

# ARI Terrestrial Quarterly Update

APRIL 2026



Australasian Bittern (*Botaurus poiciloptilus*) and Growling Grass Frog (*Litoria raniformis*). Photo by Peter Menkhorst

## About us

At the Arthur Rylah Institute (ARI), our terrestrial ecology teams deliver science to inform evidence-based decisions by governments and communities.

With over 50 skilled scientists, we bring together extensive expertise in fauna and flora research, ecological modelling and data interpretation. We work closely with national, state and local agencies, universities and community partners to support the management of Victoria's biodiversity.

## AI listens in to detect species calls

ARI has developed a powerful [artificial intelligence system](#) to revolutionise wildlife monitoring through audio recordings. The tool, ARISA (Arthur Rylah Institute Sound Analyser), can process up to a year's worth of recordings in just 24 hours.

Using species-specific recognisers trained on tens of thousands of expert-labelled recordings, it can identify calls from birds, frogs, bats, and mammals. As more data is added to our models, ARISA's accuracy improves. The need for lots of high-quality data to build these models is demonstrated by our frog recogniser, which was trained on over 370,000 samples to detect 16 Victorian frog species.

Complementing ARISA is ARIEL ([Arthur Rylah Institute Ecoacoustic Listener](#)), an open-source tool that

allows researchers to review AI-detected calls using audio, spectrograms, and confidence scores. Together, these tools enable efficient, accurate analysis of massive acoustic datasets.

This technology allows for fast, scalable monitoring solutions that can inform threatened species management, land-use planning, and environmental impact assessments.

The system has already delivered major conservation wins, including detecting endangered Sloane's Froglet at 14 sites (eight previously unknown), rediscovering the Common Spadefoot Toad in Barmah Forest after 19 years, identifying over 96,000 bat calls for a citizen science project, and detecting rare birds like the Eastern Bristlebird and Australasian Bittern.

This project is strengthening ecological research in Victoria and was funded by Victorian and Australian Government biodiversity programs. As our collaborations continue to grow, its application is making a difference in monitoring more species and landscapes across Australia.



Audiomoth deployed at McMillians Bushland Reserve. Photo by Lachlan Francis

### Conserving two threatened Grevillea species

Through research, on-ground actions, and collaboration, ARI and partners are helping protect two rare Victorian shrubs, the Enfield and Mount Cole Grevilleas.

**Enfield Grevillea** (*Grevillea bedgoodiana*) is a rare shrub found only near Ballarat, Victoria. The species can resprout after being burnt, but too frequent fire may stop it from getting large enough to produce enough seed to sustain the population.

ARI is collaborating with DEECA Grampians Region and Parks Victoria to set up long-term monitoring plots in Enfield State Parkland to determine how fire affects plant growth, seed production, and regeneration.

Early results show that fire helps seedling growth and that larger plants produce more seeds. However, more data is needed to understand survival and mortality rates. This research supports conservation planning and fire management. Visitors can help by staying on tracks and cleaning boots to prevent spreading disease.

**Mount Cole Grevillea** (*Grevillea montis-cole* subsp. *montis-cole*) is a critically endangered shrub found only in western Victoria. In February 2024, a wildfire destroyed all known populations, leaving only seeds in the soil. By August, thousands of seedlings emerged, but they face threats from browsing, disease, pests, drought, and future fires.

ARI partnered with DEECA Grampians Region, Eastern Maar Aboriginal Corporation, and Royal Botanic Gardens Victoria to install fencing, and tag 400 plants to monitor survival and growth. Early results show strong survival in larger populations, but high mortality in rocky outcrops.

Seedlings growing in areas such as on tracks and graded road edges, where they were unlikely to survive, were salvaged and replanted to form a new sub-population. Ongoing monitoring of the species recovery will guide fire planning and conservation strategies. This work is supported by the Australian Government's Saving Native Species Program and involves collaboration with Traditional Owners and conservation experts.



