



## About us

The Arthur Rylah Institute's terrestrial ecology teams produce high-quality science to support evidence based decision-making by governments and communities.

Our 50 scientists have extensive expertise in fauna and flora research, ecological modelling and data interpretation. We work collaboratively with national, state and local agencies, universities and the community.

## Impacts of grazing on alpine bogs

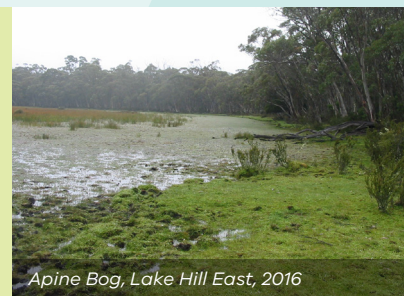
Victoria's alpine areas harbour one of our most unique ecosystems – alpine bogs. The cold and saturated habitat provides ideal conditions for Sphagnum moss and other groundwater-dependent plants that typify alpine bogs.

Australia's alpine areas have a long history of grazing following the arrival of Europeans which has led to deterioration of this irreplaceable environment.

Grazing by large hard-hoofed animals such as cattle, deer and horses, has caused extensive trampling to alpine bogs (which are listed as **threatened**) and endangers their ongoing persistence.

ARI's Arn Tolsma is an advocate for the conservation of alpine bogs (see recent Australia Geographic article '**Bogs are beautiful**') and has collaborated with DELWP Gippsland to investigate the

role of exclusion fences on recovering these ecosystems. Evidence is being generated via a long-term monitoring program to track changes in a small number of fenced alpine bogs. The research is showing that grazing exclusion improves alpine bog health by decreasing the amount of pugging and bare ground, and increasing the cover of some grazing-sensitive native plant species. This evidence, combined with extensive efforts to **map the extent of alpine bogs in Victoria**, can be used to guide mitigation actions that will minimise the impacts of grazing animals on alpine bogs.



Alpine Bog, Lake Hill East, 2016



Alpine Bog, Lake Hill East, 2021



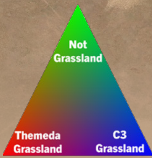
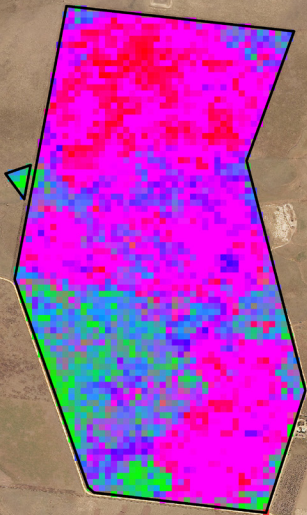
## News

### Mapping hidden grassland treasures

The Victorian Volcanic Plains sprawl across Victoria's southwest; from Melbourne to Portland and south of the Great Dividing Range. They were once predominantly covered by native grasslands and grassy woodlands. These areas are culturally important and harbour diverse and unique biodiversity. However, they are now severely diminished and listed as an **endangered ecological community** due to clearing, over-grazing and weed invasion.

The distribution of native grasslands in parks and reserves in south-eastern Australia is generally well understood. However, knowledge of the location, extent and condition of native grasslands on private land is limited. This hampers the ability of land managers to monitor losses and to protect native grasslands on private land by supporting landholders.

ARI's Brad Farmilo, Steve Sinclair, Khorloo Batpurev, Matt White and Peter Griffioen, in collaboration with Glenelg Hopkins Catchment Management Authority, have created a **spatial model of native grassland distribution across the Victorian Volcanic Plains**. This model can be displayed as a map (pictured) which provides greater certainty about where native grasslands are likely to exist within the Victorian Volcanic Plains. The model predicts the occurrence of native grassland dominated by either Kangaroo Grass (*Themeda triandra*; which signifies more intact grasslands) or native C3 grasses (which generally signifies degraded native grassland caused by long-term grazing) and will aid grassland conservation efforts, particularly on private land.



Grassland Map



### How many cockatoos are there in south-eastern Australia?

In the wild, some cockatoo species have been adversely affected by habitat loss, primarily from a shortage of suitable nesting hollows. However, some species of cockatoo have adapted well to human changes and are considered agricultural pests and may be subject to population control. Currently, it is not known what impact population control methods (legal or illegal) have on these species.

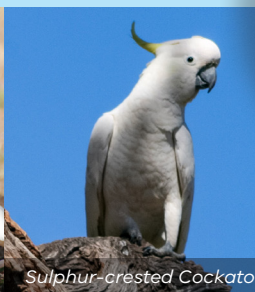
To determine what the best approach for cockatoo management is, we must first know how many cockatoos are out there. ARI's Michael Scroggie and Dave Ramsey, in collaboration with DELWP Biodiversity Division, recently **estimated the total population size for four common species of cockatoo**

(Galah, Sulphur-crested Cockatoo, Little Corella and Long-billed Corella) over 10 years in south-eastern Australia. This was achieved by relating occurrence data (obtained from **Birdlife Australia**) to bioclimatic and land-use variables using statistical models.

It was found that populations of all four species were either stable or increasing between 2010 and 2020. These population estimates and trends can be updated with new data. This gives wildlife managers a solid basis to predict the effect of population control and to ensure it is sustainable for these species of cockatoo.



Long-billed Corella



Sulphur-crested Cockatoo



Galah



### Assessing rangeland condition in the Gobi Desert, Mongolia

Measuring the condition of ecosystems is important as it helps land managers to assess and respond to changes through time, measure the success of restoration interventions, or understand the impacts of natural and human-induced disturbances.

