Living with climate change – what are the risks and sustainable solutions?

Presentation 6th Sapphire Coast Annual Marine Science Forum

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Getting warmer

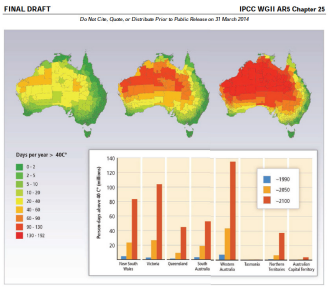
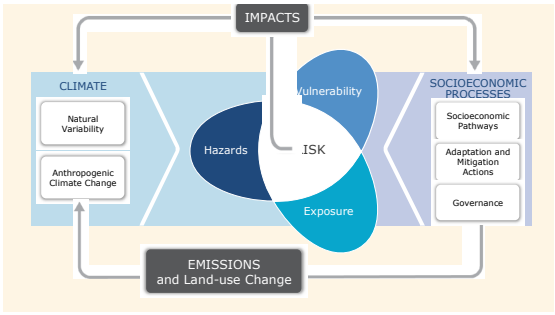


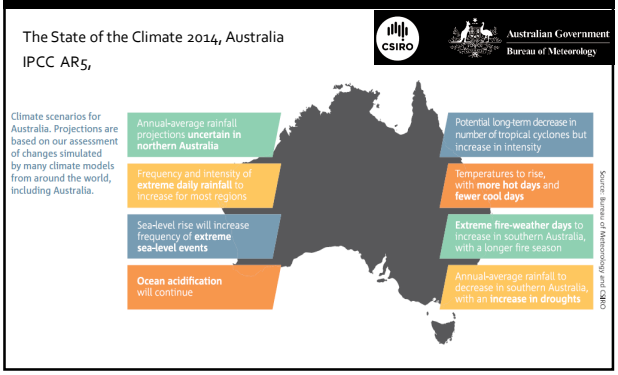
Figure 25-5: Projected changes in exposure to heat under a high emissions scenario (A1FI). Maps show the average number of days with peak temperatures >40°C, for ~1990 (based on available meteorological station data for the period 1973–2004), ~2050 and ~2100. Bar charts show the change in population heat exposure, expressed as person-days exposed to peak temperatures >40°C, aggregated by State/Territory and including projected population growth for a default scenario. Future temperatures are based on simulations by the GFDL-CM2 global climate model (Meehl *et al.*, 2007), re-scaled to the A1FI scenario; simulations based on other climate models could give higher or lower results. Data from Baynes *et al.* (2012).

A risk management approach to climate change

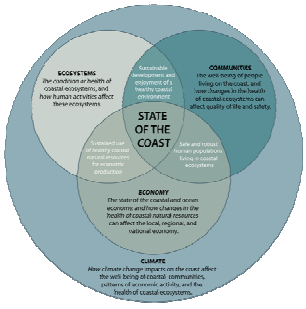


Climate change projections for Australia

The State of the Climate 2014, Australia
IPCC AR5,



Coasts and climate change



NOAA - http://stateofthecoast.noaa.gov/about.html

Climate 2014 report by CSIRO and BOM

Key points

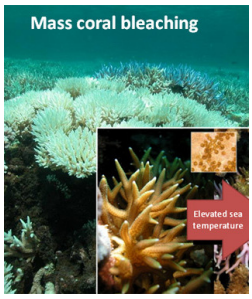
- Australian temperatures are projected to continue to increase, with more hot days and fewer cool days.
- A further increase in the number of extreme fire-weather days is expected in southern and eastern Australia, with a longer fire season in these regions.
- Average rainfall in southern Australia is projected to decrease with a likely increase in drought frequency and severity.
- The frequency and intensity of extreme daily rainfall is projected to increase.
- Tropical cyclones are projected to decrease in number but increase in intensity.
- Projected sea-level rise will increase the frequency of extreme sea-level events.

The Australian, 21 February 2015

Climate 2014 report by CSIRO and BOM

Key points

- Australia's mean surface air temperature has warmed by 0.9°C since 1910.
- Seven of the ten warmest years on record have occurred since 1998.
- Over the past 15 years, the frequency of very warm months has increased five-fold and the frequency of very cool months has declined by around a third, compared to 1951–1980.
- Sea-surface temperatures in the Australian region have warmed by 0.9°C since 1900.



http://www.exergypower.com.au/CLIMATECHANGE.HTML

Climate change in the south east

The science indicates that by 2030 the region may experience:

- increased temperatures (virtually certain)
- changes in the pattern of rainfall (likely),
- further sea -level rise (virtually certain),
- an increasing risk of coastal inundation and erosion (highly likely) and
- an increasing risk of bushfires (highly likely)'

