

Credit: Remko Duursma / Western Sydney University

# ADAPTATION PLANNING

Incorporating climate adaptation science into conservation planning

Climate change poses a major threat to the biodiversity of New South Wales. Increasing temperatures, shifts in rainfall patterns, rising sea levels and increases in the intensity and frequency of extreme events are affecting population sizes, species ranges, the timing of life cycles, the structure and composition of ecological communities and extinction risk. The exact nature of how climate change impacts will continue to affect individual species and ecological communities, however, is uncertain. Projects undertaken under the 'Adaptation Planning' research theme focus on providing information to support decision-making for optimal conservation outcomes under climate change.

## SHIFTING PATTERNS OF PHENOLOGY

The Minyumai Indigenous Protected Area (MIPA) is part of a 20,000 ha wildlife corridor on the NSW north coast. Using cross-cultural knowledge, this project led by Macquarie University assessed the impacts of climate change on the MIPA and developed strategies to support the persistence of species that are important to local indigenous people. Minyumai Rangers are monitoring changes in flowering and fruiting of culturally significant plants and documenting the breeding and behaviour of culturally significant animals.



Maitland Wilson observing a "Beach Pineapple" (Pandanus) fruiting. Credit: Emilie Ens / Macquarie University



Warrumbungle National Park. Credit: Simone Cottrell / OEH

## PLANT DIVERSITY ACROSS LANDSCAPES

Examining the past responses of rainforest plants to climatic events can inform us as to how species may respond to climate change in the future. Led by the Royal Botanic Gardens, this project used molecular data to explore genetic divergence in rainforest plants across landscapes and incorporated these patterns into predictive models to identify suitable habitat for rainforest flora under future climates.

## PRIORITISING AREAS FOR RESERVE EXPANSION

As species respond to climate change by shifting geographic ranges, the ability of present-day protected areas to conserve biodiversity in the longer term may decline. Led by Macquarie University, this project evaluated the impact of a changing climate on the Comprehensiveness, Adequacy and Representativeness (CAR) of the NSW terrestrial reserve system and identified potential priority areas for new reserves under a range of future climates.



Eastern Grey Kangaroo. Credit: Simone Cottrell / OEH



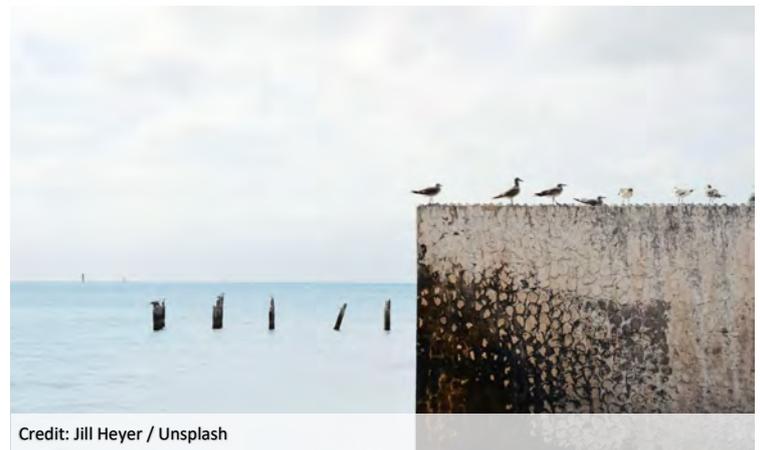
Bell's Turtle © Gary Stephenson / OEH

## VULNERABILITY OF FRESHWATER SPECIES

Freshwater species are highly susceptible to the effects of climate change and their conservation is hindered by dispersal constraints between catchments. Led by Macquarie University, this project examined the relationship between the dispersal characteristics of freshwater species and their vulnerability to climate change, and generated catchment-based datasets to underpin the evaluation of conservation plans.

## SEAWALL DESIGN

Sandy beaches of south-eastern Australia are experiencing some of the most intense and direct threats of climate change, and management actions are constrained by high-density residential coastal settlements. Led by Macquarie University, this research is generating new information on how seawall construction can simultaneously protect coastal properties and conserve the ecological value of sandy beach ecosystems.



Credit: Jill Heyer / Unsplash

## About the Biodiversity Node

The [NSW Adaptation Research Hub](#) was established in 2013 to leverage the State's multidisciplinary science capacities to produce relevant and practical research to directly inform the decision making of NSW agencies and communities. It is comprised of three nodes to address key policy and operational priorities of the NSW Office of Environment and Heritage. The Biodiversity Node is hosted by Macquarie University, and focuses on increasing our knowledge about the capacity of species, ecosystems and landscapes to adapt to climate change. Sixteen research projects have been co-developed with 15 partner institutions, which build our understanding of climate change impacts on biodiversity and inform potential actions and responses. For more information on the Biodiversity Node and the projects it supports, visit [mq.edu.au/about/biodiversity-node](http://mq.edu.au/about/biodiversity-node)

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