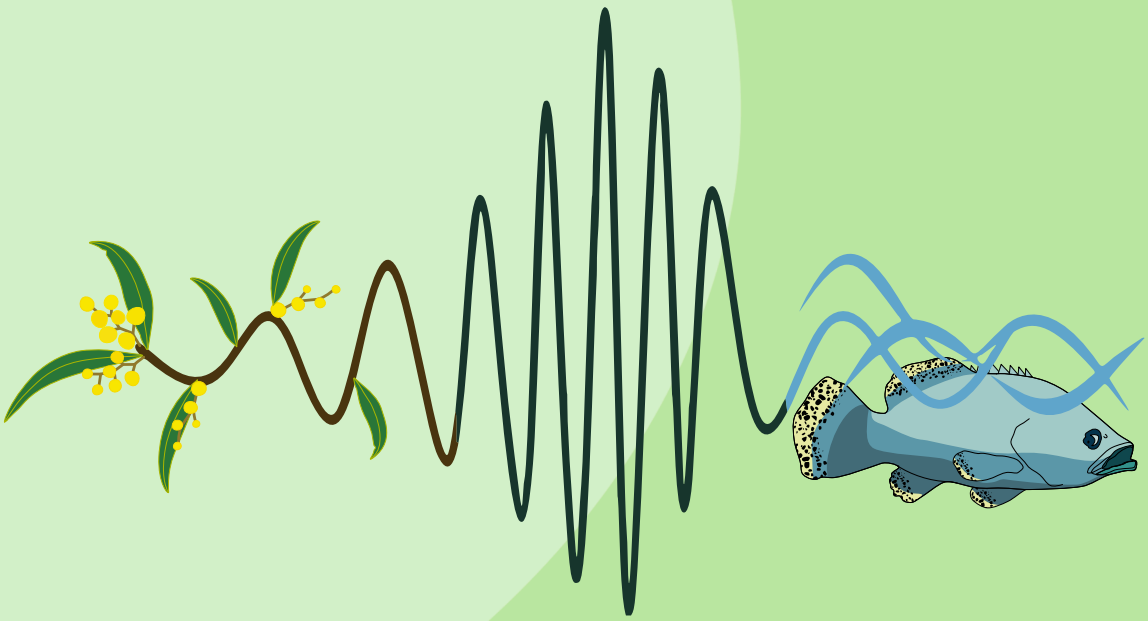
World Ecoacoustics Congress

2026 Gimuy / Cairns

Abstract Booklet



WEC 2026 Cairns

Abstract Booklet

17-20th August | Cairns Convention Centre | Cairns, Australia

122 abstracts

OPEN TALK

Presentation format: *Open talk*

How much is the model missing? Human-in-the-loop iterative clustering for threshold-agnostic acoustic validation

Callan Alexander[1*], Dr. Ayesha Tulloch[1], Prof. Paul Roe[1], and Prof. Susan Fuller[1]

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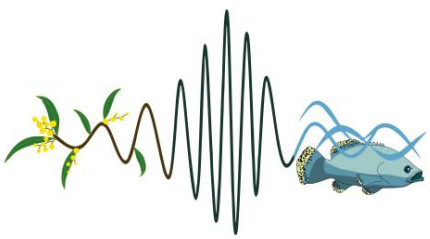
** Presenting author*

Passive acoustic monitoring generates vast datasets that exceed the capacity of manual analysis, driving widespread adoption of global birdsong models and deep learning classifiers. These workflows typically rely on arbitrary confidence thresholds to balance precision against recall, a practice that inevitably discards true positive detections at higher confidence scores while retaining false positives at lower ones. This trade-off is particularly problematic for cryptic species, rare vocalisations, or taxa underrepresented in model training data. This study asks whether unsupervised clustering of deep learning embeddings can provide a threshold-agnostic framework for validating automated detections and characterising soundscape components in agricultural landscapes. To address this question, we use a hybrid machine learning approach combining supervised model outputs with iterative UMAP dimensionality reduction and HDBSCAN clustering of BirdNET and Perch embeddings. The tool implements a human-in-the-loop workflow enabling interactive visualisation, cluster inspection, and iterative refinement of high-dimensional acoustic data, and was tested on target species and anthropogenic noise sources across a large acoustic dataset collected in Queensland's Granite Belt.

Iterative clustering substantially outperformed standard threshold-based filtering, recovering true positive detections distributed throughout the confidence spectrum and enabling the rapid removal of large numbers of false positives. The workflow proved particularly valuable for cryptic or acoustically ambiguous species, and reliably classified unwanted noise without requiring a custom-trained classifier. By removing the reliance on fixed thresholds, this human-in-the-loop approach supports more accurate and ecologically meaningful interpretation of large acoustic datasets, with direct applications for biodiversity monitoring and soundscape analysis in modified landscapes.

Related topics: *Applied ecoacoustics, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

Synthesizing long-term historical acoustic data into useful baseline calling activity for vocal vertebrate communities across the TERN network

Slade ALLEN-ANKINS[1*], and Lin Schwarzkopf[1]

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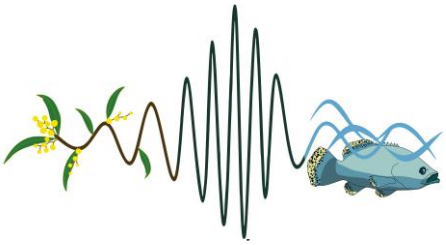
** Presenting author*

Long-term monitoring allows us to detect changes in species and communities, however, until the last decade or so, this has typically required a significant investment of time, personnel, and funding. Passive acoustic monitoring provides a less invasive, cost-effective means of gathering long-term environmental data on a broad temporal and spatial scale. Australia's Terrestrial Ecosystem Research Network (TERN) operates a number of long-term monitoring sites around the country, where on-ground instrumentation allows collection of high temporal resolution environmental and climatic data. Acoustic recordings have been collected since the 2010s, however, until now, this long-term dataset has not been used to investigate changes in vocal species and their communities. Recent advances in analytical techniques have made it possible to extract meaningful calling-activity time-series from this data. Today, I will describe how we are turning this long-term historical data into useful baseline calling activity for vocal vertebrate communities across the TERN network.

Related topics: *Sensor networks, Populations and dynamics*



Presentation format: *Open talk*

The cost of delay: Quantifying information loss from delayed ecological monitoring across biomes

Ardiantiono Ardiantiono[1*], Santiago Perea[1], Reid Rumelt[2], Carla Mere-Roncal[3], Wyatt Cummings[1], and Zuzana Burivalova[1]

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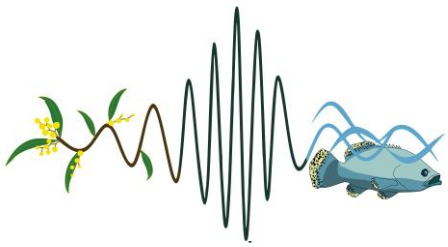
[3] *Andes Amazon Fund, USA*

** Presenting author*

The efficacy of monitoring relies on capturing key biological events through consistent survey timing. However, logistical constraints frequently cause delays and their consequences remain poorly understood. Using one year of continuous acoustic recordings from six forest sites across temperate (USA, Germany) and tropical (Peru, Ecuador, Brunei, Gabon) regions, we quantify how shifts in survey timing impact soundscape measurement and species detection. Our results show that soundscape saturation—the proportion of active frequency bins—exhibits significantly sharper seasonal peaks in temperate forests than in tropical ones. Consequently, the cost of delay is more severe in temperate regions: temporal shifts from peak period results in up to 50% soundscape loss, compared to 15% in the tropics. In a specific assessment of bird communities in the Peruvian Amazon, survey delays altered observed community composition by up to 30%. Using species accumulation curves, we found that detecting 250 bird species requires 13 days during peak period, but this duration doubles if the survey is delayed by four months, effectively increases the logistical costs of field observations. Additionally, divergent vocalization trends among bird species highlight the necessity of tailoring monitoring strategies to either community wide or species-specific objectives. Finally, our research provides a data-driven framework for assessing the risks of survey delays and establishes guidelines for robust survey design that accounts for real-world logistical uncertainty.

Related topics: *Soundscapes, Ecological inference, Monitoring*



Presentation format: *Open talk*

Accounting for biological, physical, and computational filters in ecoacoustics: lessons learned from coral reefs

Juan Carlos Azofeifa-Solano[1*], Clelia MULÀ[2], Leo CHIU-LEUNG[3], James KEMP[4], Christine ERBE[5], and Miles J. G. PARSONS[6]

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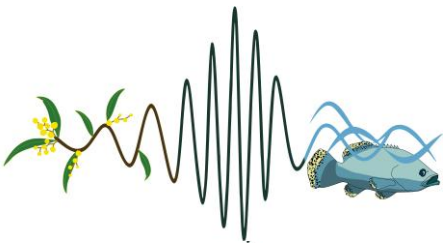
** Presenting author*

While passive acoustic monitoring (PAM) is a transformative tool for ecosystem and biodiversity assessment, its utility depends on reliable ecological interpretation that accounts for potential physical and computational biases. This synthesis draws on recent research from Australia's Great Barrier Reef and Ningaloo Coast to evaluate acoustic drivers across diverse marine environments (sand flats, macroalgal meadows, and coral reefs). Our findings indicate that soundscape analysis is highly effective at differentiating habitat types and identifying subtle ecological transitions, confirming that acoustic signatures are linked to biological communities. However, we also show that these signals are influenced by physical and computational filters. Experimental evidence demonstrates that hydrophone orientation and proximity to target habitats alter received sound pressure levels, driven by frequency-dependent sensor directivity. Additionally, the parameterisation during signal processing can influence outputs from ecoacoustic tools, which may lead to misinterpretations in spatial or temporal comparisons. We suggest that for ecoacoustics to provide rigorous ecological inference, the field must transition from pattern recognition to a mechanistic, sensitivity-aware workflow. By integrating these methodological considerations, we provide a framework that strengthens the reliability of ecoacoustics as a precision tool for coastal conservation.

Related topics: *Soundscapes, Ecological inference, Future-forward/innovative*



Presentation format: *Open talk*

An automated approach for detection and classification of Australian mysticete sounds

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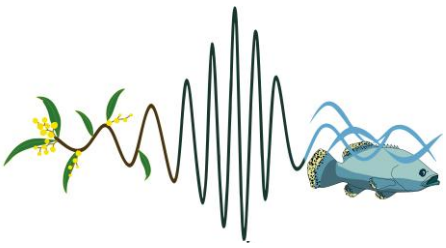
Environmental impact assessments (EIAs) are a regulatory requirement for offshore developments within Australia's blue economy. These assessments are critical for informing environmental plans (EPs) that aim to mitigate industrial impacts and ensure sustainable practices. A standard EIA involves at least twelve months of passive acoustic monitoring (PAM) across multiple sites to establish baseline noise levels and document the presence and behaviour of marine fauna, including migratory baleen whales. However, the requirement to produce EPs often places PAM analysis under significant time constraints. To streamline this process and improve the quantification of species presence, we introduced a suite of algorithms within the open-source software CHORUS. While AI tools currently dominate the field, many Australian mysticetes produce stereotypical vocalisations that are suited to simpler, high-speed processing. Here we present robust detection and classification tools for eight mysticete species, including Antarctic and pygmy blue whales, southern and pygmy right whales, Antarctic and dwarf minke whales, fin, and Omura's whales.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Understanding the mechanistic pathways for soundscape ecological interpretation: a case from coral reefs

Juan Carlos Azofeifa-Solano[1*], James KEMP[2], Christine ERBE[3], Rohan M. BROOKER[4], Robert D. MCCAULEY[5], and Miles J. G. PARSONS[6]

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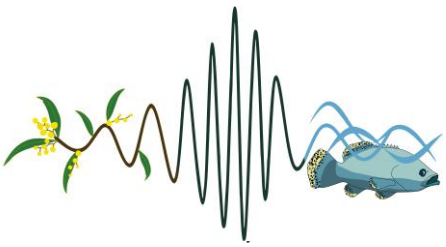
Passive acoustic monitoring (PAM) is a rapidly growing tool for biodiversity assessment, yet the ecological interpretation of soundscapes remains inconsistent. This ambiguity reflects a fundamental conceptual gap: acoustic data is often treated as a descriptive pattern rather than the output of specific biological and physical processes. Here, we propose a framework focused on understanding the mechanistic pathways that shape acoustic recordings, emphasizing how ecological drivers, environmental filters, and methodological choices collectively influence the final signal. Using coral reefs as a focal case (given their acoustic richness and the urgent need for their reliable monitoring) we illustrate how soundscapes emerge from interacting layers of variability. We argue that robust interpretation requires an explicit link between acoustic data and underlying mechanisms, such as species-specific repertoires, propagation constraints, and behavioural ecology. By integrating these mechanistic pathways with transparent reporting and validated sound libraries, we can advance PAM from a pattern-detection tool into a source of ecological inference. Our goal is to provide a conceptual map that enables researchers to move beyond description toward interpretable indicators of ecosystem change.

Related topics: *Ecological inference, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

Symposium: *Multidisciplinary approach to behavioural and Ecoacoustics challenges of avian vocal mimicry*

Composers not ARUs: what the lyrebird's mimetic song tells us about animal culture and conservation

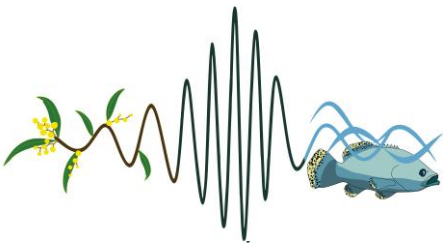
Fiona Backhouse[1*], Justin A. Welbergen, Matthew H. J. Chaumont, and Anastasia H. Dalziell

[1] *Western Sydney University, Hawkesbury Institute for the Environment, Australia*

** Presenting author*

It is tempting to assume that birds that mimic other species act like autonomous recording units, passively copying the sounds around them. This assumption may then lead to the question of whether the repertoires of vocal mimics could act as a warning of changes in heterospecific populations. However, increasing evidence suggests mimetic repertoire composition is more complex than this, and that some mimicry may in fact be socially learnt, potentially resulting in a disconnect between mimetic repertoires and avian assemblages. We explored mimetic repertoire composition and social learning in male lyrebirds (family: Menuridae) using a conspicuous mimetic song performed during the breeding season. We synthesise results from our work on lyrebird mimicry to assess whether lyrebird mimetic repertoires simply reflect the local avifauna or show evidence of social transmission and local vocal cultures. We then investigated what these repertoires could reveal about changes in species assemblages. First, we found that male superb lyrebirds (Menura novaehollandiae) in a population introduced to Tasmania almost 100 years ago still mimic a species found only on mainland Australia, showing that mimicry can be socially learnt and is remarkably stable. Second, we found that male Albert's lyrebirds (Menura alberti) compose sequences of mimetic sounds sampled from their environment, and that these sequences are shared among neighbours. Finally, we found that mimetic repertoires of Albert's lyrebirds decline with lower habitat availability, independent of model species presence. Thus, the mimetic song of male lyrebirds is partially learnt from other lyrebirds, and forms geographically distinct vocal cultures that are vulnerable to anthropogenic change. We therefore conclude that an individual lyrebird's mimetic song is not simply a recording of their acoustic environment, but rather an expression of a collective 'archive' of mimetic sounds containing ecologically valuable information about both lyrebirds and the species they mimic, if carefully interpreted.

Related topics: *Future-forward/innovative*



Presentation format: *Open talk*

Symposium: *'Listening as Ecological Practice: Ecoacoustics, Artistic Research, and Community Engagement'*

Listening to Ecosystems: The Ethics of Ecoacoustics and Interdisciplinary Perspectives of Field Recording

Leah Barclay[1*]

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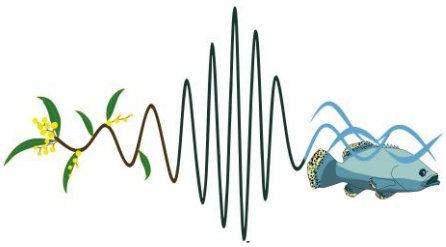
** Presenting author*

As environmental listening and field recording expand rapidly across conservation science, digital health, interdisciplinary research, and creative practice, the ethical foundations underpinning how we record ecosystems remain critically underexamined. This paper argues that field recording is never a neutral act of data collection but always a relational engagement that carries responsibilities to places, communities, and more-than-human beings. It proposes reciprocity as the foundational ethical orientation for ecoacoustics and ecological sound practices, examining how the ways we listen and record shape not only the sonic archives we create but our capacity for ecological empathy, cultural respect, and multispecies care.

Drawing on fifteen years of practice-led research at the intersection of art and science — spanning freshwater ecosystems, coral reefs, and rainforests across Australia, Mexico, Panama, and the Asia-Pacific region — this paper articulates an ethical framework grounded in five guiding principles: asking permission, building contextual knowledge, practising ethical field presence, listening before recording, and practising reciprocity. The framework draws on Indigenous methodologies, decolonial listening theory, and multispecies ethics, and is demonstrated through international case studies from collaborative research with First Nations and Indigenous communities. These principles are situated within a current ARC Discovery Project developing First Nations-led, place-based masterclasses that translate this ethical framework into participatory pedagogy for diverse communities.

The research demonstrates that ethical field recording strengthens ecoacoustics' capacity to amplify voices historically marginalised within soundscape research, contribute to sustainability through ecologically accountable listening practices, and cultivate the critical awareness required as recording practices proliferate across disciplines. By reframing the field recorder as an instrument of care rather than capture, this paper contributes to emerging posthumanist discourse within soundscape studies, proposing that relational listening grounded in reciprocity and more-than-human responsibility offers ecoacoustics a transformative orientation for expanding across sciences and making significant impact across other disciplines including the arts and humanities.

Related topics: *Conservation technology, Future-forward/innovative, Arts*



Presentation format: *Open talk*

Evaluating Passive Acoustic Monitoring for the Detection of Invasive Deer Compared to Camera Traps

Jacopo BARTHOLOMEW[1*], S Allen-Ankins[2], M Quin[2], and L Schwarzkopf[2]

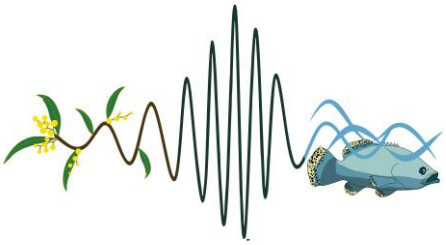
[1] *James Cook Univeristy*

[2] *James Cook University*

** Presenting author*

Globally, several deer species have established invasive populations with significant ecological and economic consequences. Invasive deer can suppress native flora regeneration, spread disease, compete with livestock, and increase vehicle collision risk. To mitigate their impacts, successful deer management relies on monitoring techniques that can reliably detect their presence. Camera trap monitoring has become a widely used approach for deer detection; however, camera traps suffer from a restricted field of view, limiting detection within low density populations or structurally complex landscapes. Alternatively, passive acoustic recorders collect acoustic data across great distances, potentially improving detection and monitoring effectiveness. We monitored 40 sites using passive acoustic monitoring (1 acoustic recorder) and camera trap monitoring (2 camera traps) to determine the most effective method for detecting feral Chital deer (Axis axis) in North Queensland, Australia. High performance acoustic classifiers (AUPRC > 0.90) were developed to identify Chital vocalizations within the 17 years of collected audio. Chital were vocally active throughout the 7-month monitoring period and exhibited vocal activity peaks at night. We determined there was a 50% chance of detecting a call produced 2 km away from a recorder. On average, the probability of detecting Chital during a single 24-hour camera trap survey was 80% lower than a 6-hour nighttime acoustic survey. We demonstrate that passive acoustic monitoring outperforms camera traps for detecting chital deer, with implications for improving evidence-based invasive deer management, particularly for surveillance and eradication efforts.

Related topics: *Conservation Science and Management*



Presentation format: *Open talk*

YAAAT: Yet Another Audio Annotation Tool

Ashlae Blum'e[1*]

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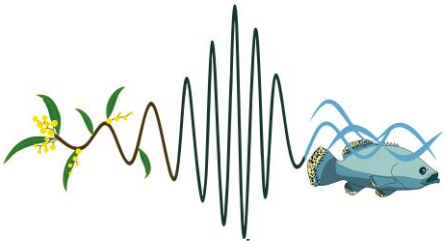
** Presenting author*

YAAAT (yet another audio annotation tool) is a modular, extensible, and lightweight audio visualization and annotation tool for use in bioacoustics analysis. It features a compact GUI that displays overlays of audio information, tabbed views with file navigation and audio playback, configurable processing parameters, and structured annotation file outputs. YAAAT has been specifically designed from the ground-up for use in bioacoustics analysis, and aims to generate new ways of visualizing and interacting with short-timescale audio data. The software is freely available at http://github.com/laelume/yaaat and via pip install.

Related topics: *Conservation technology, Applied ecoacoustics, Data visualization, Open source software*



Presentation format: *Open talk*

Acoustic monitoring to support species conservation on Christmas Island

Sheryn Brodie[1*], Lin Schwarzkopf[2], Engineering, James Cook University[3], Nicholas Macgregor[4], Phil Eichinski[5], and Australia

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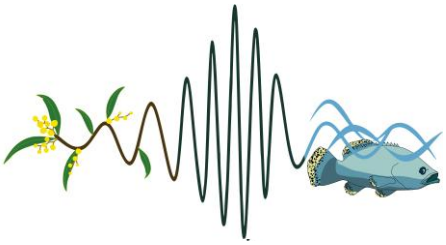
** Presenting author*

Monitoring biodiversity is fundamental to effective conservation, yet long-term monitoring programs are constrained by high costs, logistical challenges, and imperfect detection of species. Passive acoustic monitoring offers a promising alternative to traditional field surveys by enabling scalable, repeatable, and information-rich sampling of wildlife communities. As in any monitoring program, careful consideration of design and statistical power is essential to ensure population declines are detected reliably and early to inform management action. Christmas Island, in the Indian Ocean, has several endemic bird species and provides a valuable test case for development of a robust acoustic monitoring program. We deployed passive acoustic sensors across the island and utilised deep learning-based automated detection models to collate occurrence data on several priority bird species. We assessed statistical power of the acoustic methods to detect declines in occupancy of each species and compared this to data from traditional field surveys. Acoustic monitoring combined with automated detection increased power to detect occupancy declines relative to traditional surveys, particularly for species with low detection rates, such as the Christmas Island Emerald Dove and Goshawk. This study highlights the potential for passive acoustic monitoring, used in conjunction with the latest automated detection tools, to provide more cost-effective and scalable monitoring programs, particularly in remote island ecosystems. Improved power to detect population declines can enable more timely management intervention, supporting conservation of endemic and threatened species.

