

# NSW Climate Adaptation Newsletter

The latest in climate change adaptation research, news and events

This month we cover:

- Leveraging investment for greening Western Sydney
- Local Adaptation Plan for a coastal region on exhibition
- *Adaptation in Action* featuring Manly Council's 'AdaptRoads' pilot
- Plus publications, awards, conferences, news and much more!

Know someone with an interest in adaptation? [Share this newsletter with others](#)



**Seminar: Public-Private Partnerships in Dealing with Extreme Events: Improving Insurance Decision-Making in a Misunderstood Industry.** Hear from Prof. Howard Kunreuther on the challenges of dealing with insurance for a low-probability high consequence events. 12 November [RSVP here](#)

What actually is adaptation?!

Explaining just what climate change adaptation is can be complex - how do you tell people what it's all about? Tell us in up to 100 words your best description, analogy or anecdote, and you could win a copy of [Austral Ark](#) edited by Adam Stow et al. [Email your submission now!](#) Entries close October 31



How does climate drive coastal vulnerability? Researchers from the [Coastal Node](#) worked on a multi-agency study presenting data from 48 beaches, three continents and five countries, finding that a projected upsurge of severe ENSO events will cause an increase in storm events, leading to coastal flooding and erosion. [Read the article free here.](#)

## Greening Western Sydney



Greater Sydney Local Land Service has been awarded \$826,838 of Australian Government funding under the Cumberland Conservation Corridor Election Commitment. This is part of the 20 Million Trees Programme which has the objectives of improving the extent, condition and connectivity of native vegetation, supporting local environmental outcomes, engaging the community and sequestering carbon to reduce greenhouse gas emissions. The grant will fund:

- Fairfield City Council, to revegetate sites in the upper reaches of Prospect Creek and at Prout Park to improve connectivity and condition of native vegetation
- Western Sydney Parklands, to plant over 4,000 Cumberland Plain species to frame 15 Ha of open grasslands at Bungarribee Park
- Penrith City Council, to plant almost 100,000 trees in South Penrith and Emu Plains to increase diversity of flora and fauna in the urban areas and provide “Green Cover” to improve the comfort and liveability of public spaces in the City of Penrith.

The Penrith projects will also mitigate the intense heat build-up during summer due to loss of vegetation and other cooling features, known as the Urban Heat Island Effect. Western Sydney was identified as increasingly vulnerable to urban heat during the recent [Towards a Resilient Sydney](#) Project.

Overall, these projects will improve biodiversity and address the climate change impacts of urban heat and air quality, as well as improving liveability for the communities of Western Sydney. Read more about 20 million trees or [contact Bill Dixon](#).

CLIMARTE will take part in ArtCOP21, the cultural response to the climate negotiations happening at COP21 in Paris. They will curate an exhibition by Australian artist, Debbie Symons called "Counting One to Four: Nature Morte". See the video at the upcoming AdaptNSW 2015 event or contact CLIMARTE for more information

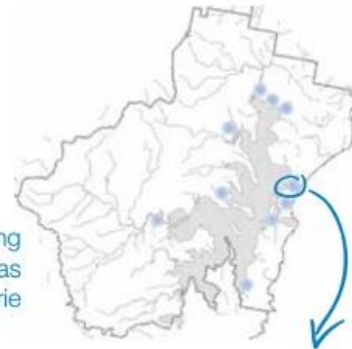
**CLIMARTE**  
ARTS FOR A SAFE CLIMATE

## How can we plan for an uncertain future?

Work with local communities ...



... to identify local solutions to changing flood conditions in low-lying areas around Lake Macquarie



Lake Macquarie City Council has put on exhibition its Local Adaptation Plan for the Marks Point and Belmont South area. A landmark project in bringing together council and community, the plan will help guide future decisions such as how to design and maintain roads and drainage systems, how to make buildings safe and durable, and how to manage foreshore erosion and maintain a healthy lake.