Enfield Grevillea (*Grevillea bedgoodiana*) in flower.  
Photo by Irena Cassettari



Mount Cole Grevillea (*Grevillea montis-cole* subsp. *montis-cole*) in flower.  
Photo by Steve Sinclair

### Monitoring wildlife using eDNA

#### Sambar Deer in Wilsons Prom

Following deer control programs, our researchers tested DNA-based methods as a monitoring tool to detect Sambar Deer and Hog Deer in Wilsons Promontory National Park. By analysing deer scats and water samples from streams, we identified species presence and estimated their population size. Results from both eDNA and camera trapping were aligned. However, identifying individual deer was difficult.

Water-based environmental DNA (eDNA) showed promise, but detection was dependent on several variables, including stream flow, recent rainfall, and sampling technique and expertise. Detection was more reliable in still water or near signs of deer activity.

#### Spotted-tailed Quoll

[This study](#) assessed whether eDNA present in soil could be used to detect the endangered Spotted-tailed Quoll. The method worked well at known quoll latrine sites, but detection in other areas was low. Because DNA levels in the soil were very small and the method had limited sensitivity, soil eDNA currently offers no advantage over existing monitoring methods for Spotted-tailed Quoll, such as scat surveys or camera trapping.

#### Watson's Tree Frog

Supported by DEECA and in collaboration with Wild Research, scientists are developing an eDNA tool to detect the endangered Watson's Tree Frog. Water samples also help track 'chytrid' fungus, which causes a deadly amphibian disease. By screening waterbodies across multiple seasons, we are monitoring both chytrid prevalence and site occupancy by Watson's Tree Frog, and how these factors fluctuate through the seasons.



Watson's Tree Frog. Photo by Louise Durkin



Spotted-tailed Quoll (*Dasyurus maculatus*). Photo by Jemma Cripps

### Feature publications

Baudraz, M., **Moore, J.** and 78 co-authors (2025). Several candidate size metrics explain vital rates across multiple populations throughout a widespread species' range. *Journal of Ecology*, 113 (11). <https://doi.org/10.1111/1365-2745.70148>

Carter, S., Mills, C., Hao, Z., Mott, R., **Hauser, C. E., White, M.**, Sharples, J., Taylor, J. and **Moore, J. L.** (2024). Spatial prioritisation for invasive species control: trade-off between current impact and future spread. *Ecological Applications*, 34 (5). <https://doi.org/10.1002/eap.2982>

Crook, D.A., van der Meulen, D.E., Lewis, S., Keating, J., Morris, S., McPhan, L.M., Dennis, R., Sarwer, G., **Koster, W.M.** and Rourke, M.L. (2026). Applying knowledge of migration behaviour to improve eDNA detection of a threatened fish, the Australian grayling (*Prototroctes maraena*). *Aquatic Conservation: Marine and Freshwater Ecosystems*, 36 (1). <https://doi.org/10.1002/aqc.70317>

**Griffioen, P., Lumsden, L., Durkin, L.** and **Francis, L.** (2025). Versatile ecoacoustic AI recognisers created with 1-D CNNs and varied sampling strategies. *Acoustics 2025 Conference Proceedings*. [www.acoustics.asn.au/conference\\_proceedings/AAS2025/papers/p84.pdf](http://www.acoustics.asn.au/conference_proceedings/AAS2025/papers/p84.pdf)

Grover, S., **Moore, J.L.**, Minasny, B., Auricht, C., Moss, P., Robertson, H., Kidd, D., Natera, G., Beer, F., Horwitz, P. and Grundy, S. (2025). Peatlands of Oceania: Ecology and Opportunities. *Austral Ecology*, 50 (11). <https://doi.org/10.1111/aec.70140>

Higginson, W., Liu, R., Tschierschke, A., Cobb, A., **Jones, C.S., Vivian, L.** and Bridgewater, P. (2025). Integrating drone and deep learning technology to monitor floodplain changes in response to

environmental flows. *Hydrobiologia* 1-17.