Related topics: *Monitoring, Applied ecoacoustics*



Presentation format: *Open talk*

Bioacoustic Playback as Ecological Intervention in Creative Practice

Jesse Budel[1*]

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** Presenting author*

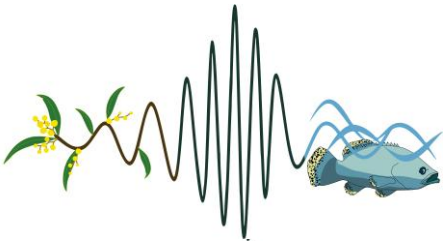
Bioacoustic playback has long functioned as an experimental method within behavioural ecology, used to elicit and analyse responses to species-specific vocalisations. In parallel, contemporary sound art and acoustic ecology practices have increasingly incorporated recorded animal sounds within site-specific installations and compositions. Despite this convergence, the ethical and ethological implications of playback across these domains remain insufficiently theorised.

This paper argues that playback operates as an ecologically active signal regardless of the intentions of the practitioner. Drawing on bioacoustic literature alongside analyses of selected artistic and scientific case studies, it examines how recorded vocalisations may be perceived by non-human listeners as functionally meaningful signals, even when deployed for aesthetic or representational purposes. The distinction between representation and interaction is therefore destabilised, as playback re-enters the communicative field of an ecosystem.

The study identifies key variables shaping this perceptual and behavioural salience, including spectral fidelity, temporal structure, repetition, spatialisation, and site-specific context. It further considers the implications of both fixed and responsive systems, ranging from static installations to emerging interactive and AI-mediated approaches. By reframing scientific playback experiments as forms of creative practice, the paper highlights a shared domain of intervention in which sound is both aesthetic material and ecological agent.

In response, an ethical framework is proposed for practitioners working with bioacoustic playback across disciplines. This framework foregrounds responsibility in relation to perceptual recognisability, ecological impact, and intentionality, advocating for strategies that mitigate unintended behavioural disruption while maintaining the integrity of artistic inquiry. The paper positions playback as a site of critical intersection between art, science, and ecology, requiring a re-evaluation of listening and sounding as forms of environmental action.

Related topics: *Soundscapes, Future-forward/innovative, Arts*



Presentation format: *Open talk*

From Calls to Counts: Estimating Koala Abundance Using Integrated Ecoacoustic and Visual Surveys

Justin Cally[1*], Dave Ramsey, and Desley Whisson

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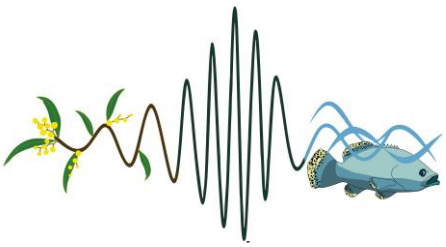
** Presenting author*

Estimating the abundance and distribution of cryptic arboreal mammals at large spatial scales remains a major challenge for wildlife monitoring. For koalas (Phascolarctos cinereus), traditional visual surveys are constrained by low and heterogeneous detection probabilities, limiting their utility for statewide inference. We present a novel ecoacoustic framework for estimating koala abundance and distribution across 57,556 km2 of potential koala habitat in Victoria, Australia. We integrate passive acoustic monitoring (PAM) with conventional distance sampling in a unified hierarchical model. Koalas were repeatedly surveyed at 182 spatially balanced sites for three years (2023 – 2025) using a combination of double observer line transects and paired Song Meter acoustic recorders deployed during the breeding season. Nocturnal bellow detections were extracted using a custom convolutional neural network ensemble and manually validated. Acoustic detections (presence–absence across repeated nights) and visual counts were jointly analysed within an integrated occupancy–abundance model that explicitly links vocal activity to underlying population density while accounting for imperfect detection in both observation processes. The integrated model yielded robust statewide estimates of koala abundance across multiple years. PAM substantially outperformed visual surveys in low density populations, with two Song Meters deployed for 1–2 weeks achieving cumulative detection probabilities exceeding 0.95. The integration of PAM data reduced uncertainty relative to single method approaches and allowed abundance estimation across areas where visual surveys alone would be infeasible. We demonstrate the methodological power of combining PAM with hierarchical abundance models to deliver scalable, repeatable estimates of wildlife abundance and distribution. This approach provides a transferable framework for monitoring vocally active species and establishes PAM as a core tool for population assessment rather than other supplementary detection methods.

Related topics: *Ecological inference, Monitoring*



Presentation format: *Open talk*

Detecting seasonal soundscape patterns in protected areas for long-term monitoring: a standardized, unbiased sampling design associated with acoustic region workflow for establishing soundscape states and trends

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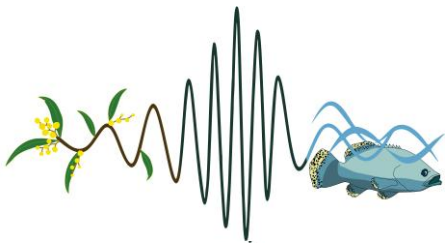
** Presenting author*

Long-term biodiversity monitoring in protected areas (PAs) requires standardized methods capable of detecting trends across time and comparable across different ecosystems. Passive acoustic monitoring (PAM) combined with acoustic index analysis and the acoustic region approach (Campos et al., 2021, 2022) has been shown to be sensitive to soundscape differences across seasons and between sites, making it a suitable tool for establishing baselines and detecting long-term trends in PA management.

We present a PAM sampling design and analytical workflow developed for soundscape monitoring of Brazilian PAs, tested with one year of data collected at two federal PAs: the Serra do Cipó National Park (rupestrian grassland, Minas Gerais) and the Raso da Catarina Ecological Station (Caatinga biome, Bahia), both core areas of different UNESCO Biosphere Reserves. At each PA, 16 AudioMoth autonomous recorders were deployed following a spatially balanced design in which four quadrants are randomly selected from a predefined grid, with four recorders placed at the corners of each quadrant. This design ensures spatial representation across the PA, dilutes recorder-level variation, and can be adapted to PAs of different sizes and shapes. Recorders followed a standardized schedule of one minute every ten minutes and one day every ten days. Six acoustic indices were calculated — ACI (Pieretti et al., 2011), Ht (Sueur et al., 2008), EVN (Towsey, 2017), BGN (Towsey, 2017), SNR (Towsey, 2017), AEI and ADI (Villanueva-Rivera et al., 2011) — and combined with the acoustic region approach (Campos et al., 2021, 2022) to generate seasonal soundscape representations from 144 recorder-days per season per PA. This analytical framework is unbiased with respect to biological group, as the main seasonal differences may arise from any sound source, including geophony. Geophony and periods of low acoustic activity are themselves ecologically relevant and may change over time, particularly as a result of climate change.

Results showed that the sampling design and associated analyses detected the main acoustic differences among seasons at both PAs, providing seasonal baselines from which long-term trends can be monitored. The workflow's applicability across two biomes with contrasting acoustic communities supports its potential for standardized soundscape monitoring of PAs at a national scale.

Related topics: *Soundscapes, Ecological inference, Monitoring*



Presentation format: *Open talk*

Is Conservation Tech Ready for What's Next?

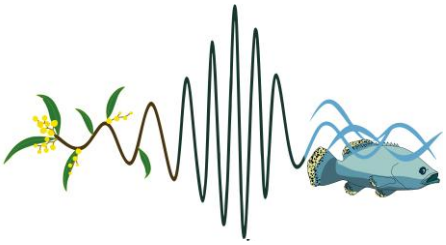
Lisa Cawthen[1*], Nicole Wright, and Lisa Cawthen

[1] *Wildlife Acoustics*

** Presenting author*

Conservation technology is rapidly evolving to meet needs to analyze more data, faster, and on a broader scale. Compared to humans observation in the field, bioacoustics and ecoacoustics have experienced a major leap for in time and cost efficiency. It has allowed wildlife monitoring to scale to a great degree, but we are at another inflection point now . AI and remote sensing is being increasingly explored for this, but is it ready yet? This session will look at new innovations in bioacoustics, designing hardware with the future in mind and creating extensible hardware to allow customer created innovation.

Related topics: *Conservation technology, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

Sounding Reef Futures: Ecoacoustic Methods for Tracing Loss, Persistence, and Renewal

Diana Chester[1*], Diana Chester[2], and Damien Ricketson[3]

[1] *University of Sydney*

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[3] *Sydney Conservatorium of Music, University of Sydney*

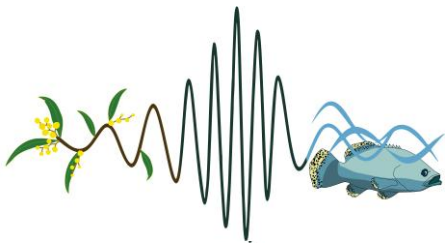
** Presenting author*

Coral reef soundscapes are shaped by the crackle, pop, and rhythmic densities of more-than-human life. These biophonies form complex acoustic ecologies that support communication, orientation, and settlement for reef organisms, while also serving as indicators of ecosystem health. As reef systems decline, their acoustic signatures are altered or silenced, raising urgent questions about how ecological degradation and potential renewal might be understood through sound. This study investigates the acoustic character of coral reef communities at One Tree Island (Great Barrier Reef, Australia), asking how ecoacoustic methods can register both loss and persistence within reef environments.

Fieldwork was conducted across fifteen reef sites at One Tree Island, selected to represent varying levels of coral health and bleaching. Using arrays of underwater hydrophones, recordings were captured across multiple times of day to document temporal and spatial variations in reef activity. Acoustic diversity is closely linked to ecological vitality, while degraded environments exhibit distinct sonic signatures of loss. This study adopts a comparative ecoacoustic approach to examine how these differences manifest across sites, asking what constitutes a “healthy” versus “bleached” reef soundscape. Alongside quantitative and critical listening analyses, the project mobilises artistic and compositional methodologies to engage the reef as both data-rich environment and expressive medium, extending ecoacoustic analysis into interpretive and experiential domains.

Rather than resolving reef degradation, this research positions sound as a critical site of inquiry and relation. Through listening, recording, and composition, the reef emerges as a dense sonic field where damage and vitality coexist. Sound-based engagement here signals renewal both within more-than-human systems and within human perception, reorienting attention and expanding how reef environments are known, encountered, and responded to.

Related topics: *Soundscapes, Applied ecoacoustics, Arts*



Presentation format: *Open talk*

Soundscape variation among habitats at Lizard Island

Leo Chiu-Leung[1*], Juan-Carlos Azofeifa-Solano[2], Andrew Hoey[3], James Kemp[4], and Miles Parsons[5]

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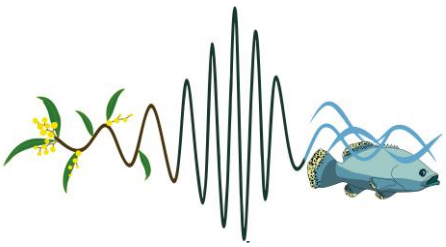
[2] *Centre for Marine Science and Technology, Curtin University, Australia*
[3] *College of Science and Engineering, James Cook University, Australia*
[4] *Oceans Institute, University of Western Australia, Australia*
[5] *Australian Institute of Marine Science, Indian Ocean Marine Research Centre, Australia*
** Presenting author*

Underwater soundscapes provide useful information on habitat type and condition through the sounds produced by the associated soniferous community. We examined these relationships at 12 sites across four shallow marine habitat types (Coral, Rock, Rubble, and Sand) around Lizard Island, northern Great Barrier Reef, Australia. In each of three sampling periods, we collected simultaneous passive acoustic recordings (up to 8 days, with up to 12 sites surveyed in each period) and compared these to diver-based visual surveys of fish and benthic communities during one of the sampling periods. A selection of ecoacoustic metrics based on the Soundscape Code were extracted from acoustic recordings and a summary output developed to represent the soundscape pattern for each day, at each site. PERMANOVA results indicated that variation in the soundscapes was influenced by sampling period, time, habitat, location, as well as environmental factors such as coral cover and the Shannon-Weiner index. While this model was able to capture a large portion of the community variation, between group variability was also not equal, reflecting environmental variability. Spatial distribution in an NMDS space were also plotted, with strong within site clustering. Daily soundscape metrics were more associated with coral cover and fish diversity than categorical allocation of habitat type or site location, reflecting the gradient of changing soniferous community associated with benthic attributes at each site. These changes were also noticeable over the day, with visible expansion of site distribution within the NMDS space being larger during the day than night. These findings highlight the ability of soundscapes to differentiate among locations in close spatial proximity, and to provide insights into how these acoustic differences are driven by community factors.

Related topics: *Soundscapes, Monitoring, Water*



Presentation format: *Open talk*

Improving survey design and distribution estimates for Powerful Owl (Ninox strenua) using passive acoustic monitoring, occupancy modelling, and spatial optimisation

Robert Clemens[1*], Callan Alexander[2], and Susan Fuller[2]

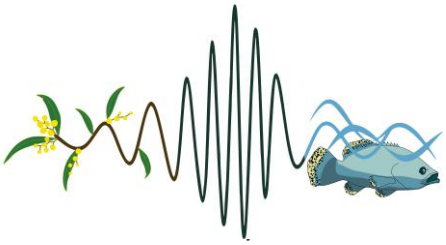
[1] *Australian Research Data Commons*

[2] *School of Biology & Environmental Science, Queensland University of Technology, Brisbane, Australia*

** Presenting author*

Introduction Biodiversity decline and climate change impacts on species are among the most acute environmental challenges facing society today. Passive acoustic monitoring is starting to enable biodiversity data collection at previously unimaginable scales, particularly in remote and hard-to-access locations. Due to advances in automated bird call recognition models and large-scale data platforms such as Ecosounds, bird monitoring is set to be transformed, with more representative, systematic, high-quality, and verifiable data. Here we explore how these methods can improve survey design and estimates of spatial distributions. Methods As part of the BirdLife Powerful Owl project, Audiomoth recorders were deployed at 115 forested locations across southeast Queensland between 2020 and 2023. Twenty-seven of these deployments followed a repeated, stratified roadside design in the poorly surveyed Conondale National Park, while the remainder were deployed opportunistically along roads and trails in other forested areas. Results We used Google's Alpha Earth to predict likely breeding hollow locations at 10 m resolution drawing on seven years of citizen science data, noting that we were not able to overcome sampling bias in these predictions. We then combined observation data and passive acoustic detections in Bayesian occupancy models to generate habitat suitability predictions that explicitly accounted for both spatial autocorrelation and imperfect detection. These results differed substantially from more traditional approaches. We further found that the coefficient of variation of posterior predictions provided a practical measure of spatial prediction uncertainty and, when combined with geographic sampling effort, supported mathematical spatial optimisation of future sensor deployments. Conclusions This approach can be used to target future surveys either to improve predictions within the existing study area or to improve predictions in under-sampled habitat beyond existing protected areas. These methods could be stacked across a broader suite of threatened or indicator species and applied across much larger landscapes.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Mapping the "Social Active Space": Integrating Sound Propagation Physics with CNN-based Monitoring to Understand Galago Sociality.

Iaetitia CONFURON[1*], Charlène Guillaumot[2], and Sébastien COUETTE[1]

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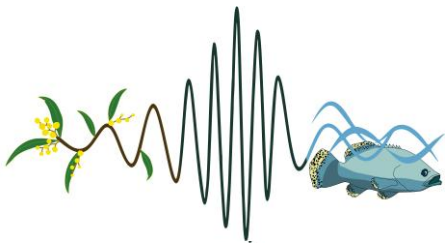
** Presenting author*

A fundamental question in ecoacoustics is how habitat structure constrains animal sociality by filtering communication signals, a concept known as the Sensory Drive Hypothesis. In the nocturnal Afromontane forests of South Africa, the thick-tailed galago (Otolemur crassicaudatus) relies on long-range 'cry' calls to maintain territory and social networks. However, the physical constraints of their habitat likely shape the effective acoustic space available for these interactions. To evaluate habitat-specific communication, we combined experimental acoustics with Passive Acoustic Monitoring (PAM) across four distinct habitats. First, we conducted propagation trials by broadcasting ‘cry’ calls at a standardized amplitude (120 dB) along linear transects (4 m to 32 m) to quantify amplitude loss and spectral degradation. Simultaneously, we deployed recorders across these four habitats, including at sleeping sites, to capture natural cry vocal behavior. To process this dataset, we developed a ResNet50 CNN model (AUC: 0.985) to automate ‘cry’ detection and extract acoustic parameters. Preliminary propagation trials revealed habitat-specific spectral filtering with sudden declines at 3,000 Hz in Bushveld and 2,500 Hz in Mistbelt Forest. Based on +2,000 hours of data, our CNN model proved highly robust in detecting 'cry' signals despite habitat-induced degradation (AUC: 0.985, Recall: 0.90). This research will explore how acoustic space dictates the social dynamics of O. crassicaudatus. By correlating propagation limits with detected vocal parameters, we will investigate whether galagos exhibit vocal plasticity, such as shifting call frequencies, to mitigate environmental filtering. Furthermore, we will model the detection probability between habitats to evaluate how the habitat might impact the acoustic space and the social connectivity. This framework provides a predictive tool for understanding how structural changes in Afromontane forests may influence the social dynamics and stability of a nocturnal primate population.

Related topics: *Monitoring*



Presentation format: *Open talk*

Symposium: *Multidisciplinary approach to behavioural and Ecoacoustics challenges of avian vocal mimicry*

Eurasian Blackbirds (Turdus merula) mimic anthropogenic sounds and vocalizations from invasive species, reflecting human impact and the ecological degradation of the soundscape

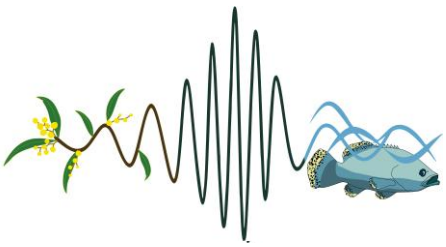
Concepción Cortés Zulueta[1*]

[1] *Museo Nacional de Ciencias Naturales (Madrid, MNCN-CSIC)*

** Presenting author*

Many passerines mimic vocalizations from other species, incorporating these imitations into their songs. Some Eurasian Blackbirds (Turdus merula) are known to mimic several species present in their context, mainly avian, but they also imitate anthropogenic sounds like alarms, digital signals, traffic-related, or metal screeches, among others. This talk will present a range of mimicries that several urban Eurasian Blackbirds from different locations in the Iberian Peninsula (south-western Europe) introduce in their songs. These mimicries reflect the ecological degradation of their soundscapes. They include human sounds usually perceived as noise and detrimental to vocal communication. Vocalizations by avian invasive species are also imitated, like those of monk parakeets (Myiopsitta monachus) or rose-ringed parakeets (Psittacula krameri). The songs of several urban Eurasian Blackbirds were recorded along their breeding seasons using a hand-held recorder in different locations in the Iberian Peninsula, in Málaga (south), Madrid (centre), and Lisbon (west). These songs were studied to identify any discernible mimicries the birds had incorporated, and then these mimicries were considered regarding what was present and could be listened to in the local soundscapes. The comparison between the mimicries by some of the Eurasian Blackbirds and the surrounding local soundscapes shows how these avian mimics select, learn, incorporate, and repeat certain sounds, a selection of those present and heard in their contexts. By addressing this comparison and selection through an interdisciplinary arts/humanities background, it is possible to argue that these birds are expressing a cultural and aural, non-human perspective of the area they inhabit. Among those sounds anthropogenic noise and vocalizations of invasive species are included. It would be relevant for Ecoacoustics to pay a closer attention to the range of mimicries by Eurasian Blackbirds and other urban birds, and to how these mimicries reflect their local soundscapes, and their degradation.

Related topics: *Soundscapes, Arts*



Presentation format: *Open talk*

Sonic Vision: Learning to Read the Landscape Through Listening

Peter Coulter[1*], and tippi coulter

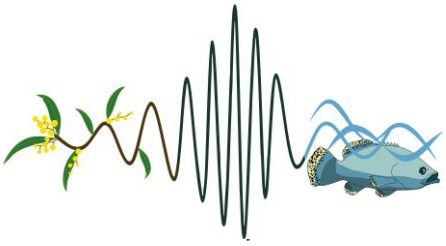
[1] *Coulter Creations*

** Presenting author*

A short lecture introduces acoustics (sound in physical space) and electroacoustics (recording and amplification), plus the “geography of sound”: how terrain, vegetation, humidity, seasons, and human activity shape propagation, reflection, masking, and signal-to-noise balance. Participants also gain qualitative language for sonic texture, density, clarity, and depth. The workshop frames listening as a mode of “seeing” landscape. While visual interpretation dominates modern environmental understanding, places have an equally rich acoustic dimension — ecological, spatial, relational — that broadens perception and can reconnect us to remembered or lost environments. Hi-fi vs lo-fi soundscapes are contrasted: hi-fi allows subtle sounds (e.g. your own footsteps) to be heard clearly; lo-fi features persistent masking noise and reduced detail. This invites reflection on attention, perception, and environmental health.

The field component is a guided listening walk in the McAllister Range rainforest, using structured exercises to experience spatial depth, biophonic/geophonic layering, and acoustic-ecological interactions in real time. Together, the session reawakens acoustic awareness as a powerful tool for ecological insight, extending environmental literacy beyond sight and reaffirming listening as essential to understanding place.

Related topics: *Soundscapes, Arts*



Presentation format: *Open talk*

Acoustic identity: linking signature whistles and visual identification in a threatened dolphin population

Amber Crittenden[1*], Amber Crittenden[2], Kate Robb Marine Mammal Foundation[3], and Christine Erbe[4]

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[2] *Centre for Marine Science Technology, Australia, Marine Mammal Foundation, Australia*

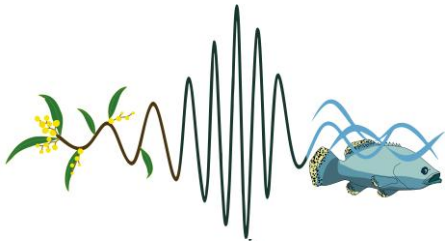
[3] *Australia*

[4] *Centre for Marine Science Technology, Australia*

** Presenting author*

Signature whistles (SWs) are a key component of delphinid vocal repertoires, encoding self-identifying information and facilitating cohesion among related or allied individuals through stereotyped whistles. SWs allow researchers to identify individuals, assess social dynamics, and estimate population size without visual observation. This study represents the first attempt to match distinct SWs to individual Burrunan dolphins (Tursiops australis) in the Gippsland Lakes, Victoria, Australia. Simultaneous photographic identification and hand-held hydrophone recordings captured 57 dolphins producing 236 whistles, from which 22 unique SW contours were extracted following modified SIGnature IDentification (SIGID) criteria. Conditional probability and cluster analyses associated SWs with dolphin pairs or clusters rather than isolated individuals, reflecting the species' fission–fusion social dynamics. Social structure, philopatry, and acoustic environment likely influence SW production and complexity. While direct individual matching is limited, the findings demonstrate the potential of passive acoustic monitoring for population-level conservation management of this small, threatened population.

