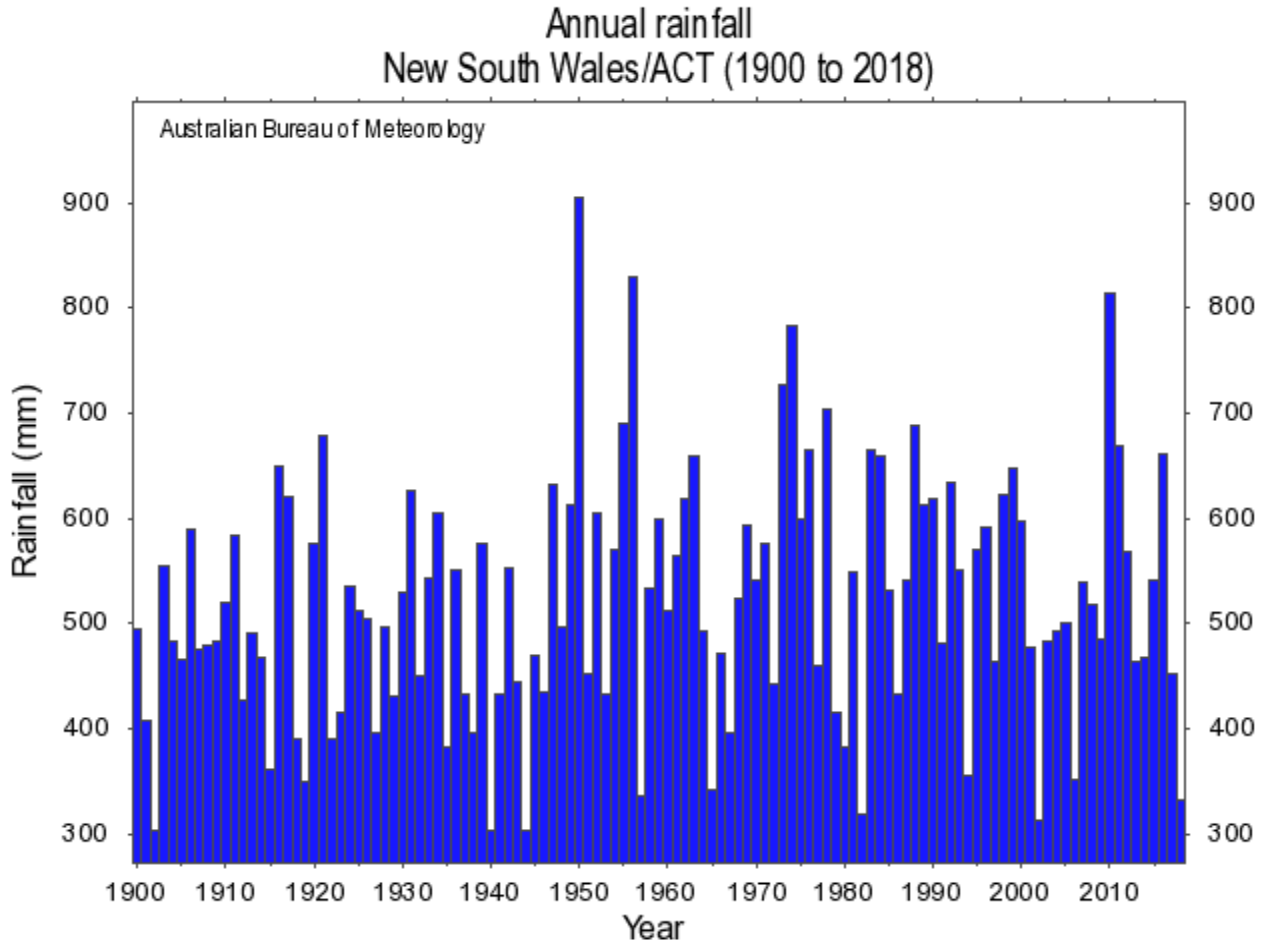
NARCliM (NSW/ACT Regional Climate Modelling)

http://climatechange.environment.nsw.gov.au/Climate-projections-for-NSW/About-NARCliM