<https://doi.org/10.1007/s10750-025-06024-8>

Keller, A.B., Borer, E.T., Buyarski, C.R., Cleland, E.E., Gill, A., MacDougall, A.S., **Moore, J.L.**, Morgan, J.W., McCulley, R.L., Risch, A.C. and Seabloom, E.W. (2025). Effects of elevated nutrient supply on litter decomposition are robust to impacts of mammalian herbivores across diverse grasslands. *Oecologia*, 207 (10), 1-11. <https://doi.org/10.1007/s00442-025-05791-4>

Robert, K. A., Dimovski, A. M., Contos, P., **Khwaja, N.** and Griffiths, S. R. (2025). Divergent responses of insectivorous bats and flying insects to experimental LED illumination of spectra. *Ecosphere*, 16. <https://doi.org/10.1002/ecs2.70291>

Rowiński, P. K., Näslund, J., **Sowersby, W.**, Eckerström-Liedholm, S. and Rogell, B. (2025). The evolution of a placenta is not linked to increased brain size in poeciliid fishes. *Journal of Evolutionary Biology*, 39 (3), 385-393. <https://doi.org/10.1093/jeb/voaf147>

Sogawa, S., Kobayashi, T., Bshary, R., **Sowersby, W.**, Awata, S., Kubo, N., Nakai, Y. and Kohda, M. (2025). Rapid self-recognition ability in the cleaner fish. *Scientific Reports*, 15 (1). <https://doi.org/10.1038/s41598-025-25837-0>

Villada-Cadavid, T., Wu, N.C., Sloggett, B., **Lumsden, L.**, Welbergen, J.A., and Turbill, C. (2025) Winter torpor and body mass patterns of a cave-roosting bat in cool and warm climates. *Oecologia*, 207 (12), 193. <https://pubmed.ncbi.nlm.nih.gov/41266865/>

### Knowledge transfer: Visit the [ARI Seminars webpage](#) to find upcoming and past presentations:

Presentation at International Bat Research Conference. **Lumsden, L., Bush, A., Lentini, P., Moloney, P.** and **van Harten, E.** Defining key bat species of concern, quantifying collision impacts and developing guidelines for onshore wind farms in Victoria, Australia. 8th August 2025.

Presentation at Wimmera Biodiversity Symposium. **Lumsden, L.** Bats: Fascinating creatures of the night. 4th September 2025.

Presentation at Floodplain Ecology Course. **Khwaja, N.** Birds of the Floodplain for the Floodplain. 17th October 2025.

Presentation at the Acoustics 2025 conference. **Durkin, L., Cally, J., Griffioen, P., Francis, L., Scroggie, M., Howard** and **K.** Acoustic monitoring of floodplain frogs. Deep learning CNN model automates species recognition. Remote-sensed inundation status influences frog calling activity and occupancy. 14th November 2025.

Presentation at Ecological Consultants Association of Victoria. **Cripps, J., Lentini, P., Lumsden, L.** and **Nelson, J.** The Discovery of Leadbeater's Possum in NSW: A Victorian perspective of where we've been and what is next for our faunal emblem. 30th October 2025.

Presentation at Australian Society for Fish Biology Conference 2025. **Tonkin, Z., Moloney, P., Lyon, J., Kitchingman, A., O'Mahony, J., Raymond, S., Hackett, G., Saddler, S., Wood, D.** and **Woolcock, B.** Murray cod movement in a modified floodplain river system. 18th August 2025.

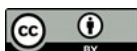
Presentation for NSW DPI: Bringing back the bluenose workshop. **Tonkin, Z.** Trout cod status and trends in Victoria. 30th July 2025.

Presentation at Four Cods workshop. **Jones, C., Vivian, L., Yen, J., Wooten, H., Mole, B.** and **Gould, E.** Unveiling the truth: Large Scale Insights into Riparian Vegetation Responses to Environmental Flows. 2nd December 2025.

Presentation for DEECA. **Francis, L., White, M.** and **Bassett, O.** Landscape scale flowering detection of an at-risk obligate seeder, Alpine Ash. 11th November 2025.

Presentation at Australasian Ornithological Conference. **Kulich, H.V.J., Griffioen, P.** and **Francis, L.** Optimising Models and Sampling Regimes for Waterbird Calls: Tailoring automated call processing for waterbirds in south-eastern Australia. 18th November 2025.

We acknowledge Victorian Traditional Owners and their Elders past and present as the original custodians of Victoria's land and waters and commit to genuinely partnering with them and Victoria's Aboriginal community to progress their aspirations.



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