Related topics: *Soundscapes, Future-forward/innovative, Vocalisation*



Presentation format: *Open talk*

Using Ecoacoustics to identify cold- and hotspots of birds in Victoria, Australia

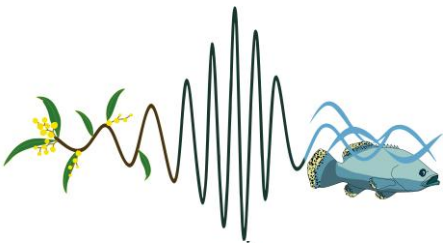
Marina D. A. Scarpelli[1*], Liam Meredith[1], Amy L. Adams[1], Kevin C. Rowe[1], and Karen M.C. Rowe[1]

[1] *Sciences Department, Museums Victoria, Australia*

** Presenting author*

Biodiversity is suffering from mounting pressure, and declines have been documented worldwide. The increase in extreme climate events, combined with high rates of land cover change, invasive species and population growth, all contribute to different degrees of fauna declines. While conservation reserves are crucial to protect biodiversity, the spatial configuration and context of such areas are not uniform, and resources for management is still limited. Understanding the spatial distribution of fauna and its threats can support efficient resource allocation and provide better conservation outcomes. Passive acoustic monitoring is increasingly used for documenting and monitoring biodiversity. Museums Victoria (MV) a large ecoacoustic collection, comprising >30 years of audio, recorded from >1,800 sites across the state of Victoria. The spatial coverage of MV's dataset, provides an opportunity to appropriately assess change and the combined effects of threats at multiple scales, all while accounting for local context. Using a semi-autonomous workflow for bird detection, combined with expert validation, this study will identify the cold and hotspots of bird activity across the state and overlay those with local indicators of threats (e.g.: fire scars, climate extremes, human population estimates etc.). These results will improve our knowledge of local impacts on birds, stipulate areas where continuous monitoring should be implemented, and provide information for local conservation management of avian fauna. Understanding and documenting the ecological importance of land dedicated to conservation through species composition and other ecological metrics will contribute to national efforts to understand the impacts of bushfire, land use change, and climate variability on birds. The scalability of the method and state-wide effort can also improve our understanding of the current picture for birds in Victoria. With climate changes projections becoming more extreme and uncertain, documenting and mapping biodiversity is crucial to mitigate biodiversity loss.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Symposium: *Multidisciplinary approach to behavioural and Ecoacoustics challenges of avian vocal mimicry*

What mimics make of soundscapes: avian vocal mimicry and Australia's lyrebirds

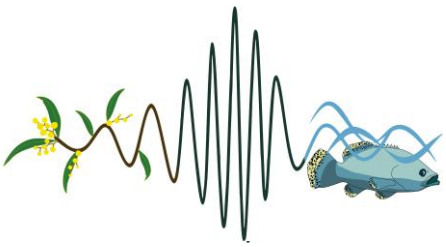
Anastasia Dalziell[1*], Fiona Backhouse[1], Victoria Austin[1], and Justin Welbergen[1]

[1] *Hawkesbury Institute for the Environment, Western Sydney University, Australia*

** Presenting author*

Vocal mimicry is geographically widespread and has been reported in almost half of songbird families globally, yet we still know surprisingly little about the evolution and ecology of this common phenomenon. Here we synthesise some of our recent discoveries from our long-term study of acoustic ecology in the lyrebird family (Menuridae), an Australian taxon celebrated for the versatile and accurate vocal mimicry produced by males. We will show that lyrebirds are surprisingly selective in what sounds they mimic and in what social and ecological contexts they perform their mimicry. Nonetheless, both male and female lyrebirds regularly mimic a wide range of vocalisations of other bird species, interspersed with mimicry of the calls of native marsupials and introduced mammalian predators. Astonishingly, lyrebirds sometimes also create complex acoustic illusions by mimicking entire ecological scenes. Taken together, our results indicate that vocal mimicry has multiple functions in both sexes, including defence from predators, repelling competitors, and attracting mates. Thus, vocal mimicry plays a more fundamental role in the acoustic ecology of lyrebirds than was previously suspected. Our work highlights the complexity of vocal mimicry in birds and emphasises the need for field-based empirical studies of this remarkable phenomenon.

Related topics: *Future-forward/innovative*



Presentation format: *Open talk*

Landscape modification effect on Bats: an Ecoacoustic assessment in lowland Northeast India

Pratik Das[1*], and Prof. Rohini Balakrishnan[2]

[1] *Centre for Ecological Sciences, Indian Instittute of Science, India*

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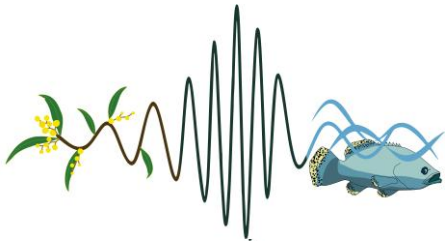
** Presenting author*

Bats are a diverse group of mammals, of which 87% use echolocation and 25% are threatened. Landscape modification or land-use change is the most frequent threat found in IUCN bat species' assessments. Species distributions in India are based on scant data, primarily because of capture-oriented sampling methods. How rapid urbanisation and agricultural expansion impact bats needs more research, especially research that incorporates acoustic techniques. The need is most intense in underexplored Northeast India, which includes two biodiversity hotspots, at least 86 bat species, and is undergoing fast land conversion. We aimed to characterise the echolocating bat assemblages in the tropical lowlands of eastern Assam and Arunachal Pradesh. It implies first building an acoustic key and, second, investigating the responses of foraging bat assemblages to different levels of landscape modification (urban, rural, and natural). The latter focuses on studying changes in bat species activity, diversity, and composition using Passive Acoustic Monitoring (PAM). Given the incompleteness of the reference data, acoustic analyses were conducted using a sonotype-based framework, in which calls were grouped into clusters of acoustically similar signals derived from the PAM dataset itself. A regional call library of 11-16 species has been established by recording on-release echolocation calls of 61 individual bats. We sampled 150 sites, 50 per modification level, for 1 night each using Autonomous Recording Units (audiomoths). Sonotype diversity is expected to be highest in natural areas (least modified), followed by rural and urban areas (most modified), and the composition is expected to be most different between urban and natural areas. Similarly, sonotype-wise activity is expected to decline with increasing modification extent. Here, using data-driven acoustic classification, this study demonstrates the utility of ecoacoustic approaches for community-level inference in data-deficient regions. It also promotes future acoustic research and aids informed conservation actions.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Social and behavioural contexts of pygmy blue whale vocalisations

Andrew Davenport[1*], Andrew M Davenport[1], K Curt S Jenner[2], Micheline-Nicole M Jenner[2], Grace Russell[2], Michele Thums[3], Christine Erbe[1], Luciana C Ferreira[3], and Robert D McCauley[1]

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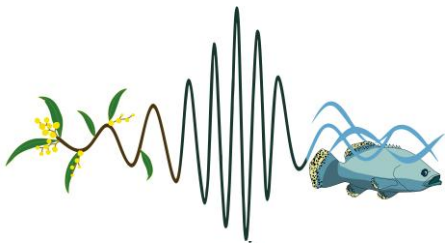
** Presenting author*

Despite extensive datasets of passively recorded pygmy blue whale (Balaenoptera musculus brevicauda) vocalisations from the eastern Indian Ocean, a poor understanding of sound function inhibits long-term monitoring of important behavioural events. To begin addressing this knowledge gap, focal-follow visual observations were paired with passive acoustic monitoring data collected during vessel-based surveys, primarily near Ningaloo Reef, Western Australia. Pygmy blue whales were found through visual census, a spotter aircraft, or acoustic localisation. Directional Frequency and Range sonobuoys were deployed to continuously send acoustic data via VHF transmission to the research vessel, where it was monitored live and recorded. Pygmy blue whales were acoustically localised either by travelling down the azimuth of a vocalisation, or by triangulation of a vocal animal from multiple deployed sonobuoys. Whales were followed to observe surface behaviours and collect photographic data. Acoustic data was manually annotated to identify pygmy blue whale vocalisations including song units and non-song sounds. Calls were attributed to visually observed individuals when the azimuth from the receiver and signal strength matched the location of observed whales. The production rate of pygmy blue whale song was distinctive of the social context, with extensive and continuous song production by singletons and intermittent song from pairs. In all instances, song was linked to slowly travelling animals with consistent directionality. Non-song downsweep vocalisations were recorded in a variety of contexts, including from solo animals, pairs, and trios, that were either migrating, engaged in agnostic male reproductive competition, or possible feeding. Downsweep production rates may provide some behavioural distinction, with the highest production rates during the reproductive competition, and the lowest rates from migrating singletons or pairs. These behavioural and social contexts of pygmy blue whale vocalisations will improve our ability to interpret passive acoustic monitoring data and provides a step towards acoustic inference of behaviour.

Related topics: *Monitoring*



Presentation format: *Open talk*

Monitoring a cryptic endangered amphibian: comparing traditional surveys and acoustic monitoring, identifying drivers of detection probability and fire-regime impacts on Watson's tree frog

Louise Durkin[1*], Matt West[2], and Rena Gaborov[3]

[1] *Arthur Rylah Institute for Environmental Research, Australia*

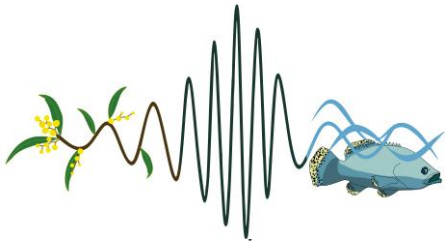
[2] *Wild Research, Australia*

[3] *Wildlife Unlimited, Wild Research, Australia*

** Presenting author*

Watson's tree frog is a cryptic, forest-dependent endangered amphibian found in south-eastern Australia. After a 19-year absence from the biological record in Victoria, it was re discovered in 2015, yet its persistence remains uncertain as it is known from very few sites and has declined since its rediscovery. Much of its forest habitat was affected by bushfires in 2014 and 2019–20, and the deadly amphibian chytrid fungus is present across its range. We synthesised multi-year presence/absence data from targeted surveys across the species' Victorian range, integrating visual encounter and call playback surveys (VES/CP) and passive acoustic monitoring (PAM), aiming to improve survey efficiency and quantify disturbance impacts. We estimated site occupancy, colonisation and persistence while modelling method specific detection probability as a function of season, climate and habitat covariates; we tested for fire regime-related effects, and chytrid occurrence or proxies (e.g. elevation and climate) on occupancy. Preliminary results indicate low detection yields from traditional methods (detections at 1–3% of >600 sites surveyed with VES/CP), whereas PAM greatly expanded the monitoring scale (e.g. 82 sites monitored nightly for 12 months in 2024–2025; calls detected at 11% of sites across 402 survey nights). A custom one-dimensional convolutional neural network enabled in-field processing, supporting rapid confirmation of calling sites and targeted follow up genetics sampling. This work will deliver comparative estimates of detection performance for VES/CP versus PAM and identify when and where detectability is maximised, providing evidence-based guidelines for cost effective monitoring. By linking persistence to fire regime and disease covariates, the study will also inform prioritisation of refugia and post-disturbance management for this declining species.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Symposium: *Call Detective*

Scaling species verification and recogniser improvement with citizen science verification

Philip Eichinski[1*], Philip Eichinksi[1], Anthony Truskinger[1], and Paul Roe[1]

[1] *Open Ecoacoustics*

** Presenting author*

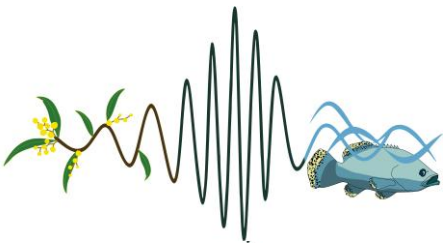
Automated recognisers and large-scale audio platforms are transforming biodiversity monitoring, but species annotation remains a major bottleneck. Open Ecoacoustics has developed a suite of reusable web components that make it easier for organisations to build lightweight, web-based verification interfaces for reviewing candidate detections. Here we explore how these tools can scale expert and citizen science verification workflows and accelerate iterative improvement of species recognisers.

We developed reusable web components and micro-website templates that support the rapid deployment of citizen science verification websites within Open Ecoacoustics workflows. These tools have now been applied by four organisations across four species-focused verification projects, including the Powerful Owl Call Detective project. The workflow enables candidate detections from recognisers to be served for review, validated annotations to be returned to the platform, and those annotations to then be incorporated into retraining and evaluation workflows for recogniser improvement.

The Powerful Owl verification site has so far supported the review of 14,757 audio clips by citizen scientists, providing an important first step toward scaling species annotations in Australia. Across these deployments, we show how increased annotation volume strengthens the feedback loop between detection, verification, retraining, and redeployment. We report quantitative improvements in recogniser performance when models are trained or refined using verified datasets and demonstrate how this iterative workflow can rapidly improve model utility. Additionally, verified datasets provide better quality observation data to Ecologists while simultaneously broadening user engagement with Open Ecoacoustics methods.

Reusable components provide a practical pathway for scaling species verification across organisations, species, and projects. By reducing development effort and increasing annotation throughput, they help accelerate the flywheel of recogniser improvement and support more efficient, transparent, and participatory ecoacoustic workflows. This approach has strong potential to be extended across a broader range of species and monitoring programs in Australia.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Description and analysis of estuarine crocodile (Crocodylus porosus) underwater and airborne sounds reveals a graded repertoire and potential differential function

Sonnie Flores[1*], Dominique Potvin[2], Stuart Parsons[3], David White[4], and Ross Dwyer[2]

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[4] *Solar Whisper Eco Tours, Australia, Rebecca Gallagher, School of Science, Technology and Engineering, University of the Sunshine Coast, Australia*

** Presenting author*

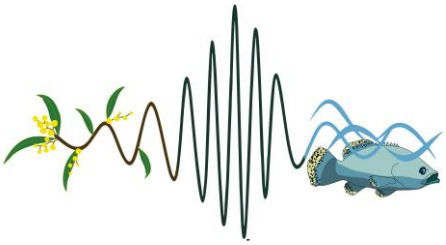
Acoustic communication plays a key role in mediating social interactions in crocodylians, yet the adult acoustic repertoire of the estuarine crocodile (Crocodylus porosus) and its temporal dynamics remain poorly quantified. Because this species occupies both terrestrial and aquatic environments, understanding airborne and underwater signalling is essential for interpreting behaviour and developing effective passive acoustic monitoring tools. This study provides the first integrated description of adult C. porosus acoustic signals across media and examines how signalling patterns vary across diel and seasonal cycles in captive and wild populations.

We analysed 349h of captive acoustic recordings and 464h of video from paired captive C. porosus in the breeding and non-breeding season in 2023. We also analysed video and audio of 123 wild recordings collected between 2012–2025. Acoustic signals were measured in-air (microphone) and underwater (hydrophone), identified using an ethogram, and quantified using frequency and time domain parameters. To evaluate repertoire structure and temporal patterns, we used principal component analysis, generalised linear mixed models, and linear mixed-effects models while controlling for individual identity.

We documented 17 distinct acoustic signal types, however PCA revealed substantial overlap among these, indicating a graded repertoire dominated by spectral rather than temporal variation. Signalling was unevenly distributed across the diel cycle, with airborne calls peaking at night and underwater calls peaking during late morning and afternoon. Seasonal patterns were pronounced with signalling rates significantly higher during the breeding season. Acoustic parameters of signals also showed clear seasonal shifts with significant structural differences in signals produced by captive compared to wild individuals.

Adult C. porosus exhibit a complex acoustic repertoire shaped by diel period, season, environment, and signalling medium. These findings provide the most comprehensive baseline to date for interpreting crocodylian acoustic communication and highlight the importance of incorporating underwater acoustics when studying amphibious taxa.

Related topics: *Monitoring, Water*



Presentation format: *Open talk*

The Sound Awakens: Continuous acoustic monitoring of fauna responses to flooding events at Moodie Swamp in northern Victoria.

Jo-Anne Geddes[1*]

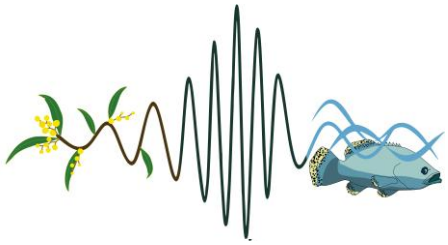
[1] *Goulburn Broken Catchment Management Authority*

** Presenting author*

Environmental water has been delivered to wetlands in the Goulburn and Broken River Catchments since 2008. This water has been set aside by the Government to improve and maintain river, wetland and floodplain systems. The Goulburn Broken Catchment Management Authority uses acoustic recorders to monitor wetland responses to the delivery of environmental water and inform management decisions at these sites In 2021 environmental water was delivered to Moodie Swamp. Moodie Swamp is a 180ha freshwater marsh and provides important Brolga breeding habitat. For the first time, a 24/7 'Solar BarTM' acoustic recorder was placed on site to record changes in wetland biological activity (biophony) as the site filled. Recording continued non-stop with acoustic files being broken up into 12-hour components. Due to prolonged wet weather and flooding of the site on at least two occasions, the swamp did not dry until September 2024 with over 1100 days of recording being captured. Preliminary analysis of the data showed a significant increase in biological activity when the wetland was filling and ponding water. As the swamp water level drew down so did the intensity of biological activity. Other factors such as time of year, wind and rain also influenced biological activity at the swamp, for example call activity from birds reduced during high wind events. The Authur Rylah Institute is currently analysing four years (2021-2024) of continuous acoustic data collected at Moodie Swamp to gain a better understanding of how both environmental water and natural flooding events influenced key wetland fauna and their utilisation of the site including Sloanes Froglet, Brolga and possibly Australasian Bittern. This information will be used to inform environmental water planning, management and monitoring at other wetlands within the Goulburn and Broken River Catchments and more broadly.

The use of continuous recording made possible by deployment of the Solar BarTM also enables us to gain a better understanding of ecological responses to environmental water delivery and other environmental drivers with minimal human-induced disturbance of the site, and with much less time and effort.

Related topics: *Soundscapes, Monitoring, Water*



Presentation format: *Open talk*

PASSIVE ACOUSTIC MONITORING AS A TOOL FOR ASSESSING ECOSYSTEM GRADIENTS IN AFRICA'S TROPICAL SAVANNAH

Consolata Gitau[1*], Esther Kettel[2], Andrew Gichira[3], Carlos Abrahams[4], Paul W. Webala[5], and Antonio Uzal[2]

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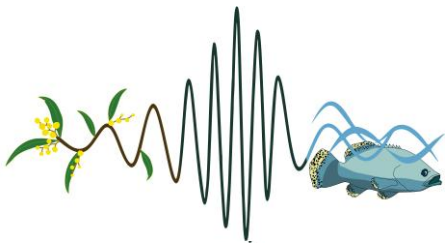
** Presenting author*

Maintaining ecosystem health is a global imperative, particularly in rangelands, which cover over 50% of Earth's land surface and support nearly 2.1 billion people. Conventional monitoring methods are constrained by high labour costs, limited spatial and temporal replication, and an inability to detect early warning signs of degradation. Passive Acoustic Monitoring (PAM) has emerged as a scalable, non-invasive alternative, yet its direct validation against established ecological indicators in African savannahs remains critically understudied. This study evaluates preliminary ecoacoustic metrics—derived from standard acoustic indices and deep learning-based bird identification (BirdNET)—for assessing ecosystem health gradients in a Kenyan savannah, using traditional vegetation and soil metrics as validation benchmarks. A hierarchical, spatially stratified sampling design, the Land Degradation and Surveillance Framework, was implemented across a 100 km² region of the Maasai Mara ecosystem. Vegetation diversity, woody structure, soil properties, and bird point-count data were collected across 16 clusters and 160 plots. Concurrent PAM was conducted using Song Meter recorders, capturing soundscapes over two years across wet and dry seasons. Acoustic data were analysed using six standard indices (ACI, ADI, AEI, BI, NDSI, H) and BirdNET-derived avian community metrics. Multiple regression models examined preliminary relationships between acoustic responses and environmental predictors. Preliminary results revealed significant spatial variation in vegetation alpha diversity ($p < 0.01$) and woody vegetation structure ($p < 0.001$) across 16 clusters, with near-complete species turnover (β.BRAY = 0.988) indicating high landscape heterogeneity. Woody vegetation structure was the most consistent predictor of acoustic indices, showing significant relationships with NDSI ($\beta = -0.772$, $p = 0.007$), ADI ($\beta = -0.872$, $p = 0.002$), ACI ($\beta = 0.740$, $p = 0.007$), and SH ($\beta = -0.806$, $p = 0.006$). Vegetation alpha diversity positively predicted ADI ($\beta = 0.587$, $p = 0.023$) but negatively predicted BirdNET-derived Shannon diversity ($\beta = -0.690$, $p = 0.027$). The ADI model exhibited the strongest predictive capacity ($R^2 = 0.618$, $p = 0.022$). Contrary to hypotheses, NDSI showed negative relationships with vegetation structure, while BI showed no significant environmental correlations. Soil properties did not significantly predict any acoustic metrics. The integration of PAM with ground-based monitoring demonstrates potential for developing sensitive, scalable tools for ecosystem assessment, particularly relevant given projected semi-arid expansion and Land Degradation Neutrality targets. Final results following complete data analysis will determine the full utility of this approach for operationalising PAM in rangeland monitoring programmes.

Related topics: *Conservation technology, Soundscapes, Monitoring*



Presentation format: *Open talk*

Hearing the Bigger Picture: Landscape-scale Acoustic Monitoring of Fauna in NSW Timber Production Forests

Leroy GONSALVES[1*], Brad Law[2], Traecey Brassil[2], Glenyse Villanueva[2], Isobel Kerr[2], Elsa Kohane[2], Christopher O'Loughlin[2], Emma Sawyers[2], and Chris Slade[3]

[1] *Forest Science, NSW Department Primary Industries and Regional Development, Australia*

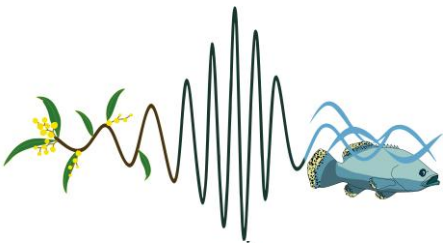
[2] *NSW Department of Primary Industries and Regional Development, Australia*

[3] *Forestry Corporation of NSW, Australia*

** Presenting author*

Systematic monitoring is a key approach for understanding where fauna populations are distributed in space and time, particularly at landscape scales that capture variations in climate, environmental attributes and disturbances. Monitoring occupancy of species at these scales and tracking trends can be used to assess the effectiveness of management. In New South Wales State forests, timber production is balanced with environmental outcomes using the coastal integrated forestry operations approval (CIFOA), which is a licence that sets out the rules for timber harvesting, including landscape protections of fauna habitat. In 2022, landscape monitoring was initiated to assess whether timber harvesting and other disturbances (fire and climate change) are having a neutral, positive or negative impact on landscape-scale environmental values. A rotating panel design was implemented such that in each of three regions, 50 sites are surveyed annually along with a panel of 10 sites that are rotated over a five-year period. Sampling is also spread among spring and autumn to allow for seasonal variation in detectability of different species to be captured. Remote sensors (acoustics, ultrasonics and cameras) coupled with artificial intelligence and analytical approaches that account for imperfect detection have been used to model population trends for up to ~50 species after the first three years of the program, while also identifying correlates (e.g., climatic and forest disturbance variables). We present trends for multiple species using acoustic and ultrasonic datasets and provide context using estimates from baseline surveys in the early 1990s. Furthermore, we present examples of how monitoring data may be used to inform management.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

How useful is captive training data for automatically detecting wild acoustic vocalisations? A case study on African lions.