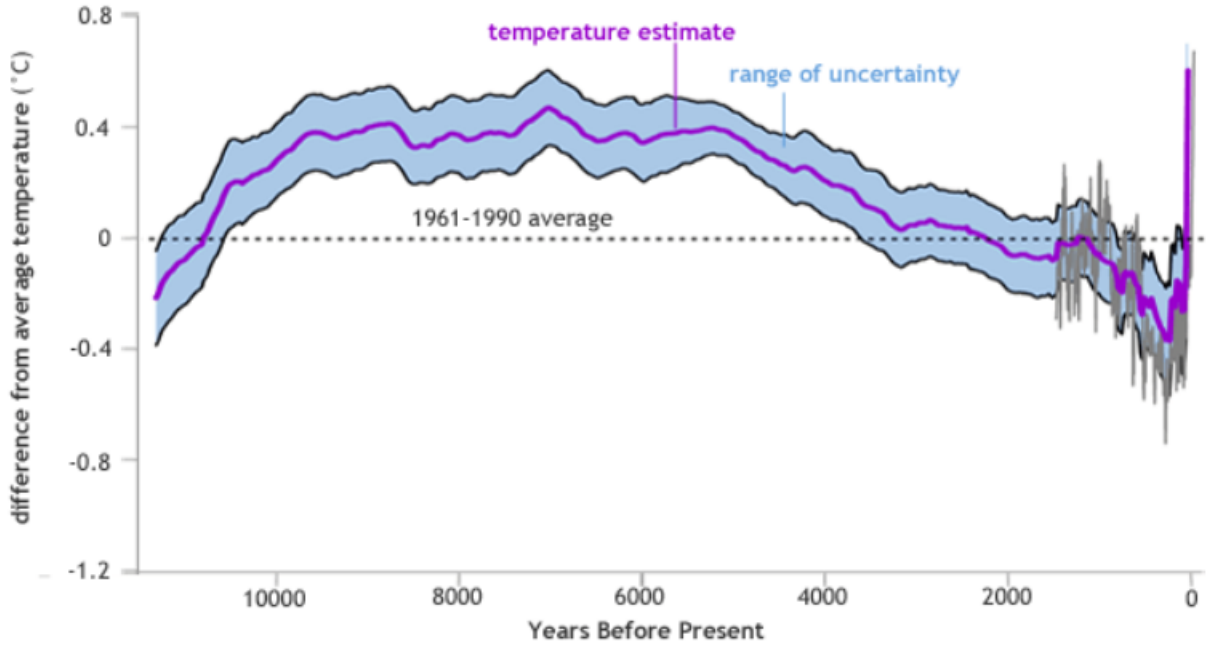
Project features	NARCliM
Resolution (Australia / SE Australia)	~50km / ~10km
Number of Global Climate Models	4
Number of Regional Climate Models per Global Climate Model	3
Emission scenario	A2 (Business as usual)
Baseline time period	1990-2009
Two future simulation periods	2020-2039 (near future); 2060-2079 (far future)



