



Connecting landholders with researchers

A team of 36 researchers led by the University of Tasmania's Centre for Environment Director, Professor Ted Lefroy, is studying the Northern Midlands Bioregion as a case study in regional biodiversity conservation.

The Landscapes and Policy Research Hub is funded for four years (2011-2014) by the National Environmental Research Program (NERP) to examine the environmental, social and economic impacts of land use change, climate change, demographics and government policy in two contrasting regions, Tasmania's Northern Midlands and the Australian Alps.

A review of the Australia's primary conservation legislation, the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC), recommended that we lift the scale at which we manage Australia's biological diversity, from that of species and communities, to include consideration of whole landscapes and ecosystems. The research hub is responding to this recommendation by developing tools, techniques and policy options to integrate biodiversity into regional

scale planning.

The hub is placing particular emphasis on landscape-scale management of species and communities listed under the EPBC Act, including the Tasmanian Devil and the Tasmanian Midlands Lowland Grasslands communities.

Combining the expertise of researchers from a range of disciplines (social science, economics, climatology, biogeography, wildlife, vegetation, fire and freshwater ecology), they are exploring the likely implications of different scenarios of climate, land use, land management, demographics and infrastructure development in the Tasmanian Midlands on ecosystem services, agricultural profitability and habitat suitability for selected species of plants, mammals, reptiles, birds and amphibians.

Researchers from all discipline areas have been drawing on the expertise of staff from the Department of Primary Industries, Parks, Water and Environment and using existing datasets to examine the Tasmanian Midlands as a social-ecological

system, and explore the implications of a range of plausible scenarios on biodiversity and its management.

A key objective of the hub is to talk to landowners about their agricultural operations and get a feel for what they currently do to encourage biodiversity and find out what obstacles are currently limiting the effectiveness of their conservation activity.

To gain a grassroots appreciation for biodiversity conservation in Tasmania, early in the project's life the research team visited the Coal River Valley, the Northern Midlands bioregion between the Eastern and Western Tiers, the Tunbridge Township Lagoon Nature Reserve, Hydro Tasmania's Cressy property, the Tom Gibson Nature Reserve at Epping Forest and properties at Tunbridge, Ross, Blackwood Creek and Cressy.

'We have visited farms, involved long term residents and other experts in workshops, interviewed landowners and agency staff and discussed biodiversity conservation with community organisation and NGOs that manage and fund conservation



projects' said Professor Ted Lefroy. 'Every landholder we have spoken to has emphasised the bottom line, that they are in business and they have to make a profit, but biodiversity conservation is seen as an important element of a healthy, profitable landscape,' Professor Lefroy said.

For more about the hub go to www.nerlandscapes.edu.au
Enquiries: Landscapes.Policy@utas.edu.au

Research Highlight 1: Mapping wildlife refuges from satellites

Using satellite data, we are testing a novel method for identifying areas that may function as refuges for multiple species in response to drought, climate change and fire. Focusing on the Tasmanian Midlands, we are using MODIS satellite data to generate a decade long time series of vegetation growth at a resolution of 250 m by 250 m. We have begun ground-truthing to test the hypothesis that sites with the highest and most stable growth may represent potential refuges.

Reference: Mackey B, Berry S, Hugh S, Ferrier S, Harwood TD & Williams KJ (2012) Ecosystem greenspots: identifying potential drought, fire, and climate-change micro-refuges, *Ecological Applications* 22:1852–1864.

Research Highlight 2: Species on the move

Modelling the fate of selected Tasmanian grassland species and

communities under future climate is suggesting they are on the move, with some strong contractions in the areas over which they are likely to occur. These future distributions vary depending on the particular global climate models used and the set of climate variables used in the modelling process, producing a broad range from extinction to maintenance of their current range.

This has several important implications for research and policy. For research, it highlights the potential sources of error and uncertainty involved when modelling future habitat and the need for researchers to make their selections of model inputs very clear. Questions for policy include the future value of specific locations identified as priority areas for conservation or restoration when the target species and communities are on the move.

Research Highlight 3: Temperature the big threat to freshwater biodiversity

Modelling of Tasmanian river systems under future climate indicates that changes in temperature are likely to have a greater influence on the aquatic biota than changes in stream flow. Using climate simulations from the Australian Government funded Climate Futures for Tasmania project, responses of invertebrates, fish and riparian vegetation have been

modelled using a suite of connected models. The results point to the likely localised decline of the Gondwanan-adapted aquatic fauna by 2070 (with the notable exception of eels) due to temperature thresholds being exceeded.

Research Highlight 4: Protecting biodiversity with incentive programs

We conducted an analysis of all tenders for conservation services on private land in the Tasmanian Midlands, concluding that selection criteria favoured agreements with longer durations over agreements that focused on site quality. We also revealed that as the auction budget increases, the conservation value per dollar invested declines. While the latter outcome is largely unavoidable, the tendency to value longevity over quality may not be the most effective way of protecting the greatest area. Where regulatory regimes are likely to change, securing high quality sites for shorter periods is likely to provide a greater guarantee of protecting high quality habitat into the future.

Reference: Iftekhhar MS, Tisdell JG & Sprod D (2013) A review of conservation project selection criteria in the Midlands Biodiversity Hotspot Tender, Tasmania: sensitivity to project duration and auction budget, University of Tasmania, Hobart, Tasmania.

Suzie Gaynor

Photos (L to R): Researcher Sue Gould (Griffith University) collecting vegetation data. Photo by Suzie Gaynor. A Tasmanian stream, Photo by Regina Magierowski. Tasmanian Midlands. Photo by Suzie Gaynor.