Jonathan Growcott[1*], Alex Lobora[2], Andrew Markham[3], Elizabeth Preston[4], Charlotte E. Searle[5], Johan Wahlstrom[6], Matthew Wijers[7], and Benno I. Simmons[8]

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[2] *Tanzania Wildlife Research Institute, Arusha, Tanzania*

[3] *Department of Computer Science, University of Oxford, United Kingdom*

[4] *The Royal Veterinary College, University of London, United Kingdom*

[5] *Wildlife Conservation Research Unit, The Recanati-Kaplan Centre, Department of Biology, University of Oxford, United Kingdom, Lion Landscapes, Iringa, Tanzania*

[6] *Department of Computer Science, University of Exeter, United Kingdom*

[7] *Wildlife Conservation Research Unit, The Recanati-Kaplan Centre, Department of Biology, University of Oxford, United Kingdom*

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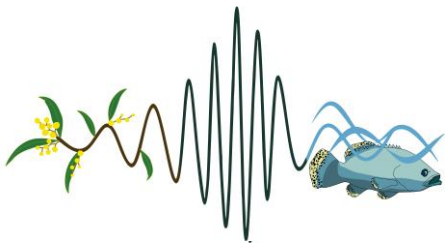
** Presenting author*

Long-term, large-scale passive acoustic monitoring (PAM) can generate thousands of hours of audio data, and manually labelling these recordings is infeasible; thus, there is an inescapable need for automated species vocalisation classifiers. However, for species that are endangered, solitary, inhabit vast areas, persist in low densities, vocalise infrequently, or have not been of historical interest to the PAM community, obtaining the necessary volume of wild training data to build an acoustic classifier is difficult. Using captive populations to collect vocalisation data which can then be used to detect the same species in wild recordings may offer a promising alternative. Here, we investigate the effectiveness of using captive lion vocalisations as training data, combined with transfer learning (using a pre-existing convolutional neural network pre-trained on the ImageNet dataset) to automatically identify wild lion roars. We tested different blends of captive and wild vocalisations to understand at what threshold captive vocalisations could be a useful supplementary data source. Using just captive lion roars, wild lion roars could be identified up to an F1 score of 0.60. When a small number of wild samples were added, performance improved to 0.81. Our results indicate that captive individuals could provide additional training data for acoustic species detection classifiers, but only if combined with wild data.

Related topics: *Conservation technology, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

Our Ears on Recovery: using Passive Acoustic Monitoring and BirdNET to reveal avian responses to changing fire regimes

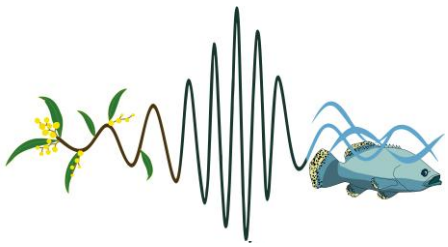
Eleanor Hadfield[1*], Glenda Wardle[1], and Aaron Greenville[1]

[1] *School of Life and Environmental Sciences, The University of Sydney, Australia*

** Presenting author*

Rapid environmental change is occurring globally, with natural disturbance events increasing in severity, extent, and frequency. Wildfires exemplify this trend. Australia's 2019–2020 bushfires drew international attention for their unprecedented scale and severity. In the Greater Blue Mountains World Heritage Area alone, approximately 79% of the landscape burned, with 29% experiencing high or extreme fire severity. Despite this impact, the responses of birds in this region remain poorly understood. This study investigates how bird communities and functional guilds respond to fire severity and historical fire frequency. Seventy-two acoustic recorders were deployed across the Blue Mountains, stratified by fire severity (unburnt, low, and high) and fire frequency (low and high), creating six treatment combinations. Since March 2023, we have collected 45,453 hours of sound, and using BirdNET, we have identified 112 native bird species, including 10 listed as vulnerable. Multivariate analyses revealed significant differences in bird community composition among fire treatments, with high-severity, high-frequency sites consistently differing from unburnt, low-frequency sites. Functional guilds showed contrasting recovery patterns linked to habitat structure. Ground-gleaning insectivores exhibited strong, non-linear increases in activity with time since fire, but their recovery was highest at unburnt, low-frequency sites, indicating fire history constrains recovery through ground-layer habitat. Perching vertivores recovered more linearly but showed treatment-specific trajectories, with highest activity at high-severity, high-frequency sites, reflecting their flexible response to changes in vegetation cover. Across guilds, vegetation structure explained much of the variation in post-fire activity, suggesting recovery depends on habitat characteristics more than time since fire alone. Together, these results show that contemporary fire regimes are shaping bird communities by filtering functional groups and constraining the magnitude of recovery. They offer a framework for predicting species vulnerability and recovery following future disturbances and will support land managers in identifying species and functional groups most at risk in post-fire landscapes.

Related topics: *Conservation technology, Ecological inference, Monitoring*



Presentation format: *Open talk*

Symposium: *Scaling Up Ecoacoustics: Large-Scale Passive Acoustic Monitoring Across Terrestrial and Underwater Environments*

Characterising Tingle Forest Soundscapes Using Passive Acoustic Monitoring

Lauren Amy Hawkins[1*], Lauren A. Hawkins[1], Ciara E. Browne[1], and Katinka X. Ruthrof[2]

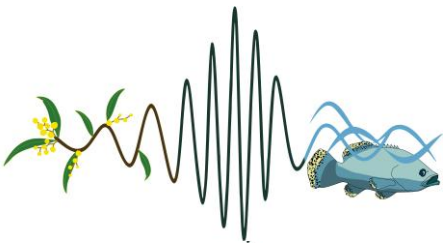
[1] *Department of Biodiversity, Conservation and Attractions, Perth, Australia*

[2] *Department of Biodiversity, Conservation and Attractions, Perth, Australia, School of Environmental and Conservation Sciences, Murdoch University, Perth, Australia*

** Presenting author*

The Tingle forests of southwestern Australia are ecologically significant and highly biodiverse. These forest systems are under threat from climate change, altered fire regimes, disease, and habitat fragmentation, highlighting the need for effective, scalable, and repeatable approaches to long-term ecosystem monitoring. Passive acoustic monitoring (PAM) is a cost-effective and non-obtrusive method with growing application in forest ecosystems, yet the soundscape structure and defining acoustic characteristics of Tingle forest systems remain poorly understood. This has led to some uncertainty around what components of the soundscape are most informative for tracking forest condition and detecting responses to environmental and anthropogenic change. To address this gap, passive acoustic recordings were collected at six Tingle forest sites over a one-month period during spring (months) in 2024 and 2025. Soundscape patterns were analysed to identify dominant acoustic contributors and characterise broad acoustic. The Tingle soundscapes were driven by a combination of predominantly biophonic and geophonic sources, including (but not limited to) amphibians, avians, insects, rain, and wind. Acoustic contributions and characteristics varied across site and between years. These patterns highlight clear taxon and frequency-specific structure within the soundscape, indicating that targeted acoustic metrics may be particularly informative for monitoring ecosystem condition in Tingle forests. This work provides a baseline description of Tingle forest soundscapes and informs the selection of acoustic indicators suitable for long-term and up-scaled PAM of forest health in southwestern Australia.

Related topics: *Soundscapes, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Symposium: *Scaling Up Ecoacoustics: Large-Scale Passive Acoustic Monitoring Across Terrestrial and Underwater Environments*

Multi year passive acoustic observations of offshore fish chorusing in the northwest of Western Australia

Lauren Amy Hawkins[1*], Lauren Amy Hawkins[2], Christine Erbe[3], Robert D. McCauley[3], Miles J.G. Parsons[4], Benjamin J. Saunders[5], and Iain M. Parnum[3]

[1] *Department of Biodiversity, Conservation and Attractions, Perth, Australia*

[2] *Centre for Marine Science and Technology, Curtin University, Perth, Western Australia, Department of Biodiversity, Conservation and Attractions, Perth, Western Australia*

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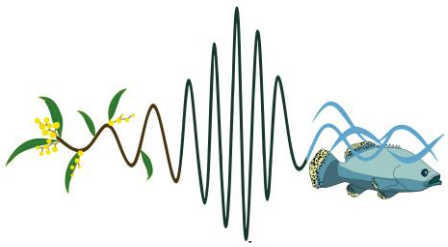
** Presenting author*

Fish are important ecological indicators. Passive acoustic monitoring of fish vocalisations can provide information about the distribution, habitat use, spawning dynamics, and behaviour of these animals as well as the type and condition of the community/ecosystem they inhabit. Fish choruses occur when many individuals vocalise continuously at a small spatial scale for a prolonged period. Hundreds of fish choruses have been detected in marine waters around Australia; however, little is known about the biological functions and environmental rhythms that drive these events, particularly those occurring in offshore and deep-water environments. This study describes the temporal distribution of five fish chorus types, along the northwest shelf of Western Australia between 2012 and 2015 recorded as part of Australia's Integrated Marine Observing System. Generalised additive mixed models were applied to eight months of continuous acoustic recordings to investigate environmental drivers of chorus intensity for three chorus types that exhibited high site fidelity. Chorus-specific relationships were identified with nutrient availability, primary productivity, water temperature, and hydrodynamic conditions. These patterns suggest that fish chorus production was temporally structured and closely associated with variability in local environmental conditions, consistent with links to underlying trophic processes including upwelling and nutrient driven primary productivity. By examining offshore fish chorusing across extended temporal scales, this study advances understanding of the timing and environmental context of fish acoustic behaviour, establishes a baseline against which future change in fish acoustic behaviour can be interpreted, and can be used to monitor ecological processes.

Related topics: *Soundscapes, Ecological inference, Monitoring*



Presentation format: *Open talk*

Sounds of the seascape: Can passive acoustic monitoring assist in evaluating the 'success' of marine restoration?

Alice Howie[1*], Melanie J. Bishop[2], Simon E. Reeves[3], and Emily Fobert[3]

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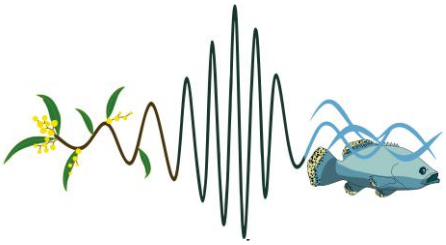
** Presenting author*

Globally, ecological restoration of marine ecosystems is scaling up, accelerated by the UN Decades of Ecosystem Restoration, Ocean Science, and the Kunming-Montreal Global Biodiversity Framework – to restore and conserve at least 30% of all ecosystems by 2030. In response to these global challenges, marine habitat restoration projects are increasing in number, spatial scale, and complexity. However, the success of these projects in meeting their restoration goals is often unknown, as accompanying monitoring and evaluation is often absent or of inadequate spatial scale and duration. An impediment to scaling up monitoring programs is the prohibitive cost of labour-intensive traditional approaches to biodiversity assessment, and their localised scale. The advent of cost-effective underwater hydrophones to record biological sounds, such as soniferous fish and snapping shrimp, paves the way for a new approach to monitoring and evaluation. Here we investigate the spatial variation in phonic richness of biophony (biological sounds) across restored oyster (Ostrea angasi) reefs in Port Phillip Bay, Victoria. We conduct a side-by-side comparison of soundscape data and traditional biodiversity monitoring approaches, to inform the extent to which passive acoustic monitoring is a useful tool to monitor biodiversity in large-scale oyster restoration projects.

Related topics: *Applied ecoacoustics, Monitoring, Water*



Presentation format: *Open talk*

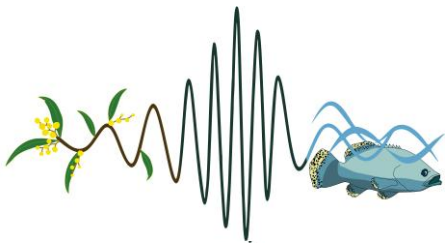
Listening to Managalas: Large-Scale Biodiversity Monitoring in a Community-Led Conservation Landscape in New Guinea

Karlina Indraswari[1*], Karlina Indraswari[2], Rhett Harrison[3], William Unsworth[4], Mellie S. Musonera[4], Dr. Gabriel Augusto Leite[5], Dr. Tomaz Nascimento de Melo[5], Guilherme Melo[5], Giulyana Althmann Benedicto[5], Kris Harmon[5], Dr. Marconi Campos-Cerqueira[5], Dr. Michael C. Allen[6], Umar Fhadli Kennedi[2], Danny Nanne[2], and William Laurance[2]

[1] *James Cook University*
[2] *James Cook University, Australia*
[3] *CIFOR-ICRAF, Zambia*
[4] *CIFOR-ICRAF, PNG*
[5] *WildMon*
[6] *Map of Life Solutions*
** Presenting author*

Tropical rainforests harbour some of the world's highest biodiversity yet remain among the least understood and most challenging ecosystems to access. The Managalas Community Conservation Area in Papua New Guinea exemplifies this challenge: a large (215,000 ha), community-managed landscape and the country's largest conservation area, situated within one of the world's most biodiverse regions. Established in 2017, Managalas represents a rare model of bottom-up conservation that also aligns with global biodiversity and climate targets. Given its importance, continuous biodiversity monitoring is crucial to support its protection and long-term management. Recent advances in passive monitoring have provided new opportunities to acquire and analyse biodiversity data at large scale—something critically needed for an expansive conservation area like Managalas. Here, we present a framework initiated and developed in collaboration among WildMon, CIFOR-ICRAF, and James Cook University. WildMon led the analytical pipeline, using AI-driven workflows that integrate foundation models, biodiversity databases, and acoustic libraries to generate initial detections, which were refined through expert validation. This formed the basis for soundscape-level analysis, enabling exploration of acoustic visualisation, event-based summaries, and links between automated detections and emerging acoustic-index patterns. This work demonstrates how we can perform large-scale data gathering, detection, and analysis in complex tropical ecosystems, and how such work supports both local stewardship and global biodiversity frameworks. In the longer term, examining how ecological patterns vary across sites and time provides a pathway for establishing biodiversity baselines as well as a framework for sustained monitoring in data-poor tropical environments.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Acoustic arrays and acoustic spatial capture recapture (aSCR) for estimating abundance and habitat preferences of the Critically Endangered Western Ground Parrot

Joseph Jantke[1*]

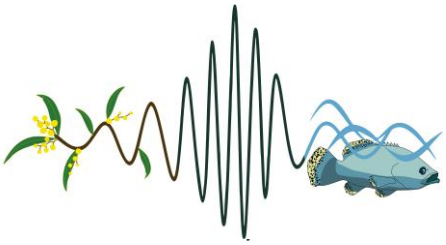
[1] *School of Biological Sciences, Adelaide University, Australia*

** Presenting author*

With fewer than 150 individuals remaining in a single wild population, the critically endangered Kyloriny (Western Ground Parrot; Pezoporus flaviventris) faces an extremely high risk of extinction. As with many threatened and cryptic species worldwide, its small population size, highly restricted distribution, and elusive behaviour make it particularly difficult to study. Consequently, important knowledge gaps remain regarding its basic ecology, population dynamics, and long-term trends, which currently limit effective monitoring and conservation efforts. This chapter of my PhD applied recordings from acoustic arrays and techniques of acoustic spatial capture recapture to estimate density of vocally active Kyloriny and model habitat preference.

12 acoustic arrays of three recorders were deployed in Cape Arid National Park in Western Australia and recorded every night for two years to collect approximately 13, 140 hours of recordings. Sites were stratified by vegetation age, which we hypothesised would exert the greatest influence over density, and additional vegetation covariate data such as vegetation density and composition were collected at each site. Acoustic spatial capture recapture is a technique for estimating vocalising animal density, and was applied to the recording data to generate density estimates at each site throughout the year. A generalised linear mixed model was applied to quantify the influence of habitat covariates on the density of vocally-active Kyloriny. While the data hasn't yet been analysed, approximately half of the recording data has been collected and data analysis will take place prior to the conference. These results will contribute to sparse existing knowledge of Kyloriny habitat preferences and also provides a template for ecological studies of other cryptic and threatened vocalising species globally.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Calling out loud: influence of land-use change, social context, climate, and body condition on amphibian calling behaviour in the Western Ghats

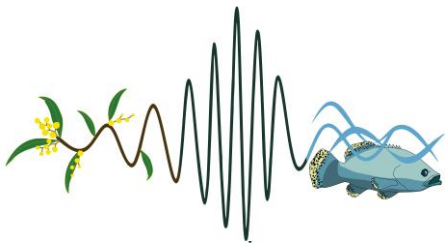
Vijay Karthick[1*], Abhishaek, Rohit Naniwadekar, and Anand Osuri

[1] *Nature Conservation Foundation, India*

** Presenting author*

Amphibian calling behaviour is shaped by a dynamic interplay of environmental, physiological, and social cues, yet how land-use change disrupts these relationships remains largely unexplored. We investigated how neighbour calling density, rainfall, air temperature, and body condition shape the calling behaviour of bush frogs, and how these relationships differ between intact rainforests and coffee agroforests. We recorded the advertisement calls of four arboreal frogs from June to September 2024 in relatively undisturbed rainforests and coffee agroforests in the Western Ghats, a biodiversity hotspot in India. We collected 10-minute continuous focal recordings from 250 individuals across the four species, alongside data on temperature, rainfall, body size, body mass, and the number of conspecific and heterospecific males calling within a 15-metre radius. We extracted temporal (call rate, call duration, inter-call interval) and spectral (dominant frequency) properties of the calls using an semi-automated annotation approach. Preliminary results indicate that air temperature and relative humidity do not differ between coffee agroforests and rainforests. However, body condition is consistently higher in coffee agroforests across all four species. We are currently using a structural equation modelling (SEM) analytical approach to disentangle how these extrinsic and intrinsic factors interact to shape calling behaviour across land-use types. Our findings will help us better understand the behavioural consequences of land-use change and the sensitivity of endemic amphibians to ongoing and future biotic and abiotic changes.

Related topics: *Applied ecoacoustics, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

Diel patterns of ecoacoustic indices show links to habitat

James Kemp[1*], Carly Randall[2], Taylor Whitman[3], Christine Giuliano[2], Rohan Brooker[2], Mathew Wyatt[2], Cathie Page[2], and Miles Parsons[2]

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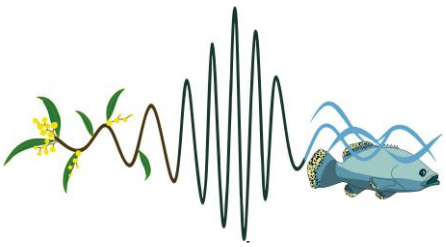
[3] *Postdoctoral Research Fellow, School of Earth and Atmospheric Science, Queensland University of Technology, Australia*

** Presenting author*

Ecoacoustic indices derived from soundscapes show high intra-site variation, leading to con-siderable overlap in many inter-site comparison studies, particularly in marine settings. More-over, concerns remain around validating links between index outputs and underlying ecologi-cal characteristics such as biodiversity. We explore the extent of intra-site variation, the possi-ble effects of variation on short-term studies, and environmental factors that potentially influ-ence that variation. We also introduce a novel representation of the Soundscape Code indi-ces which incorporates diel information and provides a useful input format for algorithms such as decision trees and dimension reduction. Some of the Soundscape Code indices were strongly influenced by environmental factors (temperature, tide height, lunar phase, and time of day), whereas others contained large variation that was not influenced by these factors. When applied to two-month long recordings from 11 coral reef sites, our representation pro-duced well-defined clusters and provided high accuracy for classifying the originating site. Furthermore, outputs from the dimension reduction algorithms were aligned with benthic community assessments (coral and macroalgae cover), revealing a clear habitat gradient across the first two principal components, suggesting that these indices can capture aspects of underlying ecological conditions. These findings are promising, and support studies pro-posing ecoacoustic indices as a practical tool for long-term reef monitoring. Ongoing work will test the generalisability of this approach on two additional datasets.

Related topics: *Soundscapes, Ecological inference, Monitoring*



Presentation format: *Open talk*

Phenological shifts in low-latitude frogs revealed by 15-year acoustic monitoring and deep learning

Kaede Kimura[1*], and Kinji Fukuyama[2]

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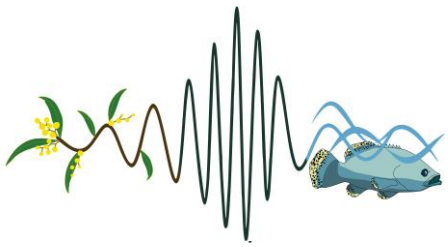
[2] *Department of Biology, Keio University, Japan*

** Presenting author*

Phenological responses to climate warming have been documented across many taxa, but most evidence comes from temperate regions, with limited data from low latitudes. This geographic bias constrains our understanding of phenological responses on a global scale. Although advances in spring phenology are commonly reported at mid- to high latitudes, patterns in tropical and subtropical regions—where many species are capable of prolonged reproduction with complex annual cycles—may differ. To address this data gap, we analyzed a 15-year passive acoustic dataset (2009–2025) collected on Iriomote Island, Japan, a transition zone between subtropical and tropical biomes. Using a custom-trained BirdNET deep learning model, we quantified the breeding phenology of seven frog species from daily recordings. Automated species detection from soundscape recordings revealed that seasonal calling patterns differed among species, with peaks occurring either in summer or from autumn to spring, while one species called nearly year-round. Among the six species analyzed for phenological trends, only the winter-breeding Owston's green treefrog (Zhangixalus owstoni) showed a significant shift in median calling date, with a delay of 3.8 days per decade. Climate–phenology analysis suggested that increased late-summer temperatures in recent years may underlie this shift. None of our study species advanced their call dates significantly, contrasting with the pattern commonly observed in temperate region. Our results suggest that climate warming can alter the timing of amphibian breeding even at low latitudes, potentially in directions different from those observed at higher latitudes. This study also demonstrates how automated acoustic monitoring can overcome longstanding data limitations in remote field sites.