(Norman et al 2013, South East Coastal Adaptation, NCCARF)

Significant change

- Responding to climate change
  - Mitigation and adaptation (floods, fire, heat, storms)
- Accommodating and servicing an ageing and retired population
- Providing and maintaining smart coastal development and infrastructure for urban growth
- Maintaining healthy coastal and marine ecosystems under pressure

Future coastal challenges

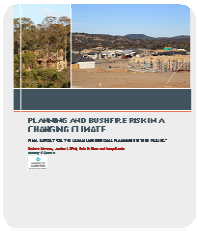
- Mainstreaming the response to climate change
- Maintaining public access
- Sea country plans and Indigenous engagement
- Space for adaptation and green infrastructure
- Urban settlements – renewable energy, smart infrastructure, green buildings, biodiversity
- Coast has a right (just like the water in the rivers)

Coastal governance

- Identify clearly who is responsible
- Regional collaboration
- Advisory and/or decision making roles
- Accountability and transparency
- A precautionary approach

"Excellent! So that's all agreed,then! All we need do no is draft the consultation document."

Coasts, fire and climate change



Coastal urban growth, Wollongong
Credit: John Reid

Finding 7

The key themes emerging across the four focus groups were risk, governance and management. The focus groups revealed that rather than planners and the fire authorities being at odds over bushfire risk, they are both grappling with responsibly addressing a risk whose sway and effects extends far beyond their job description.

Enabling new approaches

1. Scenario planning for risk management
2. Give the coast rights (public interest doctrine)
3. Continuing conversations with the community
1. Integrated regional coastal planning
1. Take a precautionary approach in coastal planning decisions

SECA research findings

Principle 1
An integrated approach should be adopted for sustainable regional and local planning (social, economic, environmental and cultural).

Principle 2
The precautionary principle to decision making should be applied to the location of new and redeveloped urban settlement and infrastructure and other relevant decisions, particularly where environmental risk currently or potentially exists.

Principle 3
Risk management approaches should be incorporated into local and regional strategies for coastal settlements responding to climate and environmental change including progressive learning from experience to ensure adaptability.

Principle 4
Appropriate forums should be established at the regional level to enable collaboration across institutions at the local and regional level. Governance mechanisms that facilitate intergovernmental agreement on policy directions (shared vision) and integration of policy decisions (implementation) are fundamental to coastal adaptation.

SECA research finds (2)

Principle 5
There should be an ongoing process of community engagement. This needs to be informed by the latest science, in developing and regularly reviewing coastal urban plans to gain community support

Principle 6
The skills and knowledge of regional and local communities should be connected by relevant organisations to provide a foundation for long-term research, co-production of knowledge and monitoring of coastal urban futures. Regional communities and practitioners could engage on a periodic basis with Australia's leading scientific research organisations.

Principle 7
A process of continuous monitoring, evaluation and reporting of adaptation actions should be implemented to ensure 'learning by doing' and to avoid past mistakes. The impacts of climate change on the coastal environment will require more attention to evaluating impacts of adaptation measures over time.

The social considerations

- Social equity considerations for the most vulnerable
- Adaptive capacity variable
- Human behavior a powerful influence
- Urgent need to identify communities at most risk and most vulnerable

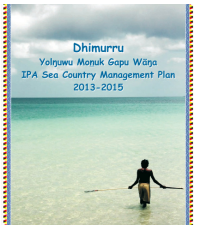
Innovative coastal climate collaborations

Peron Naturaliste Partnership

- nine local councils agreed to work collaboratively with state and federal government in order to support building a resilient regional community with a focus on reducing risks and optimizing opportunities presented by climate change and climate variability.

Sydney Coastal Councils

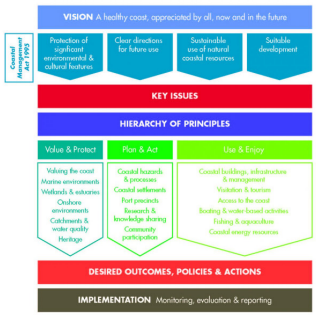
Sea Country Plans by Indigenous coastal communities



'The need for integrated land and sea management is particularly acute in the context of climate change, which is causing sea level rise, coastal erosion, and saltwater intrusion into freshwater wetlands' p39

Building capacity in coastal planning

Implementing a hierarchy of principles



Considerations for coastal legislation

1. Understanding climate change and coastal pressures is just the beginning…
1. Investment in renewable energy, public transport, smart infrastructure, green buildings, biodiversity
1. Regional collaboration is emerging an effective approach to integrated sustainable coastal planning involving government and private sector partners
1. Better sharing of knowledge is important to influence public policy outcomes on the ground
1. Scenario planning involving the community is developing as a valuable tool to explore coastal futures living with climate change