

Credit: Remko Duursma / Western Sydney University

CLIMATE RISK

Assessing the vulnerability of biodiversity to climate change

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 'Climate Risk' research theme focus on improving our understanding of the vulnerability and resilience of species to climate change.

SPECIES AT RISK ACROSS LANDSCAPES

Climate change is one of many factors which threaten biodiversity in NSW. This project, led by Macquarie University, aimed to identify species at risk of extinction across current and future landscapes by: (1) identifying suitable habitat for a range of species under future climate scenarios (2) incorporating climate change into the selection of sites managed for threatened species (the *Saving our Species* program); and (3) assessing the vulnerability of the NSW native flora using ecological range metrics.



Mountain Pygmy Possum. Credit: Mel Schroder / OEH



African Olive fruit. Credit: Peter Cuneo / The Royal Botanic Gardens

WEED FUTURES

Hundreds of introduced plants in Australia have now become invasive and threaten biodiversity. This research has assessed the extent of suitable habitat for 700 non-native plants within Australia under current and future climate conditions. Led by Macquarie University, this project has produced an interactive, online decision-support tool (weedfutures.net) to assist natural resource managers conduct weed risk assessments and prioritise monitoring and management actions across species.



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HORIZON SCANNING OF PESTS & PATHOGENS

Exotic pests and pathogens cause significant damage to native species and ecological communities. The early detection, exclusion and eradication of exotic pests and pathogens is consistently shown to be more cost-effective than management or containment. This project, jointly led by Macquarie University and the University of Melbourne, assessed the probability that particular exotic species will become invasive in NSW using horizon scanning and risk analysis, and identified species which are high priorities for future management.



Myrtle rust infection on a Broad-leaved Paperbark sapling. Credit: Laura Fernandez / Macquarie University



Tree dying from drought. Credit: Simone Cottrell / OEH

DROUGHT RISK

Severe droughts can cause large-scale tree mortality and transform landscapes. Led by Western Sydney University with co-funding from the Australian Research Council, this project aimed to identify regions of high drought-mortality risk for tree species in NSW under a range of future climate change scenarios and to provide information to underpin conservation planning for key tree species.

WILDLIFE DISEASE

Outbreaks of wildlife diseases, particularly those transmitted by insect vectors (arboviruses), are frequently associated with climate patterns such as El Niño events. Led by Taronga Zoo, this project examined the relationship between climate and arboviruses using long-term datasets contained in the Australian Registry of Wildlife Health. Models are being developed to identify areas of likely disease emergence (hotspots) and assess subsequent risk to wildlife. This research will produce best-practice protocols for disease surveillance in NSW.



Green and Golden Bell Frog. Credit: Jane Hall / Taronga Zoo

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

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