Related topics: *Ecological inference, Monitoring*



Presentation format: *Open talk*

Hoot's there? Acoustic localisation of the Christmas Island hawk-owl using passive acoustic monitoring

Mayuri Kotian[1*], V. Florence Sperring[1], Lin Schwarzkopf[2], Nicholas A. Macgregor[3], and Justin A. Welbergen[1]

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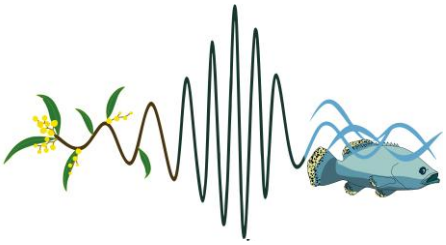
** Presenting author*

Passive acoustic monitoring offers tools for monitoring species at large scales, yet most applications are limited to detecting species. Acoustic localisation allows vocalising individuals to be situated in space, potentially enabling quantification of species abundance; yielding absolute population counts directly applicable to conservation planning. It also provides fundamental insights about behavioural ecology, such as nest sites and feeding locations. However, this approach has rarely been validated in the field. Here, we test acoustic localisation on a threatened and endemic apex predator, the Christmas Island hawk-owl (Ninox natalis), on Christmas Island, an ecologically sensitive, remote Indian Ocean island harbouring 253 endemic species, where non-invasive monitoring is a pressing need. Using an array of 13 automated recording units (ARUs) spaced 75 m apart within a hawk-owl territory, we localised at least 3 spatially distinct calling individuals within the detection range of the array. To assess the accuracy of the localisation estimates, we used two independent methods: call playback from known locations inside and outside the array, and GPS tracking data from a tagged individual within the territory. Preliminary findings show high localisation accuracy between methods (call playback: mean error = 11.5 ± 8.4 m, N = 113 vocalisations; GPS tracking: mean error = 11.6 ± 7.5 m, N = 32 vocalisations). A combination of these localisation results with the vocal activity rates from an island-wide acoustic dataset, and a knowledge of preferred habitat, could be used to yield spatially explicit abundance estimates across the whole island. This study demonstrates a non-invasive acoustic monitoring system capable of reliably locating cryptic owls as they vocalise. This allows us to move beyond presence/absence monitoring to yield insights on behaviour and abundance. This approach informs conservation planning and habitat condition assessments, offering a reliable alternative for threatened endemic species for which traditional monitoring methods could be challenging.

Related topics: *Conservation technology, Ecological inference, Monitoring*



Presentation format: *Open talk*

Improving detectability of bioacoustic signals on edge devices

Kyle N. & Susan Campbell Kyle N[1*], Richard C. MORGANS[2], William WINKEL-DAVIS[2], Thomas Barone[2], Joseph JANTKE[3], Benjamin CAZZOLATO[4], and Susan CAMPBELL[5]

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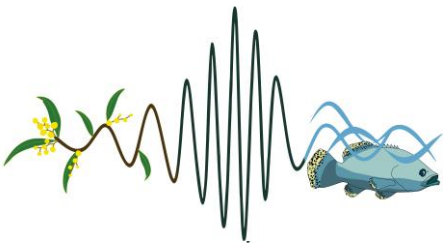
** Presenting author*

Passive acoustic monitoring (PAM) is one effective tool to improve surveillance for soniferous species, including threatened and invasive taxa. Understanding the effective detection range of autonomous surveillance devices (‘sentinels’) is essential for integrating bioacoustics data into occupancy modelling and adaptive management frameworks. The effect of adding hardware components that improve detection range can be tested, which includes a consideration of whether existing machine learning classification systems could be affected if the character of acoustic signals changes. Integration of automated, real-time PAM of starlings (Sturnus vulgaris) continues under Western Australia’s starling management program. Software and hardware refinements are bringing unprecedented landscape-scale remote surveillance for this unwanted pest bird. We examined the effect on the detectability of starling calls of a radial horn structure on the end of a microphone, which theoretically enhances the collection of sound from a 360-degree field. The addition of a radial collector to the end of a microphone also has the potential to reduce the classification probability of target signals through introduced sound artefacts and increasing the effects from wind turbulence. Through playback experiments in controlled (anechoic chamber) and field conditions, we quantified the magnitude of a mild gain without electronic amplification and an increase in the zone of reception using a custom radial collection horn. This device will help to maximise the probability of detection of invading birds across a broad habitat by automated bioacoustics-based listening sentinels.

Related topics: *Real-time monitoring; Conservation science and management; Cryptic and endangered species*



Presentation format: *Open talk*

A decade of dialect change in a vulnerable Hawaiian honeycreeper revealed by passive acoustic monitoring and birdsong embeddings

Benjamin L. GOTTESMAN[1*], M Youngblood[2], L H Fink[3], E R Wein[3], H M Araujo[3], A N Rice[3], and E Sebastián-Gonzolaz[4]

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[2] *Institute for Advanced Computational Science, Stony Brook University, USA*

[3] *[1]Cornell K. Lisa Yang Center for Conservation Bioacoustics, Cornell University, Ithaca, NY, USA & [2]Cornell Lab of Ornithology, Cornell University, USA*

[4] *Department of Ecology, University of Alicante, Spain, P J Hart, Department of Biology, University of Hawai'i at Hilo, USA*

** Presenting author*

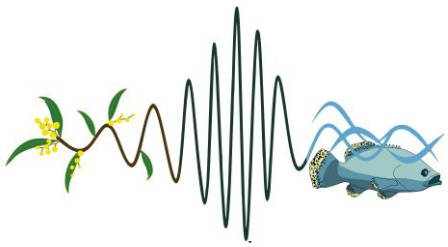
Passive acoustic monitoring and machine learning are rapidly expanding our ability to study vocal culture at landscape scales, yet automated pipelines for processing, filtering, and analyzing such quantities of data remain sorely needed. Here we present an approach integrating a custom BirdNET classifier, amplitude-based segmentation, and spectrogram-based embeddings from Chatter to detect and analyze song variation across space and time, and apply it to a decade-scale study of cultural evolution in a vulnerable Hawaiian honeycreeper.

The Hawai'i 'amakihi (Chlorodrepanis virens) is widespread across Hawai'i Island and, like many honeycreepers, exhibits remarkably rich dialects across small spatial scales. This study focuses on a population inhabiting the Pu'u 'Ō'ō corridor — a mosaic of forested kīpuka, native forest patches isolated by historic lava flows, that provides an ideal natural experiment for investigating how patch size, isolation, and population density shape vocal dialect diversity and stability. We deployed passive acoustic recorders across 100 sites in 2014–2015 and 25 sites in 2025, including 18 matched sites spanning approximately a decade. A custom BirdNET classifier detected tens of thousands of vocalizations, which were then segmented, quality-filtered, and passed through an embedding pipeline for downstream analysis.

By calculating distances between songs in a multidimensional embedding space, we quantify dialect differences across sites, as well as meme turnover and drift between decades, and model these as a function of biogeographic variables. We expect larger kīpuka to support greater within-site song variability, while more isolated patches harbor more distinctive meme communities and slower rates of cultural turnover.

Beyond dialect dynamics, we demonstrate how this embedding-based framework can support individual identification and potentially abundance estimation for species like the 'amakihi that exhibit high within-population song variability. Broadly, this work establishes a scalable foundation for monitoring vocal culture in threatened species using a passive acoustic monitoring and automated embeddings framework.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Academic Advisor, Department of Biology, College of Arts and Sciences

Tyler Andrew Lackey[1*]

[1] *United States*

** Presenting author*

This work develops Acoustic Sovereignty as a theoretical framework: the understanding of environmental sound as a fundamental question of cultural self-determination—the inherent right of communities, ecologies, and individual voices to shape the acoustic conditions of their existence. This framework emerges from an extensive itinerant practice, grounded in the OneBeat 13 U.S. State Department fellowship and sustained field work in the historically redlined neighborhoods of Chattanooga, Tennessee. This practice further extended through tours and recordings across Italy, Spain, Morocco, Canada, and various U.S. cities.

Field recording entered the practice obliquely. It began in traffic, moved through consented recordings of conversation, narrative, and critique, and deepened during pandemic isolation when listening to one's own recorded voice became a form of return. The archive now spans roughly 200 hours of audio, audiovisual, and conversational material across drives and cloud storage. Out of this listening, a working theory has formed: that acoustic ecology is the universe's natural improvisation, an infinitely dissipating and recycled vocalization in which every signal carries an urgent message waiting to be retrieved. The Sax Sax Sax saxophone trio, formed through OneBeat 13 alumni, functions as a touring listening apparatus alongside this archive, generating compositional artifacts that respond to and re-enter the field. Cymatic experimentation with geometric forms, particularly the comparative acoustics of cones versus pyramids, has produced visual evidence that architectural geometry shapes how listeners participate, perform, and observe within an acoustic space. The contribution offered to ecoacoustics is a method that integrates field data, cultural archive, and geometric visualization in service of community-engaged listening.

Related topics: *Soundscapes, Monitoring, Arts*

Presentation format: *Open talk*

Forest Voices: Landscape-scale monitoring for forest fauna using acoustic sensors, artificial intelligence and robust analytics

Brad Law[1*], Leroy GONSALVES[2], Traecey BRASSIL[2], and Glenyse VILLANUEVA[2]

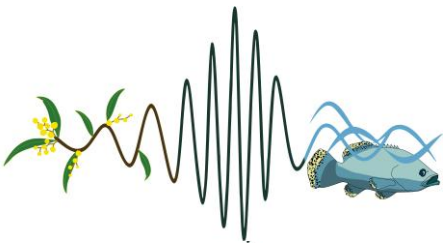
[1] *NSW Department of Primary Industries and Regional Development*

[2] *NSW DPIRD*

** Presenting author*

Landscape-scale monitoring is a key approach for assessing the status of fauna populations and is especially important with increasing climate change and megafires. However, great care needs to be taken to collect rigorous data and avoid wasting resources. Remote acoustic sensors coupled with artificial intelligence provides a cost-effective approach for detecting vocalising forest fauna over multiple nights. Robust analytical approaches that account for imperfect detection can then generate population trends while also identifying correlates of change. We present trends for a passive acoustic forest monitoring program at 224 sites across 8.5 million hectares of forest in northeast NSW. The program spanned from 2015 to 2022, before and after 'black summer' mega-fires burnt a significant portion of the study region in 2019. An extensive dataset has accumulated through the program comprising: >25,000 hours of nocturnal recording over >2,500 nights. We used semi-automated AI call recognition for a dozen iconic forest species to derive trends over eight years. For example, Koala occupancy remained high and stable throughout this period. Extent of both severe fire and 16-30 year old stands from past heavy timber harvesting (pre-current EPA regulations) increased site extinction probability. Colonisation probability was constant and offset extinction. In contrast to Koalas, Yellow-bellied Glider occupancy increased during the study and was most strongly influenced over time by variation in NDVI (drought and fire). Trends for additional species will be presented. Monitoring over such a regional scale is important for assessing the changing status of fauna together with dynamic covariates that can help explain candidate drivers of fluctuations in trends.

Related topics: *Conservation technology, Ecological inference, Monitoring*



Presentation format: *Open talk*

Fast Species Recognisers from Acoustic Embeddings: Benchmarking Performance and Spatial Transferability

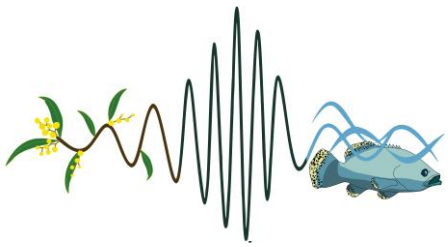
Franco Ka Wah LEUNG[1*], Lin Schwarzkopf[1], and Slade ALLEN-ANKINS[1]

[1] *James Cook University*

** Presenting author*

Passive acoustic monitoring (PAM) paired with machine-learning (ML) classifiers is increasingly used to map species occurrence at broad scales, yet spatial transferability remains a major barrier to reliable detection and ecological inference. Here, species-specific frog call recognisers were trained from acoustic embeddings and expert-validated clips from a broad-scale acoustic sensor network in Australia. The study demonstrates a fast, computationally efficient workflow for building species-specific recognisers, tests how model formulation influences detection reliability and spatial generalisation, and investigates why transferability varies among sites, with the aim of improving both performance and efficiency in ecoacoustic classifier development. Candidate clips were prioritised using an embedding-search strategy based on a custom-binned Euclidean distance ratio, then labelled as TRUE/FALSE through expert validation. Embeddings were linked to validated clips and models were trained using regression model. General performance was evaluated using an 80/20 split, and spatial transferability was assessed using leave-one-site-out evaluation, holding out sites with confirmed detections. We compared a baseline single-species binary model with variants designed to improve robustness in challenging acoustic conditions, including models that incorporate additional non-target examples and a multi-class approach trained across species. Performance was summarised using area under the precision–recall curve (AUPRC) and calibration-style reliability, quantified as the observed probability of correct prediction across predicted probability bins. Preliminary results indicate strong discrimination for most species, while transferability can vary markedly among sites and species. Ongoing analyses examine whether differences in class prevalence, training data diversity, and acoustic similarity between target and non-target calls help explain where and why generalisation succeeds or fails. The findings will support more reliable deployment of ML classifiers in PAM workflows and provide guidance for scalable monitoring of vocal species in ecological studies.

Related topics: *Conservation technology, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

Listening across landscapes: tracking ecological communities through space and time

Simon Linke[1*], Marina D. A. Scarpelli[2], James Bishop[3], Jessie Moyses[4], Daniella Teixeira[4], and Jens Froese[5]

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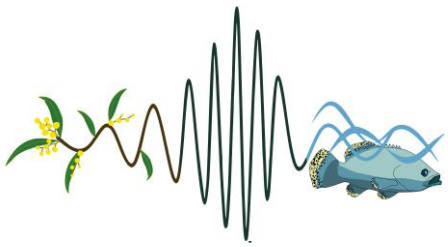
[2] *Sciences Department, Museums Victoria, Australia*
[3] *Agriculture & Food, CSIRO, Australia*
[4] *QUT, Australia*
[5] *CSIRO Health & Biosecurity, Australia*
** Presenting author*

Ecoacoustics has gained exponential traction over the last 10 years because it enables autonomous recording at remote sites, has minimal impact on wildlife, and offers two key advantages. Ecoacoustics tracks all soniferous species within reach, and does so continuously: instead of relying on a handful of sampling events, entire ecological communities can be tracked through time and space. We demonstrate the application of multi-species recognisers using three single-year studies from conservation sites in North Queensland, as well as a working 1600 ha farm near Armidale, Australia. Using stratified BirdNET recognisers, we found in all cases that we could characterise ecological communities across sample sites and times extremely well. Ecological communities shift dramatically over time, only to return close to their original state at the end of the year. Interannual migration and activity patterns are, of course, part of the temporal architecture of biodiversity. Using acoustics, we can now track site-specific differences — for example, floodplains host more waterbirds during the wet season, while permanent waterholes act as refugia during the dry season. While validation identified 60 of >160 species as likely false positives, these amounted to only 10% of overall calls and, if anything, may have further stabilised community-level patterns. Last, we discuss avenues by which these multiple interacting sources of variation — sites, ecotypes, times and seasons, as well as ecological function — can be incorporated into monitoring frameworks to fully unlock the potential of ecoacoustics, and to demonstrate the tracking of shifts in ecosystem function through space and time.

Related topics: *Applied acoustics, Monitoring, Ecological Inference*



Presentation format: *Open talk*

Symposium: *Multidisciplinary approach to behavioural and Ecoacoustics challenges of avian vocal mimicry*

Large-scale NLP detection of vocal mimicry in Australian community science bird observations

Richard Littauer[1*]

[1] *Te Herenga Waka Victoria University of Wellington*

** Presenting author*

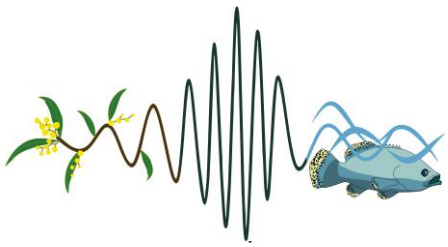
Introduction. Avian vocal mimicry is well documented for Australia's birds. However, studies normally focus on individual species or genera. Community science platforms such as eBird present an opportunity to crowd-source text comments mentioning mimicry at scale. Here, we present a natural language processing (NLP) approach for mining mimicry-related observations from the Australian eBird dataset, based on the methods from Littauer et al. (2026).

Methods. We developed a basic regex detection system applied to species-level and checklist comments from the entire Australian eBird dataset (69 million rows. We used a core bucket of terms unambiguously describing vocal mimicry (using the terms "mimic" and "imitate") and a larger bucket of broader acoustic similarity language (e.g. "sounds like," "reminiscent of"). To reduce false positives for species totals, checklist-level matches were excluded, and manual validation was performed for all core-tier observations from species with <10 occurrences.

Results. We identified 6,864 observations referencing mimicry across 689 species. Restricting to the validated core bucket yielded 2,312 confirmed mimicry observations from 111 species. The most frequently documented mimics were: Superb Lyrebird Menura novaehollandiae (579 observations), European Starling Sturnus vulgaris (220), Olive-backed Oriole Oriolus sagittatus (200), Singing Bushlark Mirafra javanica (142), Spangled Drongo Dicrurus bracteatus (92). Observations with the highest densities were in New South Wales, Victoria, and Queensland.

Conclusions. These results demonstrate that NLP-based mining of community science text can recover substantial behavioural signal from unstructured observer notes. Future work will focus on cleaning the data, building species relation matrices, and characterising model species. This study highlights both the promise and the validation challenges inherent in large-scale behavioural data mining from community science platforms.

Related topics: *Applied ecoacoustics, Future-forward/innovative, NLP*



Presentation format: *Open talk*

Listening to Lady Bay: Passive Acoustic Monitoring and Data Science Approaches to Reef Soundscape Analysis

Tristan Louth-Robins[1*]

[1] *Australian Forum for Acoustic Ecology (AFAE) Board*

** Presenting author*

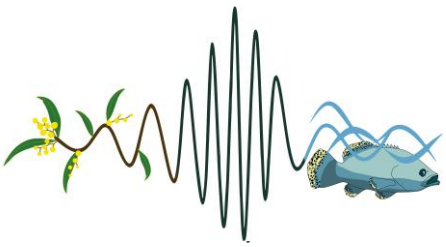
Lady Bay Reef on the Fleurieu Peninsula, South Australia - an intimate, ecologically rich intertidal environment of exposed rock platforms, tidal pools and Posidonia australis seagrass meadows - has been the subject of an ongoing artist-researcher practice grounded in acoustic ecology and data science. What began as a curiosity about what lies beneath the surface of a reef encountered since childhood has evolved into a sustained programme of fieldwork and research inquiry, motivated by a desire to understand and communicate the character of an underwater world that reveals itself discretely and on its own terms.

Beginning in 2021 and continuing to the present, AudioMoth passive acoustic monitoring devices (Open Acoustic Devices) were deployed across multiple reef locations under contrasting seasonal and tidal conditions. Devices were configured for periodic sampling across continuous 24-hour cycles, generating large volumes of data processed through reproducible workflows in R and Python. Analytical approaches have included the Acoustic Complexity Index (ACI), Circadian Soundscape Rendering and False Colour Spectrum (FCS) analysis - the latter two implemented via scikit-maad - alongside spectrogram visualisation and tidal prediction data integration.

An initial 24-hour deployment revealed a strong association between ACI values and tidal dynamics, with acoustic complexity rising and falling in step with predicted tidal peaks and troughs. A subsequent week-long dual-device deployment within a seagrass meadow cove produced markedly elevated ACI values, reflecting the meadow's contribution to soundscape complexity - including distinctive mid-frequency signatures tentatively attributed to Posidonia aerenchyma bubble release and invertebrate activity. More recently, Circadian Soundscape Rendering has enabled rapid visual summarisation of multi-day recording cycles, while FCS analysis has demonstrated the capacity to distinguish and separate concurrent acoustic components - biophony, geophony and anthrophony - within complex soundscapes.

These findings point to the value of accessible, low-cost PAM tools combined with open-source data science workflows as a means of uncovering ecological insights in understudied marine environments, and suggest a viable model for artist-researcher engagement with ecoacoustic monitoring practice.

Related topics: *Conservation technology, Soundscapes, Water*



Presentation format: *Open talk*

Decadal Trends in Migration Phenology of Eastern Indian Ocean Pygmy Blue Whales Using Long-Term Passive Acoustic Monitoring in South West Australia

Brodee Lowe[1*], Brodee Lowe[2], Chris Burton[3], Andrew Davenport[2], Robert McCauley[2], and Christine Erbe[2]

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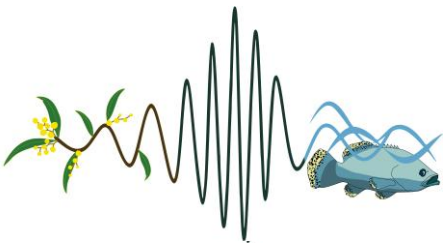
** Presenting author*

Understanding long-term variability in migration phenology is critical for managing migratory marine mammals under increasing climate-driven environmental change. For the eastern Indian Ocean pygmy blue whale (EIOPBW), research has largely focused on broad-scale detection patterns, with limited resolution of southern migration phenology. This limits our ability to accurately characterise the timing and variability of this Endangered species' use of coastal and offshore migratory corridors where anthropogenic pressures are prevalent. We analysed a 22-year time series (2002 to 2023) of passive acoustic monitoring data from the Cape Leeuwin hydroacoustic station, focusing on the northbound migration. This was complemented by land-based visual surveys from Geographe Bay, Western Australia to better resolve the southbound migration, where singing is a less reliable indicator of presence. Migration metrics including onset, peak intensity, duration, and cessation were quantified using daily maximum singers (MaxN). Diel variation in calling activity was assessed using day to night singing ratios, and interannual variability in migration timing and calling intensity was examined in relation to the El Niño Southern Oscillation (ENSO), the Southern Oscillation Index (SOI), and Fremantle sea level anomaly (SLA), an index of Leeuwin Current strength. Preliminary results show a long-term increase in peak calling intensity during the northbound migration, alongside substantial interannual variability across migration metrics. Day to night singing ratios varied between years, with some seasons exhibiting a clear diel periodicity of predominantly nocturnal activity and reduced daytime calling. Within a Biologically Important Area (BIA) characterised as a migratory corridor and a known offshore foraging area, these patterns support behavioural use consistent with foraging and suggest the South-west Corner Marine Park may be more important for foraging than previously recognised. Visual data indicate a shift toward earlier southbound migration in recent years. These findings demonstrate that EIOPBW migration phenology is dynamic and environmentally responsive. Integrating acoustic and visual datasets improves resolution of migration timing and intensity, supporting more robust, evidence-based management of this endangered population.

Related topics: *Soundscapes, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Illegal firewood harvest surveillance using specialised audio classification and localisation algorithms

Jacob Maher[1*], Falih Febrinanto[1], Sean McGowan[1], and Phill Cassey[1]

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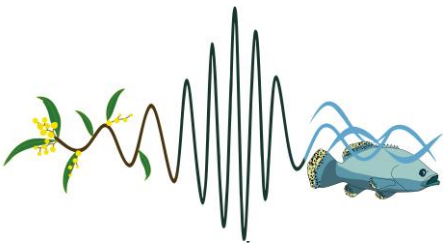
** Presenting author*

Illegal firewood harvesting has emerged as a widespread and escalating threat to Australia's ecological and cultural heritage. Large, dead, standing trees are critical habitat for hollow dependent fauna and can be of deep cultural significance to Aboriginal people. Trees of this nature are increasingly targeted, with high levels of illegal harvest documented across Australia. Detection and enforcement remain challenging as illegal harvest occurs in remote locations, across state borders, and increasingly involves organised criminal groups. This illegally harvested firewood is often sold online at below-market prices, driving demand. Challenges in collecting evidence and weak prosecutorial outcomes has limited deterrence.