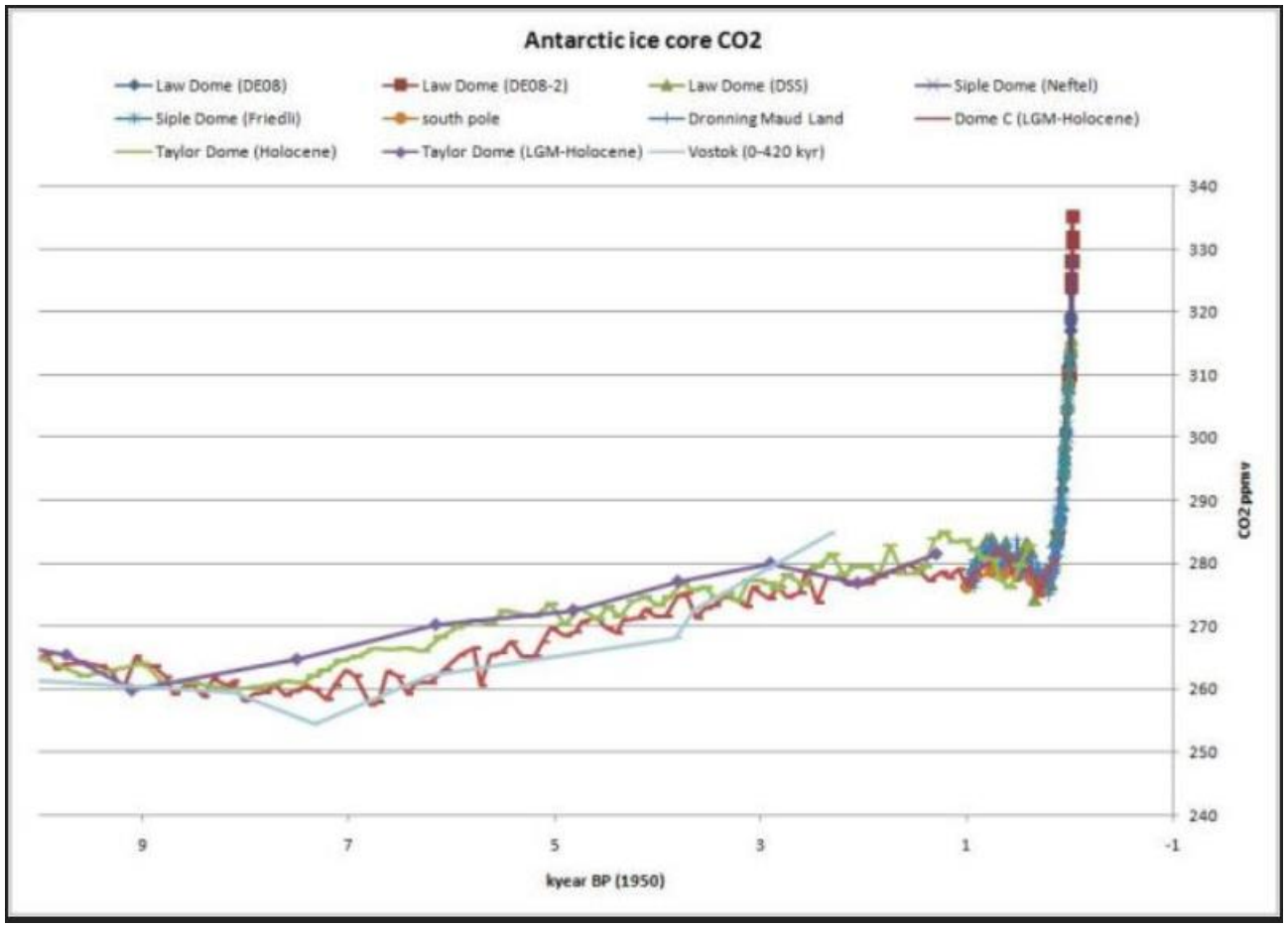

Annual mean temperature anomaly
New South Wales/ACT (1910 to 2018)
Australian Bureau of Meteorology
Mean temperature anomaly (°C)
1.5
1
0.5
0
-0.5
-1
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
Year
Based on a 30-year climatology (1961-1990)