The Plan will help Council and the community:

- manage the risk of current and future flooding and tidal inundation resulting from rising lake levels;
- provide certainty about future development in Marks Point and Belmont South; and
- address insurance affordability issues

[View the plan here](#)

### Integrated Regional Vulnerability Guidelines

Using local knowledge to identify potential threats and response options can help communities prepare for climate change. The Office of Environment and Heritage (OEH) has developed a process that has been delivered in 5 NSW Planning Regions to provide a sound basis for local climate-change adaptation planning by working with community members, agencies and other local stakeholders to identify and understand regional vulnerabilities [Read the IRVA guidelines](#) or [get in touch](#) to discuss.



## AdaptRoads - Manly Council

Sharing practical examples of adaptation in NSW, this month we talk with the AdaptRoads team about an progressive partnership between a water utility, a local Council and a private software company to address technical and financial challenges in adapting local government roads to climate change.

This project was funded by the [Building Resilience to Climate Change Grants](#), which are funded by the Office of Environment and Heritage and the NSW Environmental Trust, and administrated by Local Government NSW.

### Unusual Partnerships

The AdaptRoads project emerged when Manly Council on Sydney's northern beaches started to talk to Sydney Water about the threats from flooding and inundation hazards to water security for their residents. Initially the two agreed to share data and use the AdaptWater software to quantify the extreme weather and climate change risks to water assets today or in future in the Manly area.

*"But the largest asset base of almost all councils in Australia is their roads" said Eduard McPeake, Manager Environmental Programs at Manly Council. "So the discussion turned to using the same software to identify which sections of road in the Manly area could be at risk from climate change and how to financially optimize adaptation." At this point they brought in Climate Risk the team behind the AdaptWater software to scope up a plan for a BRCC funded AdaptRoads pilot project. "We wanted to work with the team to develop an AdaptRoads system that could be used by all councils in future" said Eduard.*

### Big Data, Big Computation

The software is a big data solution to the complex problem of understanding climate change impacts. The cloud based software uses high speed servers to process hundreds of geospatial maps, cross reference these with engineering data about exposed assets and then superimposes statistical data about climate change impacts on sea levels, flooding, heat, wind extremes, bushfires and coastal inundation. The results show the statistics for asset vulnerability over time and the related costs and closure times.

*"Knowing how expensive the problem will be over time is a good basis to then test adaptation options" said Nicola Nelson, Manager, Science Business Strategy & Resilience at Sydney Water. "In Sydney Water we can then quantify the cost benefit*

*of one or more actions over time using cash flows and Net Present Value. This is the basis for any sound business decision either for a utility or a council."*

### **An Open Approach**

Karl Mallon, a climate change analyst and one of the architects of the software system, has explained that the aim is to not just to switch one type infrastructure for another, but to *"open up the architecture so that we can easily add in new sectors in future. Today it's roads, but in the future we need to look at electricity or telecommunications."* This has meant achieving a much more open software approach to what can be included and how users can add and change what they want to assess or adapt. *"We are learning a lot along the way. Not just about roads and climate change, but about how councils and utilities need to be able to quantify the interdependencies between all types of critical infrastructure"* said Karl.

### **Where to from here?**

As this article is being written, the AdaptRoads team have announced that the first version of its new server has been brought on-line with detailed GIS layers for all of the major hazards.

*"We are now analysing all Sydney Water's treatment plants, pumping stations and water reservoirs within the Manly LGA and have imported nearly 2,400 individually geo-referenced sections of Manly's roads and intersections,"* said Jackie Lamb who is leading the project implementation. *"Our next step is to commission the system to compute the new key performance indicators for damage costs, road closure and disrupted homes and traffic, so that we can fully understand not only the financial impacts from climate change but the non financial impacts that will affect residences and commuters."*

### **Updating to the Latest Science**

The project has also started working with OEH to integrate the latest high resolution data from NARCLiM into the software. *"This data has a much higher quality climate projection data than is usually available, so it presents a potential step change in data sophistication."* said Karl Mallon.

### **Observers Invited**

Far from a 'black-box' AdaptRoads is designed to be a transparent computational system available to all councils. Once the system is operational later this year, professionals from other councils, utilities or their consultants will be invited to test the capabilities of the system and provide feed-back. If you'd like to find out more contact [Lachlan Barnes](#).



Images from the AdaptRoads Tools, showing the Manly council assets, and example of the risk costs from adaptation pathways being compared in AdaptWater tool.