To address this complex problem, we have partnered with the Victorian Conservation Regulator to develop a real-time acoustic monitoring system capable of detecting illegal firewood harvesting activity. Our work explores the development and feasibility of deploying low-cost acoustic sensors as a scalable surveillance tool, while also identifying secondary applications for wildlife monitoring and biosecurity. We use machine learning based on a foundation model, which is then adapted via a hierarchical detection protocol to prioritise real-time detection of chainsaw sound and other malicious activities (e.g. machinery or explosive sounds). Our system utilises a parent-child mesh network to cover large areas of protected land to enhance evidence capture. We pair this with sound source localisation algorithms to allow high resolution spatial detection to support decision making, surveillance optimisation, and provide spatially-complex biodiversity monitoring data.

This project demonstrates how ecoacoustic technologies with recent computing and algorithms advancement can enhance protection of vulnerable habitats, improve environmental compliance, and contribute to on-going biodiversity monitoring. This work highlights the expanding role of acoustics in detecting human-driven ecological threats and underscores the value of interdisciplinary approaches.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Passive acoustic recorders and a new call-recogniser software expand knowledge of the Plains-wanderer in Queensland's Channel Country

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[2] *Senior Research Software Engineer, Science and Engineering Faculty, Queensland University of Technology, Brisbane, Queensland, Australia*

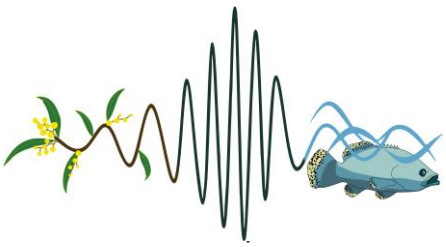
[3] *Regional Ecologist, Australian Wildlife Conservancy, Subiaco, Western Australia, Australia*

[4] *Director Terrestrial Birds, BirdLife Australia, Collingwood, Victoria, Australia (previously Australian Wildlife Conservancy)*

** Presenting author*

The Plains-wanderer (Pedionomus torquatus) is a cryptic, ground-dwelling bird, endemic to the Australian mainland, and listed federally as Critically Endangered. It is restricted to grassland and low shrubland habitat across arid and semi-arid Australia, though it has been historically understudied and its distribution is not well-understood. In 2023 Australian Wildlife Conservancy (AWC), in partnership with North Australia Pastoral Company (NAPCo), began surveys for the Plains-wanderer on a south-west Queensland pastoral station with potentially suitable habitat and nearby Plains-wanderer records. It was not known if the species occurred on the property. A trial of ten long-term solar-powered bioacoustic recorders (Solar BAR-LT, Frontier Labs) were deployed in May 2023 and run continuously for 12 months. In June 2024 the project was upscaled to sixty-one Solar BAR-LT units run continuously for a further 12 months (June 2024–June 2025). During the project, 410,062 hours of recordings were collected across the 68 sites. To expedite processing, AWC submitted recordings to Queensland University of Technology where a novel call-recogniser for the Plains-wanderer was being developed. The recogniser used Perch ecoacoustic embeddings to train a linear classifier using labelled Plains-wanderer examples from New South Wales and Queensland. The classifier was run over all unlabelled data from the NAPCo pastoral station, giving a score of Plains-wanderer likelihood for each 5-second segment. An AWC ecologist verified a temporally stratified subset of highest-scoring segments and identified Plains-wanderer at 28 of 68 sites. Listening for a Plains-wanderer call in thousands of hours of unclassified sound records was akin to searching for a needle in a haystack. The call-recogniser acted like a magnet to assist with the search by narrowing down the number of recordings requiring verification.

Related topics: *Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

The Bush Bird Classifier (BBC) provides a road-tested, custom recogniser for automating biodiversity assessments of the woodland birds of south-east Australia, including Tasmania

Paul McDonald[1*], Lance De Vine[2], Victoria Austin[3], Daniella Teixeira[4], Courtney Melton[5], Catherine Young[6], Martine Maron[7], and David Watson[3]

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[2] *Zoology, University of New England, Australia*
[3] *Gulbali Institute, Charles Sturt University, Australia*
[4] *School of Biology and Environmental Science, Queensland University of Technology, Australia*
[5] *Bush Heritage Australia*
[6] *NRM South, Australia*
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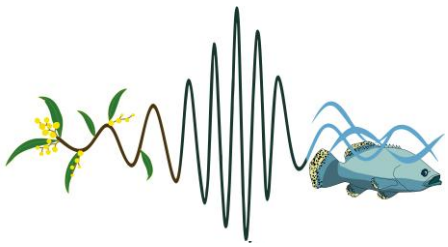
** Presenting author*

A combination of declining levels of biodiversity coupled with limited resources available for land managers means that the need for accurate, simple biodiversity monitoring tools has never been greater. While large amounts of Passive Acoustic Monitoring (PAM) audio data have been collected in south-east Australia, with a common focus on woodland bird monitoring, automated analyses to date have focused on a few species of concern rather than a more wholistic assessment of community biodiversity. We aimed to resolve this by developing a cloud-based solution to reliably detect the vocalisations of over 175 species that form the core of woodland bird communities in the region. Our tool developed as a set of independent binary classifiers on top of BirdNET embeddings, and is packaged as a custom recogniser that can be run with standard BirdNET software or accessed as a cloud-based solution via the online Ecosounds platform. Development maximised training data diversity by collecting sample vocalisations of targeted taxa from on average 5 sites per species using a combination of manual inspections through to clustering techniques, drawing on a decade of Australian Acoustic Observatory (A2O) recordings and privately sourced audio archives. Classifier performance was evaluated using expert verification of 100 randomly selected detections of each species across multiple confidence levels spanning 0.6 – 0.9, allowing species-specific calibration of detections. Overall average performance of the BBC yielded similar precision with twice the recall of the default BirdNET model for the same annotated audio across species, and further expanded coverage of taxa and regional dialects detected. The BBC therefore offers a quantified, consistent and repeatable means for accurate, accessible audio monitoring of woodland birds for researchers and land managers alike. By following provided guidelines, the tool allows woodland bird community health indices to be quantified by non-professionals and researchers alike for both archival and modern data, opening up new ways of assessing avian biodiversity that promise novel PAM research opportunities from a local to landscape level.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Calibrating condition calculations for acoustic data: A case study of the imperiled woodland bird community of southeast Australia

Courtney Melton[1*], Hannah Fraser[2], Martine Maron[2], Bruce Webber[3], and Hedley Grantham[3]

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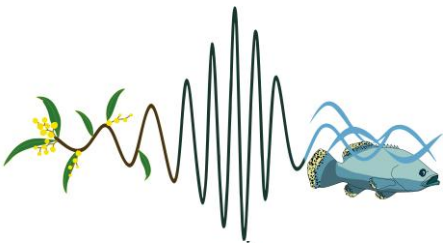
[2] *School of Environment, The University of Queensland, Australia*

[3] *Science and Conservation, Bush Heritage Australia*

** Presenting author*

Woodland birds of southeast Australia have suffered severe decline following extensive loss and degradation of their habitat. Even in remaining patches of habitat that appear relatively intact from a vegetation perspective, and generate higher habitat condition assessments accordingly, we often still observe a depauperate bird community. To better understand and track the health of bird communities distinct from vegetation measures, Fraser et al., (2017) developed bird community condition metrics. These metrics can help reveal such discrepancies, supporting a more robust assessment of community trends over time and in response to management actions. Bird community condition metrics are typically calculated from standardised on-ground bird surveys and have not yet been applied to acoustic monitoring methods. Here we explore what calibration is required for community condition metric calculations using acoustic data by comparing metrics derived from simultaneous on-ground and acoustic surveys. In addition, we comment on how the method of annotation influences metric results, by comparing condition as calculated from acoustic data that was manually annotated, processed by readily available multi-species recognisers, and processed by tailored species recognisers. Together these results can help guide researchers and practitioners on how to calculate community condition from acoustic data confidently. We showcase the potential application deriving these metrics from acoustic data has for increasing our spatial and temporal assessments of bird community health and better informing conservation efforts.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Towards Robust and Scalable Biodiversity Monitoring in Guyana

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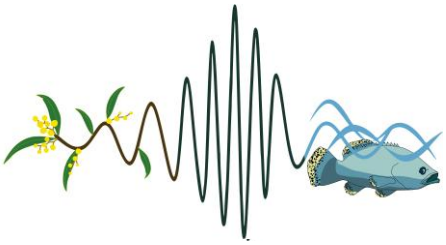
** Presenting author*

Tropical ecosystems support extraordinary biological diversity yet are under increasing pressure, creating an urgent need for monitoring approaches that are both reliable and practical at scale. Established field-based methods remain important but are frequently constrained by cost, accessibility and limited temporal coverage, reducing their effectiveness for ongoing assessment and timely decision-making. Developments in ecoacoustic monitoring, alongside camera trapping and environmental DNA (eDNA), provide new opportunities to collect continuous, non-invasive data across large areas, while Local Ecological Knowledge (LEK) offers critical insight grounded in long-term observation and lived experience. We present findings from an applied monitoring framework in Guyana that brings these approaches together within a single system. The integration of ecoacoustic data with eDNA, camera trap data and LEK allows for comparison between methods and a more complete representation of species presence across varied habitats. The approach is designed to be accessible and cost-effective, enabling Indigenous Peoples and Local Communities to implement monitoring activities directly thus strengthening local capacity while generating data that can inform management and policy. Our analysis detected 741 species across 7 sites in Region 9, Guyana, with 460 detected through ecoacoustics. The results demonstrate how integrated systems can improve the consistency and usability of biodiversity data in tropical contexts.

Related topics: *Conservation technology, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

The Acoustic Death Hypothesis: Climate-driven Constraints on Anuran Communication and Survival

Nikhil MODAK[1*], and Shivam Shrotriya[2]

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** Presenting author*

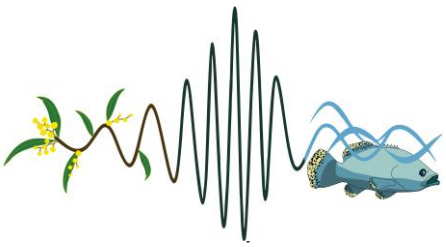
Acoustic communication plays a central role in reproductive success and in survival, in many ectothermic taxa, particularly anuran amphibians. Warming due to climate change is expected to disrupt these systems, yet the pathways by which temperature change reduces survival potential remain to be explored further. Here, we propose the Acoustic Death Hypothesis, which describes how rising temperatures can reduce mating success and survival in acoustically communicating species through interacting biological and physical constraints.

We develop a mechanistic framework that links environmental temperature to mating probability through body size, call frequency, and atmospheric sound attenuation. Heat-balance hypothesis and body size-temperature relationships in ectotherms suggest a linear decline in body size with increasing temperature. The allometric relation indicates that a smaller body, driven by climate warming, will increase the call frequency. Higher-frequency calls experience stronger atmospheric attenuation, which itself increases with air temperature, reducing communication distance and efficacy of the call for reproductive success. Our framework models mating probability as a decaying function of sound attenuation and temperature, translating to the impairing effect of rising temperatures on reproductive encounters and survival of the species.

This framework discusses three interconnected pathways: (1) climate-driven altitudinal or latitudinal shifts toward cooler habitats, which are spatially limited in mountainous regions; (2) temperature-mediated selection for smaller body sizes leading to higher call frequencies, reducing reproductive success; and (3) energetic and survival costs incurred when smaller-bodied individuals occupy cooler environments to maintain acoustic efficiency. Together, these pathways form a cyclic feedback loop that can reduce both reproductive success and survival.

Although developed using anurans as a model system, the hypothesis has broader relevance for acoustically communicating taxa. By explicitly linking behavioural ecology, physiology, and physical acoustics, this study highlights how understanding communication systems is critical for predicting climate vulnerability and informing conservation strategies in a warming world.

Related topics: *Future-forward/innovative*



Presentation format: *Open talk*

Beyond Fixed Windows: A Data-Driven Approach to Acoustic Event Segmentation in Ecoacoustics

Thomas Napier[1*], Euijoon Ahn[1], Slade Allen-Ankins[1], Lin Schwarzkopf[1], and Ickjai Lee[1]

[1] *College of Science and Engineering, James Cook University, Australia*

** Presenting author*

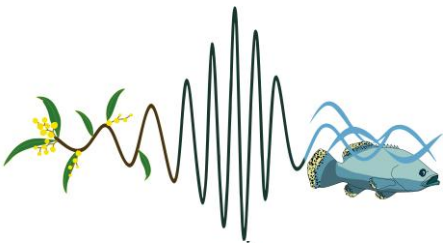
Ecoacoustic approaches provide new opportunities to study species and communities within the full context of the soundscapes they inhabit. However, extracting useful patterns depends critically on how recordings are segmented into acoustic events. A key limitation in current workflows is the reliance on fixed time windows, which, while practical, impose artificial boundaries on inherently variable signals. This can fragment longer vocalisations, or merge overlapping sounds, reducing ecological interpretability in complex environments such as dawn choruses.

To address this, we propose an automated, data-driven approach that identifies acoustic events by modelling how soundscape structure changes over time within a feature space derived from the signal. Event boundaries are inferred from transitions in this structure, allowing segmentation to adapt to the underlying dynamics of the recording rather than fixed windowing. This allows events to emerge from the data, adapting naturally to variation in call structure, overlap, and background noise.

In preliminary analyses, these emergent structures show strong alignment with overall acoustic activity (Pearson r ≈ 0.8). When compared against expert-annotated data, the method further indicates the potential to (i) resolve coarse annotation regions into multiple temporally distinct events and (ii) surface additional signals of interest not captured in the original ground truth.

This work highlights the feasibility of moving from fixed-window segmentation toward adaptive, structure-driven approaches in ecoacoustics. By aligning segmentation with the intrinsic dynamics of the soundscape, this direction has the potential to improve the fidelity of detected events and support more scalable downstream analysis. These early results motivate further investigation into data-driven segmentation as a foundation for more flexible and ecologically grounded biodiversity monitoring pipelines.

Related topics: *Conservation technology, Ecological inference, Future-forward/innovative*



Presentation format: *Open talk*

EcoCommons: Scalable, Reproducible Infrastructure for Ecological Modelling and Conservation Decisions

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[2] *Head of Sustainable Futures Department and Principal Data Scientist, QCIF*

** Presenting author*

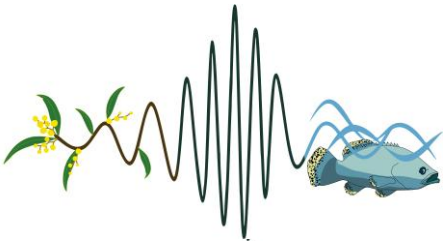
Acoustic monitoring is increasingly used to investigate the ecology of elusive species, particularly birds, that are not easily detected through manual surveys or camera trapping. Advances in automated detection and annotation now enable large volumes of acoustic recordings to be translated into species presence detections. When structured as occurrence data, these outputs provide a critical bridge between acoustic data collection and downstream ecological analysis.

Occurrence datasets derived from acoustic monitoring can support analyses such as occupancy modelling and species distribution modelling, providing insights into the environmental drivers of species distributions and enabling predictions under future climate scenarios. However, barriers remain, including access to high-quality environmental data, computational infrastructure, advanced coding expertise, and reproducible workflows.

EcoCommons is a national, cloud-based platform designed to overcome these challenges by enabling users to analyse occurrence data within an integrated modelling environment. The platform provides access to over 50,000 curated environmental and biodiversity datasets and leverages the ARDC Nectar Research Cloud to support computationally intensive analyses at scale. It combines user-friendly analytical interfaces with a growing library of code-based spatial tools and ecological modelling notebooks, supporting both accessible and more advanced modelling approaches. Users can develop and run species distribution models, occupancy models, and future habitat projections without requiring advanced coding skills, while retaining the flexibility to extend analyses through code-based tools when needed.

For researchers focused on acoustic monitoring methods and their ecological application, EcoCommons provides a pathway to move from species detection outputs to spatial modelling and ecological inference. By lowering technical barriers and supporting best-practice, reproducible analyses, the platform enables robust, scalable modelling that strengthens the evidence base for conservation and environmental decision-making in increasingly data-rich acoustic monitoring contexts.

Related topics: *Conservation technology, Ecological inference, Future-forward/innovative*



Presentation format: *Open talk*

Abiotic and Land Use Drivers of Insect Acoustic Activity in the Western Ghats

Arpit OMPRAKASH[1*], Robert Ewers[2], Sarab Sethi[2], and Rohini Balakrishnan[1]

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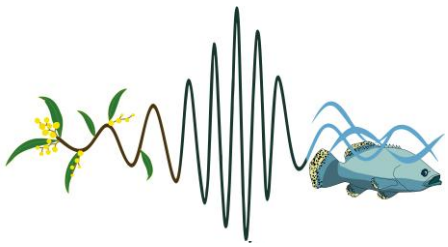
[2] *Department of Life Sciences, Imperial College London, UK*

** Presenting author*

In recent years, Passive Acoustic Monitoring has advanced rapidly, particularly with the integration of machine learning approaches to estimate acoustic activity. However, most ecoacoustic research remains biased towards vertebrate taxa such as bats, birds, and frogs, often overlooking insects which dominate biophony in tropical ecosystems. Existing insect-focused studies frequently rely on ecoacoustic indices as proxies of activity, which can perform poorly in species-rich habitats and limit inference at the species or community level. In this study, we investigate how environmental factors and anthropogenic land use interact and shape insect acoustic communities in the paleotropical ecosystem of the Western Ghats. We examine the effects of moonlight, habitat structure, and land use on orthopteran calling behaviour and the broader insect acoustic community patterns. We conducted passive acoustic monitoring across 18 sites spanning three land use categories (agriculture, natural forests, monodominant forests) and sampled nocturnal soundscapes from these sites across six months (November 2024- April 2025). A part of the dataset was annotated to create an acoustic library of insect calls and was used to train machine-learning based classifiers to quantify insect activity, diversity, and community composition across space and time. Our results indicate that both environmental drivers and land use change significantly influence insect acoustic communities. Natural forests support higher insect diversity and more complex acoustic communities, while simplified habitats exhibit reduced diversity and altered activity patterns. We also found that factors such as moonlight and habitat structure play a key role in determining orthopteran calling behaviour, highlighting the importance of considering multiple interacting drivers of calling patterns. By generating an annotated acoustic library of insect sonotypes and advancing methods for species-level inference in orthopterans, our work contributes to scalable biodiversity monitoring techniques and provides new insights into how environmental factors and anthropogenic stressors affect insect communities in tropical ecosystems.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

A semi-automated acoustic survey method for Southern Whiteface – a threatened passerine of inland Australia.

Jasmin Pratt[1*], Jasmin Pratt (lead author)[1], Louise Morton[1], Joseph Sollis[1], and Brandi Simmons[1]

[1] *Stantec*

** Presenting author*

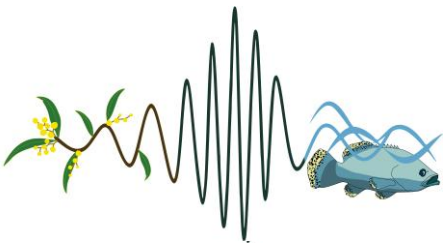
The Southern Whiteface (Aphelocephala leucopsis) is a small passerine species, occupying arid areas of southern and central inland Australia. This species has recently been listed as threatened nationally, yet no targeted survey guidelines or government-endorsed detection methods currently exist. This gap poses a challenge for proponents, consultants, and other environmental practitioners, particularly in regions where the species is sparse, cryptic, and difficult to detect using traditional survey techniques. We hypothesised that Autonomous Recording Units (ARUs) could provide an effective method for detecting the species in areas where it may occur sporadically and at low densities. Additionally, expert elicitation was conducted to seek feedback on the effectiveness of potential methods.

We deployed ARUs across four survey areas in the Yalgoo, Murchison, Gascoyne and Pilbara bioregions. Audio triggers within the frequency range of the Southern Whiteface's known call structure were extracted using clustering and trained call classifier models using Wildlife Acoustic's Kaleidoscope Pro software. This process condensed large trigger sets into a manageable subset of candidate clusters for manual verification.

We successfully identified Southern Whiteface vocalisations at three of the four survey areas, with a greater number of detections and locations than non-acoustic methods. These findings confirm that acoustic monitoring can reliably detect the species and substantially reduce manual review effort, even in areas where encounter rates through traditional observational methods are low.

Based on expert elicitation and the outcomes of this study, we recommend ARUs as the primary detection method for Southern Whiteface surveys, as part of a broader approach that includes habitat identification and targeted visual searches where practical. ARUs provide improved detection probability, standardisation across survey programs, and the ability to monitor large areas over extended periods.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Linking Science and Communities: Acoustic Monitoring of an Indicator Species to Support Corridor Management

Mónica Retamosa Izaguirre[1*], Jimy Barrantes Madrigal[1], Carolina Esquivel Dobles[1], Randall Jiménez Borbón[2], and Costa Rica

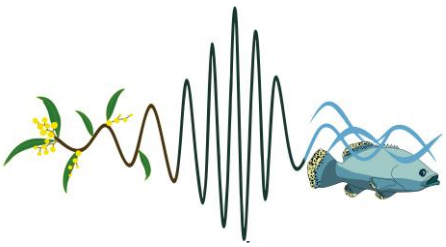
[1] *Universidad Nacional, Costa Rica*

[2] *Corredor Biológico AmistOsa*

** Presenting author*

The AmistOsa Biological Corridor in Costa Rica serves as a critical altitudinal bridge linking diverse ecosystems and protected areas, including La Amistad International Park and Piedras Blancas National Park. Maintaining connectivity across this landscape is essential for species that depend on seasonal altitudinal movements. However, biodiversity monitoring in complex tropical environments is often limited by logistical constraints. Passive Acoustic Monitoring (PAM) provides a non-invasive and continuous approach to assess biodiversity patterns, ecological connectivity, and human impacts. This study applied PAM to monitor the Three-wattled Bellbird (Procnias tricarunculatus), an emblematic indicator species of montane forests. Automated recording units were deployed across multiple sites with varying elevations and land uses between May 2023 and August 2024. Recordings were analyzed through manual spectrogram verification using Raven Pro, complemented by an automated detection model developed with Perch. A total of 796 confirmed detections were recorded over seven months. Vocal activity peaked in June and July 2024, coinciding with the reproductive season. Spatial analyses indicated that most detections occurred in mid-elevation forested areas, with a single site accounting for 85.6% of all records. Temporal patterns revealed detections at higher elevations during July–August and at lower elevations during November–December, suggesting seasonal altitudinal movements. Beyond its scientific contributions, the project incorporated a strong community-based component focused on environmental education and local capacity building. A participatory Environmental Education Plan was developed based on the biodiversity and soundscape of the corridor. These results demonstrate the effectiveness of PAM for detecting indicator species and evaluating ecological connectivity. High-resolution acoustic data can identify potential connectivity bottlenecks and inform adaptive conservation strategies. When integrated with community-based monitoring and education initiatives, PAM can strengthen long-term conservation and management of the AmistOsa Biological Corridor.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Avifauna within an agricultural mosaic: a pilot study from northwest Queensland

Elle Robertson[1], Lin Schwarzkopf[1]; Jack Koci[2]; Sebastian Hoefer[1]

[1] *James Cook University, Australia*

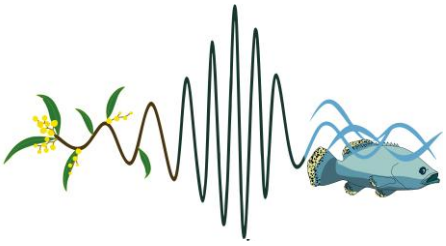
[2] *TropWATER: James Cook University, Australia*

** Presenting author*

In northwest Queensland, over 95% of land is used for low intensity cattle production. Government and industry are increasingly interested in intensifying and diversifying agricultural production in the region, with significant investment being directed at assessing the efficacy of different land uses such as cropping. The impacts of this agricultural activity on fauna in the region are poorly documented due to the region's remoteness and predominance of private landholdings.