In the Gobi Desert of Mongolia there is growing concern that the condition of rangelands is declining due to overgrazing by goats that support a growing cashmere market. ARI researchers Steve Sinclair, Matt White, Khorloo Batpurev and Peter Griffioen, in collaboration with the Wildlife Conservation Society and La Trobe University, have **developed a robust and transparent method to assess ecosystem condition** in five different Mongolian rangeland ecosystems. Over 90 stakeholders representing various viewpoints (nomadic pastoralists, botanists, wildlife ecologists and policymakers) were asked to judge which elements of the rangeland ecosystem should be

evaluated, and how effectively these represent the consensus understanding of ecosystem condition. Stakeholders were also asked to subjectively assess a range of sites, providing a score for each. This data was then used to develop a mathematical model and tool to calculate the condition of any rangeland site. After validating the model with field tests, it was then used to assess sites not seen by stakeholders. The method is cost-effective and repeatable, and has also been **applied to natural grassy ecosystems in Victoria**.

The metric is soon to be used to track the impact of the South Gobi Cashmere Project. That project aims to work with nomadic pastoralists to voluntarily reduce livestock numbers in overgrazed areas, in exchange for access to more lucrative cashmere fibre markets in Europe. This work will be a collaboration between ARI, Wildlife Conservation Society and Agronomes et Vétérinaires Sans Frontières.

'The method is **cost-effective** and **repeatable**, and has also been applied to natural grassy ecosystems in Victoria.'



Quantifying rangeland condition



Expert elicitation





## Influencing Change

## Feature publications

Legge, S., ... **MacHunter, J.**, ... **Menkhorst, P.**, et al. (2022) The conservation impacts of ecological disturbance: Time-bound estimates of population loss and recovery for fauna affected by the 2019–2020 Australian megafires. *Global Ecology and Biogeography* (early online) <https://doi.org/10.1111/geb.13473>

Bengson, A., Forsyth, D., **Ramsey, D.**, Amos, M., Brennan, M., Pople, A., Comte, S., Crittle, T. (2022) Estimating deer density and abundance using spatial mark-resight models with camera traps. *Journal of Mammalogy* gvac016, <https://doi.org/10.1093/jmammal/gvac016>

Keith, D.A., Allen, S.P., Gallagher, R.V., Mackenzie, B.D.E., Auld, T.D., Barrett, S., Buchan, A., English, V., Gosper, C., Kelly, D., McIlwee, A., Melrose, R.T., Miller, B.J., Neldner, J., Simpson, C.P., **Tolsma, A.D.**, Rogers, D., van Leeuwen, S., **White, M.D.**, Yates, C., Tozer, M.G. (2022) Fire-related threats and transformational change in Australian ecosystems, *Global Ecology & Biogeography* (early online) <http://doi.org/10.1111/geb.13500>

van Harten, E., Lawrence, R., **Lumsden, L.**, Reardon, T., Bennett, A., Prowse, T. (2022) Seasonal population dynamics and movement patterns of a critically endangered, cave-dwelling bat, *Miniopterus orianae bassanii*. *Wildlife Research* (early online) <https://doi.org/10.1071/WR21088>

van Harten, E., Lawrence, R., **Lumsden, L.F.**, Reardon, T., Prowse, T.A.A. (2022) Novel passive detection approach reveals low breeding season survival and apparent lactation cost in a critically endangered cave bat. *Scientific Reports* 12: 7390. <https://doi.org/10.1038/s41598-022-11404-4>

**Ramsey, D.S.**, Forsyth, D.M., Perry, M., Thomas, P., McKay, M., Wright, E.F. (2022) Using helicopter counts to estimate the abundance of Himalayan tahr in New Zealand's Southern Alps. *The Journal of Wildlife Management*, e22252. <https://doi.org/10.1002/jwmg.22252>

## Knowledge transfer: some recent presentations and workshops

**ARI seminars** (subscribe [here](#) on the ARI website):



[“Quantifying Antarctica’s unique biodiversity and wilderness value”](#) and [“Decision tools for conservation management”](#) (Dr. Rachel Leihy, Community Ecology Section and Dr. Joslin Moore, Community Ecology Section, respectively)

**The Conversation**

[“One of Australia’s tiniest mammals is heading for extinction – but you can help”](#) (Dr. Lindy Lumsden and co-authors)



[“Toughness has limits: over 1,100 species live in Antarctica – but they’re at risk from human activity”](#) (Dr. Rachel Leihy and co-authors, Community Ecology Section)

**Society for Conservation Biology: Emerging Issues in Conservation Seminar**

[“Improving species-based area protection in Antarctica”](#) (Dr. Rachel Leihy, Community Ecology Section)

**Glenelg Hopkins CMA ‘The Pondcast’**

[“Episode 10: Tossing golf balls in grasslands with ARI”](#) (Dr. Brad Farmilo, Community Ecology Section)

**ABC Radio Gippsland: Interview with Mim Hook**

“Artificial intelligence develops an ear for nature calls” (Lachlan Francis, Community Ecology Section)

**20th Australasian Bat Society Conference**

“GPS tracking reveals long distance foraging flights of Southern Bent-wing Bats in an agricultural landscape” (Amanda Bush, Wildlife Ecology Section)

**Frogs Victoria**

“*Litoria watsoni* - Updates from the field. In search of Watson’s Tree Frog in a post-fire landscape.” (Louise Durkin, Wildlife Ecology Section)

**Veterinarians working with pigs, Victoria**

“Ardeidae (Herons and Egrets) – background for pig vets working with Japanese Encephalitis Virus” (Dr. Danny Rogers, Community Ecology Section)

Compiled by Brad Farmilo

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