Local Land Services
Central Tablelands

Biodivesity and climate change

Common Fringe Lily. Photography – NSW DPI

The Central Tablelands region is located in central NSW, and includes the major towns of Bathurst, Cowra, Lithgow, Mudgee and Orange.

The region has a number of natural resource assets and is home to a diverse range of agricultural industries. This information is part of a series of factsheets highlighting changes and options for the region associated with climate change.

Biodiversity in the Central Tablelands

The Central Tablelands is home to diverse plant and animal species. Vegetation communities range from dry open woodlands to the high altitude wet forests of the tablelands. The region houses high value habitat along with numerous threatened species and plant communities including the endangered Booroolong Frog and critically endangered Regent Honeyeater.

The majority of the region has seen a long history of human occupation and consequently is considered a highly disturbed landscape. Habitat fragmentation, loss of landscape function, changes in soil condition, changes in botanical composition and the overall drying of the landscape are seen as key driving processes for species loss and degradation in the region since European occupation. For example, 64% of vertebrate fauna in the broader Central West and Lachlan catchments are considered to be declining.

Potential impacts

Changing climates will almost certainly impose extra pressures on an already degraded and fragmented landscape. Changes to the frequency, intensity and seasonality of rainfall, coupled with the high likelihood of increased temperatures across the region will impact on the survival capacity of many species, especially those already at the margins of their ranges or independently vulnerable.

Biological responses to climate change include:

- Species extinction (specialists, vulnerable species, isolated communities)
- Migration (mobile, generalists, weed species)
- Evolution (rapid reproducers eg. insects such as locusts)
- Withstanding climate change (generalists, weed species, pests, large widespread populations)

The NSW Register of Threatened species indicates 130 species, populations, communities or habitats are currently listed as threatened by climate change in NSW. Many of these exist in the Central Tablelands or may rely on the region for migration. Key endemic populations include Canobolas Candlebark (Eucalyptus canobolensis) and the Xanthoparmelia Lichen Community on Mt Canobolas. Critical habitats such as montane swamps and swampy meadows are similarly listed as vulnerable. It is expected that as climate changes, further species, communities and habitats will be listed as vulnerable or endangered.

Interactions between specific Key Threatening Processes as a result of changing climates will further exacerbate risks. For example, weed, disease and pest invasion have the ability to expand under climate change. Cascading impacts are likely, where changes in one threat will exacerbate others. Compounding of impacts will increase the rate at which species will become vulnerable.

The Central Tablelands, being centrally located in NSW, is a critical region for species migration in all directions. Recent biodiversity adaptation modeling has indicated that high elevation parts of the tablelands will become critical habitat and potential refugia for vulnerable species affected by rising temperatures and links to lower elevations in the slopes and mixed farming slopes will become important corridors in the future. Both structural and functional connectivity of the natural landscape will become increasingly important under changed climates.

For more information... www.lls.nsw.gov.au/centraltablelands

Habitat restoration in the Capertee Valley. Photography – Clare Kerr.

Adaptation options

The imposition of climate change will undoubtedly increase the value of revegetation and corridor expansion initiatives. Modeling has highlighted the overall value of cool, moist regions across central parts of the Tablelands landscape for biodiversity adaptation to climate change, and revegetation values are significantly enhanced in regions to the west of Orange under future climates. This highlights the importance of planting and maintaining native vegetation corridors along with identification and protection of valuable habitat to help species adapt to future climate. Becoming involved in strategic corridor network projects, such as the Kanangra to Wyangala corridor (K2W) established through the Great Eastern Ranges Initiative, will ensure a regional approach to aiding species migration.

Identification of all high value habitats and their degradation status along with development of options for their rehabilitation is important baseline information that will be essential when managing and monitoring changes across the region. Further research is will also be required to define specific species and ecosystem responses to changing climates.

Multiple benefits should be aimed for when assisting biodiversity adaptation. For example, revegetation of riparian corridors adjacent to grazing lands has the multiple benefit of improved aquatic ecology, a cross-elevation migration corridor for species affected by changing climates, shade and shelter for stock, increased carbon sequestration in biomass and soils, and potential sites for rehabilitation of endangered or vulnerable species affected by changing climates.

Revegetation strategies need to be mindful of future climates which may be limiting for particular species currently used for rehabilitation. Similarly, species endemic to lower elevations may soon be considered for high country rehabilitation.

Patch size and heterogeneity should also be considered when planting or protecting existing remnant to ensure that the resistance and resilience of vegetation communities and their associated species are maintained or enhanced. Actively managing genetic diversity, landscape connectivity and hydrological processes will also help to maintain functioning ecosystems and protect the services they provide across the region.

The use of fire as a management tool is also an option for adaptation as fire ecology is a primary driver of biodiversity in the region, and can be used as a weed reduction and land rehabilitation tool. Aboriginal cultural use of fire is receiving increased recognition in recent years, and many local rehabilitation projects are starting with cultural cool burns.

Education and community engagement will be important to assist uptake of climate change adaptation strategies.

Increased opportunities for agricultural expansion in the Tablelands under a warmer climate must be balanced against the need to maintain adequate native vegetation corridors for species migration, and water resources for all.

Information sources and additional reading

Climate change adaptation tools and resources for natural resource management **http://adaptnrm.csiro.au/**

Climate change impacts on biodiversity **www.environment.nsw.gov.au/biodiversity/climatechange.htm**

For more information contact your nearest Central Tablelands Local Land Services office on 1300 795 29 or visit

www.lls.nsw.gov.au/centraltablelands

Acknowledgement: *Dr Andrew Rawson – Charles Sturt University, Orange and Clare Kerr – Central Tablelands Local Land Services.*

This information has been provided through funding from the Australian Government.

For updates go to www.lls.nsw.gov.au/centraltablelands