This talk presents findings from a pilot study in the Gilbert catchment, examining the impact of various agricultural land uses and clearing on avifaunal communities using ecoacoustic monitoring. We also discuss the value of ecoacoustic monitoring as a tool for assessing land-use impacts on fauna in remote, data-poor regions such as north-west Queensland.

Related topics: *Applied ecoacoustics, future forward/innovative*



Presentation format: *Open talk*

Beyond presence-absence: ecoacoustic detection of complex bird community responses to fire

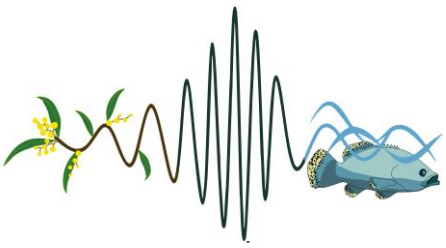
Liam Meredith, Kevin C. Rowe, Matthew Swan, Marina D. A. Scarpelli, and **Karen M.C. Rowe**[1*]

[1] *Museums Victoria Research Institute, Museums Victoria, Sciences Department*

** Presenting author*[1]

Ecoacoustics generates high resolution data across fine temporal and spatial scales, enabling the investigation of ecologically challenging questions, such as how birds respond to disturbance within complex, human and climate driven landscapes. In Australia, climate change continues to intensify extreme events including drought, fire, and flooding, making species responses to these often synergistic stressors difficult to predict. In 2023, Museums Victoria and the University of Melbourne collected ecoacoustic and habitat data across more than 100 sites in Grampians/Gariwerd National Park, immediately prior to a large scale fire in 2024–25 that burned nearly 80% of the park. Capitalising on this Before–After–Control–Impact study design, we re surveyed sites spanning unburned areas and a gradient of fire severity to assess avian responses to fire. To characterise bird community composition, we developed a semi automated acoustic analysis pipeline based on the BirdNET v2.4 model, complemented by a structured detection validation workflow to assess model performance. This approach enabled estimation of both species presence/absence and estimated daily detection rates as a proxy for abundance. Our results indicate that fire strongly influences bird community composition, with higher fire severity driving greater community change, including species and guild turnover. Notably, shifts in presence/absence did not always correspond with changes in abundance, and individual species often exhibited idiosyncratic responses to fire severity. These findings suggest that nuanced and non linear responses to fire may be common for birds. More broadly, our study demonstrates how ecoacoustic data, combined with increasingly robust analytical pipelines incorporating abundance estimates, can help address complex ecological questions in disturbance prone systems.

Related topics: *Applied ecoacoustics, future forward/innovative*



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Presentation format: *Open talk*

How passive acoustic and traditional monitoring estimate bird diversity across habitats

Jarek Scanferla[1*], Julia Seeber[1], Mattia Brambilla[2], Emmanuel Requena[1], Giordano Brambilla[1], Andreas Hilpold[1], Ulrike Tappeiner[1], and Matteo Anderle[1]

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[2] *University of Milan, Italy*

** Presenting author*

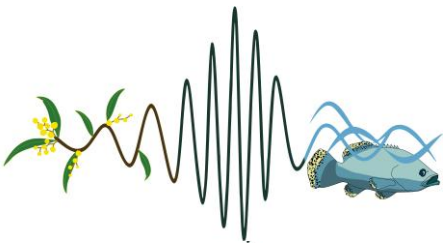
Bird monitoring techniques have evolved substantially in recent years. While the most used protocols remain the point count and transect survey, new technologies such as passive acoustic monitoring (PAM) are increasingly popular. As more monitoring programs adopt PAM, it is crucial to understand how comparable it is with classical monitoring derived data.

For our study we compared diversity indices (i.e. species richness, Shannon diversity and Jaccard index) derived from both classical (by means of point counts) and passive acoustic (by means of recording devices) monitoring and developed a novel estimated Shannon index based on PAM, using species-specific confidence thresholds and detection rates. We applied the protocols at 121 sites in a large-scale, heterogeneous landscape within the Italian Alps, enabling us to investigate for the first time whether the effectiveness of monitoring methods differs depends on the habitat type.

We show that PAM captured approximately twice as many species as the classical point count method. The species richness estimated by both protocols was strongly correlated (rs = 0.79), but with major differences between habitat types. The difference was greater in diversity hotspots such as wetlands and meadows and lower in alpine habitats, suggesting that the latter require more specialized monitoring programs. The novel PAM-based Shannon index was very reliable and consistently yielded similar results to the observer-based Shannon index, illustrating its effectiveness. Species composition differed significantly between the two protocols (average Jaccard index = 0.49). PAM detected most of the species of point count surveys and many more (e.g., owls and woodpeckers).

Although this study highlights the additional information that PAM can provide, point counts remain indispensable for some bird species (e.g., acoustically indistinguishable species). Our results highlight the strengths and weaknesses of each approach and provide recommendations for future monitoring programs.

Related topics: *Applied ecoacoustics, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

Resevoir Project

Jaime Schmidt[1*]

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** Presenting author*

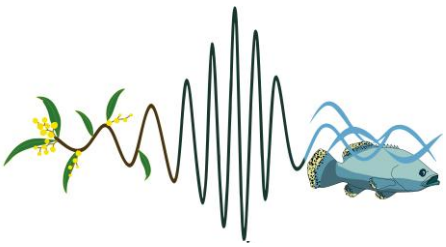
Water is fundamental to planetary life, yet industrial extraction, colonial histories, and ecological degradation have disrupted reciprocal relationships between humans and aquatic systems. The Reservoir Project explores how hydrofeminist and eco-acoustic perspectives can re-enchant relationships with water during contemporary environmental and cultural polycrisis. Drawing on frameworks presented in Thinking with Water and mythological associations with Persephone and Lake Pergusa in Sicily, the project investigates water as both ecological system and relational being.

The project employs autoethnographic, practice-based, and participatory research methods integrating interdisciplinary art, somatic listening, and permaculture-informed relational design. Participants engage in a ritualized sound practice inspired by the grief work of Francis Weller and the eco-acoustic composition Water and Memory by Annea Lockwood. Stones symbolizing ecological, ancestral, or personal grief are placed into a shared vessel of water while collective vocalization generates wave-like sonic environments. The sounds of water, stones, and voices are recorded and processed to form a temporary sonic ecology.

Preliminary outcomes indicate that embodied listening and collaborative sound-making create spaces for processing ecological grief and fostering relational awareness between human bodies and water systems. Participants often report heightened sensory awareness, emotional release, and a sense of collective holding within the ritual environment.

The Reservoir Project demonstrates how participatory eco-acoustic art can function as a container for grief while promoting ecological reciprocity. By integrating hydrofeminism, autoethnography, and somatic ritual practice, the work proposes embodied listening as a method for responding to climate crisis and reimagining human relationships with living waters.

Related topics: *Future-forward/innovative, Water, Arts*



Presentation format: *Open talk*

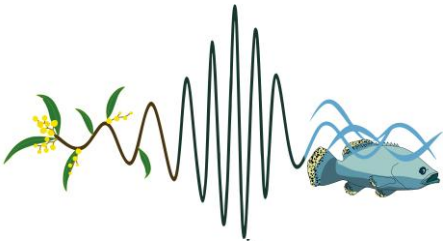
Impacts of Cattle Grazing on Tropical Savanna Bird Communities Revealed Through Ecoacoustic Monitoring

Shantel Gregoraci[1], **Lin Schwarzkopf**[1*], Slade Allen-Ankins[1]

[1] *James Cook University*

** Presenting author*

Grazing is the dominant land use across much of northern Australia, but its effects on vertebrate communities remain poorly understood. We used passive acoustic monitoring to compare bird communities among ungrazed sites and grazed sites in good (A) and poor (D) land condition in north-western Queensland, aiming to identify species sensitive to grazing. Bird communities were characterised using BirdNET, with detections validated for 84 of 96 species. We used Hierarchical Modelling of Species Communities (HMSC) to estimate grazing effects while accounting for environmental variation among sites. Presence–absence models identified clear differences between grazed and ungrazed bird communities during the dry season, while differences were weaker during the wet season. Examination of species-level “winners” and “losers” identified ten species particularly sensitive to grazing. These species are promising indicators of grazing impacts and could provide graziers with a practical way to monitor biodiversity and ecological condition alongside agricultural production.



Presentation format: *Open talk*

Using a customised BirdNET acoustic recogniser to detect and estimate population densities of Noisy Miners (Manorina melanocephala)

Kieran STEPHENSON-BANKS[1*], Paul MCDONALD[1], Eric NORDBERG[1], Lance DEVINE[2], and Daniella TEIXEIRA[2]

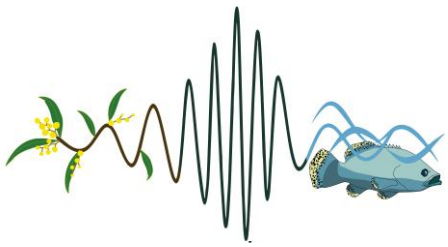
[1] *University of New England*

[2] *Queensland University of Technology*

** Presenting author*

Population density estimation underpins effective biodiversity monitoring, threat assessment, and evaluation of conservation interventions. In Australia's temperate woodlands, ecosystems that have experienced up to 85% clearing, avian community declines persist despite the stability of some species. A key driver of these declines is the Noisy Miner (Manorina melanocephala), an aggressively territorial honeyeater that suppresses small woodland birds once miner densities exceed 0.60–0.83 individuals per hectare. These impacts have led to culling as a management strategy, highlighting the need for scalable and reliable methods to detect and estimate Noisy Miner abundance. This study tested whether passive acoustic monitoring, coupled with an automated call recogniser, can be used to detect and estimate Noisy Miner population sizes. Acoustic recordings were processed using the Noisy Miner Call Recogniser V1, with detections modelled against manually verified recordings and concurrent field-based point-count surveys. The recogniser detected Noisy Miners with more than 85% accuracy and was able to confirm their presence at study sites within 3 hours, if present. Further analyses quantified the relationship between recogniser-derived vocalisation counts and the number of individuals recorded within a standardised 100 m radius, and under an unrestricted detection framework. A strong, consistent positive relationship was identified between recogniser detections and observed abundance. Within a 100m radius, the number of individuals could be estimated using detection counts (individuals ≈ detections / 8.882). A comparable relationship was observed (individuals ≈ detections / 8.377), without spatial constraints, demonstrating consistency and strength across detection methods. These findings show that automated acoustic detection provides a robust and scalable method for estimating Noisy Miner density. Although estimates remain sensitive to ecological context, colony structure, and calling behaviour, standardised processing enables consistent large-scale inference. This approach supports the integration of passive acoustic monitoring into woodland bird management, informing targeted interventions and long-term conservation outcomes.

Related topics: *Ecological inference, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

Listening Together: How the Land Libraries Project has Connected Private Landholders with the Acoustic Tools for Conservation

Joel STIBBARD[1*], James LIDSEY[1], and Alice MCGRATH[1]

[1] *NSW Biodiversity Conservation Trust*

** Presenting author*

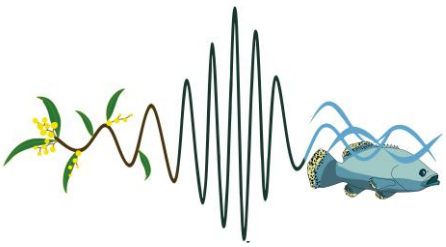
It is estimated that close to two-thirds of Australia's land is privately owned, with a substantial proportion of threatened species habitat occurring within this area. Monitoring biodiversity on private land presents an ongoing challenge due to limitations to access and long-term monitoring capacity. The Biodiversity Conservation Trust's (BCT) Land Libraries Program was developed to address this gap by empowering landholders with the skills and tools to monitor biodiversity on their properties. Central to this approach was acoustic monitoring, which used passive acoustic recordings to tell a story of species diversity on private land. Thus, the program aims to build local capacity for long-term species monitoring while simultaneously improving the quality of ecological data in underrepresented regions.

To achieve this, the BCT Education Team delivered hands-on training, provided equipment loans for song meters and coordinated structured monitoring periods. Ecologists then analyse the data, identify species and return clear, interpreted results to each participating landholder. Verified datasets then flowed into the external biodiversity repository NSW BioNET, enhancing the collective knowledge base for decision-making. To enable identification of a greater number of species, the BCT applied the BirdNET automated analysis tool. This has substantially expanded monitoring capacity, increasing avian species identification from 10 to more than 200 species per property.

To date, the Land Libraries Program has had over 892,000 hours of survey effort, recording more than 13,000 species, 1,100 of which are threatened species. After the program 100% of landholders were able to identify key management actions to enhance biodiversity as a direct result of the project.

By combining passive acoustic recording with automated analysis tools, the program overcomes many traditional barriers to biodiversity monitoring, including knowledge, resources and expertise. The program builds local stewardship and provides a clear pathway for engaging private land in acoustic monitoring.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

FAIR Practices in Ecoacoustics: State of the Art Review, Challenges and Opportunities for Data Stewardship

Joëlle Stocker[1*], Joëlle Stocker[2], Ricardo Beldade[3], and Anna Fensel[2]

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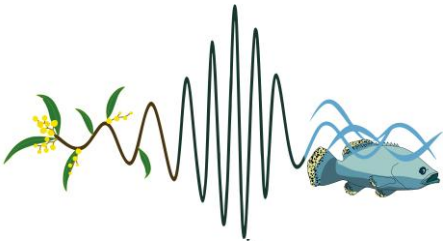
[3] *Gump South Pacific Research Station, University of California Berkeley, French Polynesia*

** Presenting author*

Academia currently finds itself at a crossroad, with advances in data science and AI unlocking great research potential, whilst also creating obstacles for accountability, such as through intransparency and poor-quality datasets. To tackle this, frameworks stipulating data handling are needed, especially when it comes to complex datasets such as those used in ecoacoustics. Here, we present a state of the art on the adoption of the FAIR (Findable, Accessible, Interoperable and Reliable) principles for data management in ecoacoustics, through a literature review and interviews with ecoacoustic researchers. We identified challenges and opportunities concerning FAIR implementation, relating to ethical frameworks such as CARE (Collective benefit, Authority to control and Responsibility and Ethics) and OLR (Ownership, Localisation and Regulatory compliance). We found under-utilisation of the FAIR principles in the field, in part due to differing interpretations of FAIR and limited resources facilitating FAIRification. The first mention of the FAIR principles in ecoacoustic research took place in 2021, five years after they were adopted as best practice in research. Key barriers are inconsistent metadata practices, scarce machine-actionable standards, low findability of existing resources, and heterogeneous FAIR interpretations. Research infrastructures show greater progress, but community-level standards and granular vocabularies are lacking, impeding interoperability and reuse. CARE considerations are rarely integrated in the literature, although concerns related to data privacy and security are more prominent. Going forward, special attention should be placed on the publication of domain-specific standards and semantic types, ensuring they are registered in searchable resources, the development of ecoacoustic ontologies, the implementation of access-control protocols that respect legal and community rights, and we recommend the use of the GO PLAN framework for project- and resource-level FAIRification.

Related topics: *Future-forward/innovative*



Presentation format: *Open talk*

Event-Driven Acoustic Monitoring for Asian Elephant Rumble Detection Using Edge-Based Classification

Aekkarach Suwan[1*], Suchaisri Lion[1], Nont Kheawwan[1], Sittichai Jinamoy[2], Jiraporn Teampanpong[3], Aphirak Jansang[1], Anan Phonphoem[1], and Chaiporn Jaikaeo[1]

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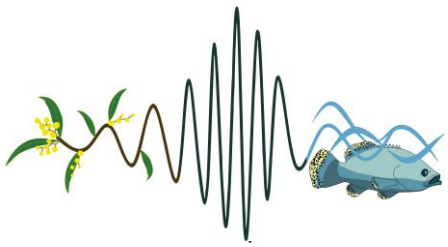
** Presenting author*

Human–Elephant Conflict (HEC) involving the Asian elephant (Elephas maximus) has intensified across many regions of Thailand, posing significant challenges to both agricultural productivity and human well-being. Existing approaches to transmitting elephants' infrasonic sounds to the cloud for classification often result in high communication overhead and energy consumption. We therefore redesign the system as an edge-based intelligent system for infrasound-based elephant detection built on a custom-designed ESP32-based sensing node, enabling long-range, non-invasive monitoring without disturbing elephant behavior. It presents an event-driven acoustic analysis framework on the sensing node, where audio signals are processed locally using rule-based trigger detection, TinyML, and Linear SVM. Irrelevant data is discarded to minimize unnecessary transmission, while detected signals are transformed into spectrograms for classification and visualized through a near-real-time web application, reducing bandwidth usage and enabling near-real-time remote monitoring. The classification accuracies are 66.67%, 68.52%, and 98.15% for the rule-based method, TinyML, and Linear SVM, respectively. The dataset consists of 108 audio samples, including 47 elephant vocalizations and 61 non-elephant environmental sounds. Compared to a cloud-based approach that transmits all data, the system reduces data transmission by 23.15%, 26.85%, and 49.07% for the rule-based method, TinyML, and Linear SVM, respectively. Energy consumption analysis further confirms the benefits of the edge-based approach. Compared to the cloud-based method, the system reduces average current and daily energy consumption by up to 46.96%, with Linear SVM achieving the highest reduction. The system is particularly effective in scenarios where elephant vocalizations occur infrequently, as the event-driven mechanism minimizes unnecessary transmissions. However, performance depends on dataset composition and may vary under different environmental conditions. Overall, the proposed system enables efficient near-real-time acoustic monitoring while significantly reducing communication overhead and energy consumption, making it suitable for practical deployment in mitigating HEC.

Related topics: *Conservation technology, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

Occupancy of Glossy Black-Cockatoos using passive acoustics and conventional surveys

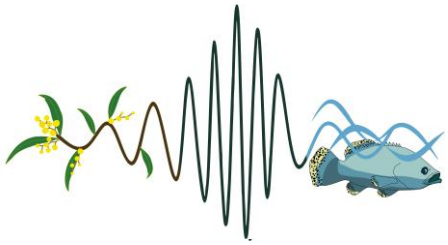
Daniella Teixeira[1*]

[1] *QUT*

** Presenting author*

Glossy Black-Cockatoos are a specialised, long-lived species with low reproductive output. These traits make them particularly vulnerable to threats like habitat loss, inappropriate fire and drought. Following widespread impacts from the Black Summer fires, the species is now nationally threatened and a recovery plan is being drafted. A key knowledge gap is the species' population trends. This is partly due to the difficulties of monitoring; the birds have a large but patchy distribution, they occur in low densities and are typically cryptic in behaviour. In this talk, I will discuss our current research using bioacoustics and machine learning to monitor the occupancy of Glossy Black-Cockatoos in south-east Queensland. Over five years, we monitored up to 100 sites, across breeding and non-breeding seasons, using passive acoustic recorders and on-ground surveys. The birds' occupancy was confirmed from audio recordings using a custom BirdNET model with manual validation. Given the birds' cryptic nature, our approach prioritises recall over precision. Results show that acoustic monitoring greatly improves detection probability over traditional approaches. Occupancy is influenced by habitat quality and extent and, to a lesser degree, fire history. I will discuss the conservation implications of this work and what needs to happen next to help conserve this vulnerable population.

Related topics: *Monitoring*



Presentation format: *Open talk*

Researching Songlines with new technologies

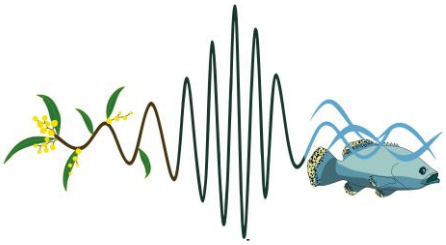
Jacinta Tobin[1*]

[1] *The University of Sydney*

** Presenting author*

Researching Songlines with new technologies By Dr Jacinta Tobin I am a sovereign woman of Dharug dalang (tongue) also known as Eora (people from here) who cover the Blue Mountains to Sydney area. Dharug Songlines are my cultural responsibility and my living practice. My Research will harness modern technology to show effects of song and ceremony. My methodology is practiced based research, exploring the emergence of new technology such as infrasound and ultrasound as well as magnetic field recordings, as a form of mapping Country. Walking with Dharug on Country in its living landscape, through our living culture. There is a science that has always been practice in this Country, a robust practice that sustained magnetic fields from time in memorial. Using model technology, I will record those connections and influences we as humans have on Songline through ceremony and song. Here in Dharug Ngurra life and those old songlines have been carved up, torn, built on even dammed but the song sing on, it never goes away they are still here ever present. The big question is can those lines which have been mined or disturbed still work as a co-creative space. Maybe some may have to take a different route due to the disruption but until serious research into those fields and human interaction is done, we will never know. The goal is to create music for other than human, to assist in heal, caring for and rejoicing once more in our, inter species communication corrobborees with Country. Show the effects and relationships through Dharug connection to Country as a living culture. Setting a future vision from the right intention through song, for healthy water ways, Dharug clans moving on Song lines, restoring, engaging with respect in the interaction and intercommunication through authentic bloodline connections.