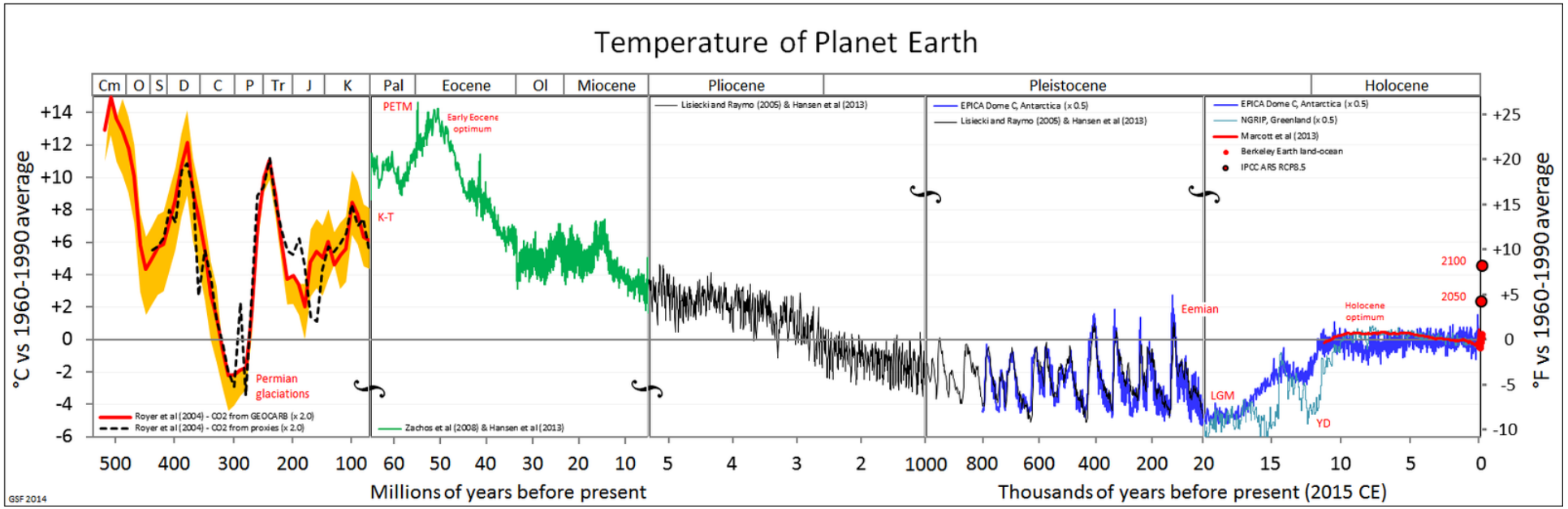

Annual rainfall
New South Wales/ACT (1900 to 2018)
Australian Bureau of Meteorology
Rainfall (mm)
900
800
700
600
500
400
300
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
Year

BOM 2019



Global temperature anomalies over the past 11,300 years compared to historic average (1961-1990). The purple line shows the annual anomaly, and the light blue band shows the statistical uncertainty (one standard deviation). The gray line shows temperature from a separate analysis spanning the past 1,500 years. Image adapted from Figure 1 (b) in Marcott et al.


Antarctic ice core CO2
Law Dome (DE08)
Law Dome (DE08-2)
Law Dome (DSS)
Siple Dome (Neftel)
Siple Dome (Friedli)
south pole
Dronning Maud Land
Dome C (LGM-Holocene)
Taylor Dome (Holocene)
Taylor Dome (LGM-Holocene)
Vostok (0-420 kyr)
340
330
320
310
300
290
280
270
260
250
240
CO2 ppmv
9
7
5
3
1
-1
kyear BP (1950)


Temperature of Planet Earth
Cm
O
S
D
C
P
Tr
J
K
Pal
Eocene
Ol
Miocene
Pliocene
Pleistocene
Holocene
°C vs 1960-1990 average
°F vs 1960-1990 average
+14
+12
+10
+8
+6
+4
+2
0
-2
-4
-6
+25
+20
+15
+10
+5
0
-5
-10
PETM
Early Eocene optimum
K-T
Permian glaciations
Eemian
LGM
YD
Holocene optimum
2100
2050
Royer et al (2004) - CO2 from GEOCARB (x 2.0)
Royer et al (2004) - CO2 from proxies (x 2.0)
Zachos et al (2008) & Hansen et al (2013)
Lisiecki and Raymo (2005) & Hansen et al (2013)
EPICA Dome C, Antarctica (x 0.5)
NGRIP, Greenland (x 0.5)
Marcott et al (2013)
Berkeley Earth land-ocean
IPCC AR5 RCP8.5
500
400
300
200
100
60
50
40
30
20
10
5
4
3
2
1000
800
600
400
200
20
15
10
5
0
Millions of years before present
Thousands of years before present (2015 CE)
GSF 2014