Australia and New Zealand are home to a remarkable and unique assemblage of flora and fauna. Sadly though, by virtue of their long isolation, and a naïve and vulnerable biota, both countries have suffered substantial losses to biodiversity since European contact. Bringing together the contributions of leading conservation biologists, Austral Ark presents the special features and historical context of Austral biota, and explains what is being conserved and why. The threatening processes occurring worldwide are discussed, along with the unique conservation problems faced at regional level. At the same time, the book highlights many examples of conservation success resulting from the innovative solutions that have been developed to safeguard native species and habitats in both New Zealand and Australia. Austral Ark fills an important gap regarding wildlife gains and declines, and how best to take conservation forward to keep this extraordinary area of the world thriving.

#### **PRIORITIES AND UNCERTAINTIES OF PREDICTED IMPACTS OF CLIMATE CHANGE ON FRESHWATER BIODIVERSITY IN NEW SOUTH WALES**

Dr Alex Bush

Alongside a growing awareness that climate change represents a substantial threat to biodiversity in New South Wales, it has become increasingly evident that we cannot afford to wait until impacts on ecosystems are observed before acting. The scale of projected changes, and the significant implications these will have for the functioning of ecological communities mean we must act early to reduce the risks posed by climate change, in addition to multiple other processes driving biodiversity loss. Freshwater systems are challenging environments to manage for multiple stakeholders, and climate change will further exacerbate many existing conflicts or threats to biodiversity. This report provides guidance for land and water managers on how conservation management may improve the long-term capacity of freshwater ecosystems to adapt and reduce biodiversity loss.

The report was supported by the Biodiversity Node of the NSW Adaptation Research Hub. For a copy of the report, please contact - [leigh.staas@mq.edu.au](mailto:leigh.staas@mq.edu.au).

## **Publications, events, news and grants**

### ***Publications***

The following publications are a collection from the East Coast Climate Change Initiative program.

Evans J, Ekström M, Ji F (2012) [Evaluating the performance of a WRF physics ensemble over South- East Australia](#). *Climate Dynamics* 39:1241–1258.

Ji, F., J.P. Evans, D. Argueso, L. Fita and A. Di Luca (2015) [Using large-scale diagnostic quantities to investigate change in East Coast Lows](#). *Clim Dyn* 1–11

Pepler, A., L. Alexander and J.P. Evans (2015) [Zonal winds and southeast Australian rainfall in climate models](#). *Climate Dynamics*

Gilmore, J., J.P. Evans, S.C. Sherwood, M. Ekstrom and F. Ji (2015) [Extreme Precipitation in WRF during the Newcastle East Coast Low of 2007](#). *Theoretical and Applied Climatology*

Goodwin, I. D., Freeman, R., & Blackmore, K. (2013). [An insight into headland sand bypassing and wave climate variability from shoreface bathymetric change at Byron Bay, New South Wales, Australia](#). *Marine Geology*, 341, 29-45.

Pepler, A. S., Di Luca, A., Ji, F., Alexander, L. V., Evans, J. P., & Sherwood, S. C. (2015). Impact of identification method on the inferred characteristics and variability of Australian East Coast Lows. *Monthly Weather Review*, 143(3), 864-877.

Pepler, A.S. and Coutts-Smith, A. 2013. [A new, objective, database of East Coast Lows](#). *Aust. Meteor. Oceanogr. J.*,63, 461-472

### ***Conferences / events***

[AdaptNSW 2015](#) November 6, Ariel Function Centre, Ultimo. Hosted by the Office of Environment and Heritage, this event will focus on climate change adaptation research and application in NSW.

[24th NSW Coastal Conference, 2015](#) 10-13 November 2015, Forster, NSW. Hosted by Great Lakes Council. The theme of the conference is *Great Expectations - pathways for learning and delivery*

[Public-Private Partnerships in Dealing with Extreme Events:Improving Insurance Decision-Making in a Misunderstood Industry](#) 12 November 2015. Sydney

[Environmental Health Australia's National Conference](#). 20 - 24 October 2015, Sydney. This conference will includes sessions around how climate change is increasing impacts on health. The theme this year is 'Strength in Unity'.

[NSW Environmental Education Conference](#) 29-30 October Kurri Kurri. The theme of this year's conference is 'Connecting for the Future'.