Related topics: *Soundscapes, Future-forward/innovative, Cultural*



Presentation format: *Open talk*

Open Ecoacoustics: New Features and Platform Updates

Anthony Truskinger[1*], Anthony Truskinger[1], Philip Eichinksi[1], Andrew Schwenke[1], and Paul Roe[1]

[1] *Open Ecoacoustics*

** Presenting author*

Open Ecoacoustics is an ARDC-supported, national-scale Australian meta-platform for applied ecoacoustics. It enables large-scale acoustic monitoring through cloud-based storage, sharing, annotation, and analysis of audio data. The platform consists of several open source projects, including the Acoustic Workbench: a generic and customizable ecoacoustics data management platform. Here we present highlights recent updates, new features, and planned improvements of the platform that support the continued scaling of ecoacoustic research and monitoring.

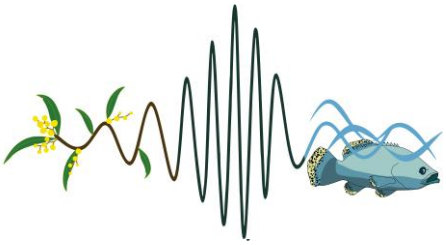
Design of the platform is driven by users through feedback, co-design surveys, and interviews. Development is ongoing but is driven by an open source ethos and a commitment to FAIR principles. This includes reusable web components for audio visualisation and interaction, shared microsite templates for rapid deployment of public-facing workflows, and recognizer publication templates that support versioned model release, linked training and test data, performance reporting, and citable outputs. Interoperability work has also been aligned with emerging standards efforts around Camtrap DP for bioacoustics to improve FAIR data exchange.

We will present new mapping and reporting modules in the Acoustic Workbench; automated analysis and embedding generation on ingestion; single sign-on; and standards-based data export using the proposed Camtrap DP bioacoustics profile to support FAIR data exchange.

Platform impact is reflected in sustained growth: year-on-year increases of 120% in users, 137% in total audio duration, and 6700% in detected annotations. This sharp rise in annotations has been driven by a continental-scale BirdNET analysis across the full 400-year A2O dataset. Together, these updates demonstrate how improvements to platform capability, usability, and interoperability are supporting larger and more efficient ecoacoustic workflows.

Open Ecoacoustics continues to expand its capacity to support ecoacoustic data management, analysis, and exchange at scale. These updates position the platform to better serve researchers, practitioners, and monitoring programs, while providing a strong foundation for future development and broader adoption.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

A remotely deployed multi-sensor biodiversity assessment tool integrating passive acoustic monitoring, camera traps, and satellite remote sensing for agricultural landscapes

David Tucker[1*], Ella Dewilde[2], and David Rowlings[3]

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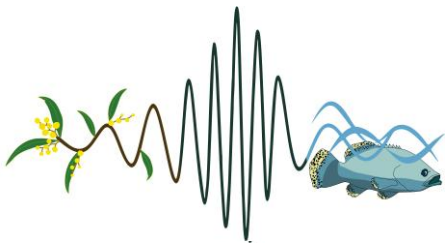
[2] *Sustainable Agroecosystems, School of Biology and Environmental Science, Queensland University of Technology, Australia*

[3] *Sustainable Agroecosystems, School of Biology and Environmental Science, Queensland University of Technology*

** Presenting author*

Biodiversity assessment in agricultural landscapes requires a reference assemblage against which on-farm sensor detections can be compared, but characterising intact-condition assemblages has traditionally required physical access to reference sites in the conservation estate, limiting scalability and excluding most private landholders. We developed a remotely deployed biodiversity assessment tool integrating passive acoustic monitoring (AudioMoth and BirdNET), camera traps, satellite-derived vegetation indices, and landscape metrics into a composite 0 to 100 ecological integrity score. Reference calibration uses a novel Atlas of Living Australia (ALA) threshold framework: occurrence records filtered to protected areas within optimised buffer zones provide bioregion-specific, percentile-based thresholds for the Acoustic Recorder and Camera Trap indices. For each survey site, three candidate buffer distances are evaluated using species accumulation curves and the inflection-point radius selected. The acoustic component benchmarks native bird species richness, indicator presence frequency, and acoustic activity rate against BirdNET-filtered ALA records. An Ecological Condition Index applies elastic net regression to EVI, fractional vegetation cover, patch metrics, and eBird-derived indicator assemblages. Deployed across eight properties in two Queensland bioregions (Brigalow Belt South and South-East Queensland), the tool produced ecologically interpretable integrity scores spanning Very Low to High condition classes. Acoustic and camera trap components showed directional agreement with botanical condition assessments across index-eligible survey points. Accumulation-curve-selected buffer radii were stable and geographically-specific, and threshold parameters were ecologically coherent with habitat associations for intact vegetation fauna. Multi-sensor biodiversity assessment calibrated against a continental fauna and flora dataset can achieve scalable, landowner-deployable ecological integrity monitoring without specialist field visits or physical reference site access. The ALA-derived threshold framework provides a reproducible, location-specific calibration pathway applicable to biodiversity crediting, nature repair market assessment, and stewardship program monitoring in Queensland agricultural landscapes.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Open talk*

Using soil vibrations to analyze the effects of unsustainable selective logging on soil invertebrate communities

Joakim VAAGEN[1*], Stanton Pitu Mosah[2], Lesley Vigulu[3], Ikuo Gumo Tigulu[2], Bastiaan Van Gemert[4], Brittany Elliott[5], Eric Katovai[6], Helen Wallace[4], Elektra Grant[4], and Susan Fuller[7]

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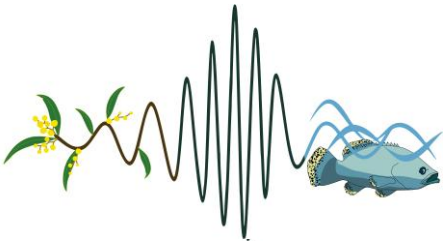
** Presenting author*

Soil is a central component in the functioning of tropical rainforests. Yet, soil biodiversity monitoring is frequently overlooked in ecological assessments of disturbance, leaving gaps in our understanding of how some of the most pervasive drivers of the biodiversity crisis affect ecosystems such as tropical rainforests. Selective logging is one of the most widespread drivers of habitat degradation across the tropics, yet its effects on soil invertebrates remain poorly understood, particularly at high extraction levels across multiple-entry logging events. The logging practices in the Solomon Islands represent such a case, making them among the least sustainable in the tropics. A growing, but still limited, body of research suggests that acoustic methods can be used as a minimally invasive and efficient method to monitor soil invertebrate communities. In this study, we leverage the efficiency of soil acoustic monitoring to examine how soil soundscapes relate to the abundance and diversity of soil, and how these relationships are influenced by selective logging in a heavily logged tropical rainforest. Sites in the Solomon Islands were analyzed using acoustic indices across a logging chronosequence (logged 1-5 years ago, 25-30 years ago, and unlogged). Soil samples were collected at the recording sites, and soil invertebrate abundance and diversity will be quantified using manual counts and DNA metabarcoding. Preliminary results show that unlogged forest soundscapes were more complex and even than those of forests logged approximately 25-30 years ago. Forests logged approximately 1-5 years ago were statistically indistinguishable from both unlogged forests and forests logged 25-30 years ago. Ongoing work is quantifying soil invertebrates at each location and relating their abundance and diversity to soundscape metrics, helping to clarify the link between soundscapes and soil invertebrate abundance and diversity. Together, these analyses highlight the potential of soil acoustics for monitoring habitat degradation in tropical rainforests.

Related topics: *Soundscapes, Monitoring, Soil Acoustics*



Presentation format: *Open talk*

NOAA's Passive Acoustics Strategic Initiative – Building Open-Source Applications, Analytical Capability, Community Data Standards and Ecological Metrics.

Sofie Van Parijs[1*], Berchok[2], Gedamke[3], Holt[4], Rankin[5], Soldevilla[6], Oleson[7], and Van Hoeck[8]

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[2] *Catherine, Alaska Fisheries Science Centre, NOAA Fisheries, USA*
[3] *Jason, Office of Science and Technology, NOAA Fisheries, USA*
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[5] *Shannon, Southwest Fisheries Science Center, NOAA Fisheries, USA*
[6] *Melissa, Southeast Fisheries Science Center, NOAA Fisheries, USA*
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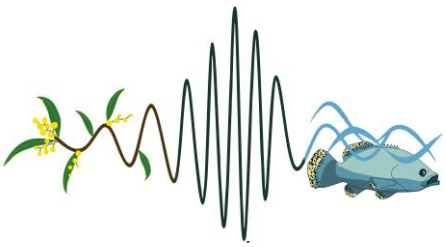
[8] *Rebecca, Northeast Fisheries Science Center, NOAA Fisheries, USA and Wall, Carrie, University of Colorado Boulder, USA*
** Presenting author*

Over the last five years, the National Oceanic and Atmospheric Administration (NOAA) has funded an effort to operationalize passive acoustic monitoring (PAM) technology in support of its oceans mandate. As a result, a core team of experts have been working to establish the tools needed for PAM to become an integral part of national-scale long-term monitoring and mitigation efforts aimed at protecting marine species and their environment. The focus has been on five core areas; 1) Establishing a Cloud based analytical center capable of holding petabytes of data, running efficient software detectors to create data products focused on monitoring long term trends in underwater soundscapes, marine species population assessment.. 2) Creating an ISO compliant standardized PAM database and global web-based data visualization tool (PACM) that anyone in the ecoacoustics community can contribute to. 3) Expanding open source R packages (PAMScapes and PAMverse) to allow for the easy reproduction of core data products and figures commonly used in Soundscape research, PAM species monitoring and environmental or anthropogenic data integration. 4) Accelerated archiving at the NOAA National Centers for Environmental Data to promote broader availability of long-term PAM recordings and annotated data sets to the ecoacoustics community. 5) Expanding new technological applications such as the use of autonomous vehicles and drifting buoys. These applications include establishing a real time PAM monitoring network for mitigating ship strike of large whales, estimating species abundance and protecting sensitive fisheries spawning grounds. This presentation will provide information on all open source PAM tools, as well as how users can access and use these applications for data collected in marine, riverine or terrestrial environments.

Related topics: *Applied ecoacoustics, Monitoring, Future-forward/innovative*



Presentation format: *Open talk*

Symposium: *Listening as Ecological Practice: Ecoacoustics, Artistic Research, and Community Engagement*

Hearing Now: Connecting people to place through soundscape performance in Noosa, Australia

Finley Wegener[1*]

[1] *UniSC*

** Presenting author*

In the related fields of soundscape composition and ecological sound art, sound is widely recognised as a medium with unique capacity to foster empathetic connections between audiences and the natural world due to its immersive and ephemeral qualities. Hearing Now was a practice-based research project conducted by Finley Wegener at the University of the Sunshine Coast that explored ecological sound art as site-responsive, durational performances of experimental music in natural spaces. In 2025, Hearing Now featured in Noosa's biennial Floating Land festival as a weekly two-hour performance in collaboration with Lake Cootharaba. The five weekly iterations became a site for study within Finley's Masters project, where qualitative research evaluated audience attitudes and informed iterative development. Methods of reflective journalling, observation, interviews with collaborators and surveys conducted through voicemail messages captured shared moments of environmental observation as well as internal experiences of audience members. The project found that long-form musical performances that participate in the broader soundscape and respond to ecology can cultivate deep appreciations of natural places by supporting long periods of observation in an emotionally engaging setting. Results emphasise the role of clear interaction between performers and the environment, achieved either through technology or musical interpretation, in creating meaning, as well as the high degree of autonomy that audience members maintain in how they interpret the artwork. While the study supports consensus in the fields of soundscape composition and acoustic ecology, the depth of insight into audience perspectives is quite novel. Hearing Now suggests that ecological sound art performances cultivate connections between people and ecology by becoming sites for autonomous inquiry in which audiences are supported to observe and interpret the environment on their own terms within a meaningful context.

Related topics: *Soundscapes, Arts*

Presentation format: *Open talk*

Soundscapes Under Influence An artistic and scientific exploration of semantic and aesthetic soundscape listening

Philippe Woloszyn[1*], and Kahina Ikni[2]

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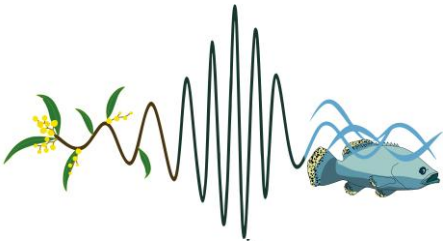
** Presenting author*

Introduction: Our proposal relates the encounter between soundscape researchers and musicians who perform concerts in nature, into a project called AmbiMuse, winner of the FACTS Festival organized by the University of Bordeaux in 2025. The project aims to investigate the impact of acoustic integration of musical sounds within the environment, generating hybrid soundscapes balanced between the original natural ambiance and musical in situ interpretation. Methods: This was experimented in two restorative areas - Bordeaux Metropolis expertise sites- , where spaces are specifically intended to promote relaxation and psychological recovery. A shared discussion about listening practices and space-time modelling allowed us to qualify the mutual influences between scientific research and artistic expression in soundscape creation. Results: The results obtained in eco-acoustics, along with the reflexive process they generated, will be developed in two parts: (1) The presentation, structure, and outcomes of the collaborative work between musicians and researchers. (2) Sound time-mappings produced through a combination of two listening-based methods for identifying sound sources -the SACSSO method (Sound Content Sequence Analysis System) and the ambient sound objects dimensional survey. Conclusion: The twin interpretation of music and sound environmental data - understood as anthropophonic, biophonic, and geophonic sources structure - can only be grasped under specific conditions: a simultaneous practice of both reduced listening (according to Pierre Schaeffer: listening to the sound for itself - aesthetic listening way) and causal listening (an “environmental” mode of listening - implying phenomenological soundscape semantics). This dual approach allows us model the spatial and temporal dimensions of the landscape ambient components.

Related topics: *Soundscapes, Arts*



SPEED TALK

Presentation format: *Speed talk*

Insights on fish sounds from portable audio-video array

Juan Carlos Azofeifa-Solano[1*], Xavier MOUY[2], Christine ERBE[3], Rohan M. BROOKER[4], Robert D. MCCAULEY[5], Craig A. RADFOR[6], and Miles J. G. PARSONS[7]

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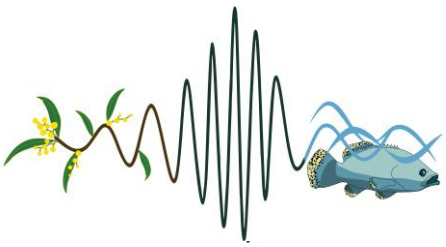
** Presenting author*

Characterising fish vocalisations is essential for understanding species-specific ecology and the environmental factors that shape communication. Despite the ecological importance of fish sound production, many calls remain unattributed, hindering the use of bioacoustics in biodiversity monitoring. This study utilised portable audio-video arrays to investigate the acoustic courtship signals of two sympatric damselfishes (Dascyllus aruanus and D. reticulatus) across multiple reef systems. By integrating multi-hydrophone localisation with synchronized video observations, we enabled the automated detection of pulse trains and precise behavioural validation. Our findings reveal significant interspecific variation and, notably, strong population-level divergence in call structure. Site-specific effects were found to outweigh species differences, suggesting that local environmental factors—particularly thermal conditions—may modulate sound production performance. These results indicate that rising ocean temperatures could potentially constrain acoustic communication in these species. Our research demonstrates that combining high-resolution spatial arrays with behavioural context not only facilitates species-specific monitoring but also provides critical insights into how social signals vary across spatial scales. This integrative approach enhances the application of fish bioacoustics within broader ecological and conservation frameworks.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Speed talk*

Comparative performance of BirdNET, Perch and VicFrogNET for automated acoustic classification of birds and frogs in south-eastern Australia

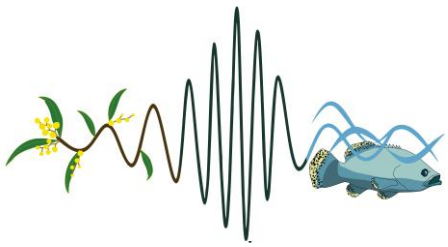
Kristian Bell[1*]

[1] *RMIT*

** Presenting author*

Passive acoustic monitoring (PAM) combined with automated deep learning classifiers offers a scalable approach to biodiversity monitoring, yet classifier performance remains poorly characterised, particularly outside of Europe and North America. We evaluated three open-source classifiers — BirdNET (v2.4), Perch (v2), and VicFrogNET — for automated acoustic identification of birds and frogs in south-eastern Australia, benchmarking each against a dataset of expert-validated audio clips. For birds, Perch outperformed BirdNET overall, correctly identifying the expert-validated species more often. However, BirdNET demonstrated broader taxonomic coverage, detecting a greater number of unique species and achieving higher precision at equivalent recall levels, suggesting it retains an advantage for rarer or acoustically challenging taxa. For frogs, Perch substantially outperformed VicFrogNET across all metrics, achieving higher top-1 accuracy, recall, precision, and F1 score. VicFrogNET showed competitive per-species precision for several target species, but generated a higher rate of detections for species not present in the dataset, limiting its utility for open-ended surveys where the target assemblage is unknown. Together, our results highlight that no single classifier is optimal across all taxa or use cases, with BirdNET and Perch offering complementary strengths for birds. We hope that transparent, species-level benchmarking allows practitioners to make informed choices about classifier selection, confidence thresholds, and target species combinations - turning classifier limitations into manageable, quantifiable parameters rather than unknown sources of error.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Speed talk*

Divergent Scaling in Fire-Maintained Landscapes: Mono- vs. Multifractal Soundscape Geometry as Indicators of Avian Diversity and Forest Structure

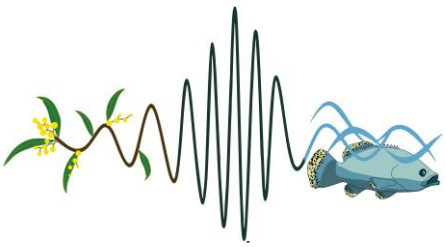
Gabriel CAHALAN[1*]

[1] *The Nature Conservancy*

** Presenting author*

In the face of climate change and habitat loss, land managers are faced with increasingly difficult choices on how to maintain the biological integrity of protected areas. Since 2008, The Nature Conservancy has utilized controlled burns and selective timber harvests to restore a more diverse forest structure at the Nassawango Creek Preserve—a critical stop-over and breeding area planted in loblolly pine (Pinus taeda L.) on the Atlantic coastal plain. To evaluate these habitat management strategies, ecoacoustics provides a window into avian spatial dynamics. We deployed autonomous recording units across this 2,000-hectare fire-maintained landscape to examine how fire and timber harvesting impact bird diversity. Using BirdNET, we isolated discrete avian vocalization events from the recordings. To quantify the topological roughness of the acoustic waveforms, we computed the 1D monofractal dimension of each clip (Higuchi, Katz, box counting) and calculated the Hurst and Lipschitz-Hölder exponents using multifractal detrended fluctuation analysis (MFDFA) and Chhabra-Jensen (MFCJ) methods. To measure the diversity of vocal activity while correcting for sample size biases, we applied the Chao-Shen estimator, which statistically adjusts for unobserved species based on the frequency of rare, single detections. Our analysis revealed divergent mathematical scaling behaviors in the soundscape. We found a significant negative correlation between standard monofractal dimensions (HFD, Katz) and the diversity index. Conversely, the multifractal dimension (MFDFA) was positively correlated with the diversity index. Ultimately, recording sites with a longer history of prescribed fire, exhibited lower mean monofractal dimensions but higher multifractal complexity. These results suggest that while monofractal dimensions capture the physical acoustic changes of a post fire understory, multifractal metrics measure the complexity of the avian community. In this presentation, we will explore this divergent soundscape geometry to demonstrate how a fractal soundscape can be used to evaluate fire management outcomes.

Related topics: *Soundscapes, Ecological inference, Applied ecoacoustics*



Presentation format: *Speed talk*

Integrated monitoring for cryptic Black-breasted Button quail

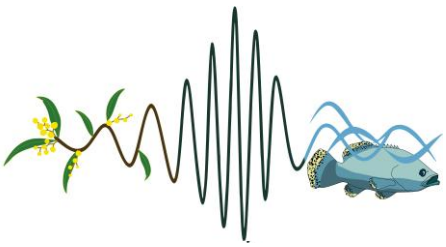
Sydney Collett[1*]

[1] *Burnett Mary Regional Group*

** Presenting author*

The Black-breasted Button-quail (Turnix melanogaster) is a threatened, cryptic grounddwelling species whose monitoring is constrained by low detectability, dense habitat structure, and infrequent vocalisations. These limitations reduce the effectiveness of conventional survey methods and highlight the need for improved detection approaches. Passive acoustic monitoring offers a promising tool for surveying elusive species, but its application to rarely vocalising taxa requires careful consideration of temporal sampling design. Acoustic recorders are deployed to capture vocal activity, while camera traps continuously monitor ground-level movement and behaviour. Environmental samples are collected and analysed for species-specific DNA to assess indirect detection. These three approaches are implemented concurrently to enable direct comparison of detection performance and to assess their relative suitability for long-term monitoring of this species. As this project is ongoing, results are not yet available. However, preliminary field deployment has demonstrated the logistical feasibility of integrating these approaches within a single monitoring design, and is generating datasets suitable for cross-method comparison. This work will inform the development of more reliable monitoring strategies for Black-breasted Button-quail and other cryptic terrestrial species.

Related topics: *Conservation technology, Monitoring*



Presentation format: *Speed talk*

Attunement as Method: Spatial Audio Installation and Ecological Encounter

Kristina Dutton[1*], and Ken Pearce[2]

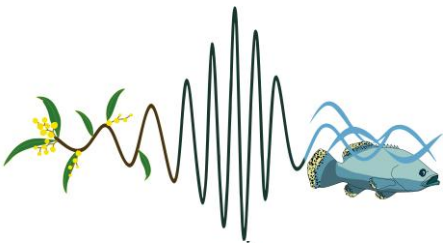
[1] *Various project partners, USA, Sweden*

[2] *spatial sound designer and engineer, Tremology Lab*

** Presenting author*

Sound is not simply heard, it is experienced. This distinction shapes the practice I want to describe: spatial audio installation as a way of creating conditions in which ecological relationships are not just known, but physically understood. Two works inform this inquiry. Both works emerge from a fundamentally phenomenological approach: not to explain ecological experience, but to reveal it. The first, developed with spatial audio engineer Ken Pearce and the Estuary Ocean Science Center in Tiburon, California, renders humpback whale bubble net feeding in full spatial audio. Listeners encounter the geometry of coordinated predation from within it — the escalating calls of the lead whale, the circling formation, the momentum of the hunt building around them, the whales rising and crashing back into water above. The experience is visceral: a felt comprehension of coordinated animal intelligence that resists translation into any other format. The second, developed with the Swedish Royal Academy of Sciences' Anthropocene Lab, and the Baltic Seabird Research program AukLab, renders the vertical ecological architecture of Stora Karlsö island through a multi-level speaker array. Waves and seabirds occupy the lowest level; forest sounds the middle; auks and wind rise above; the island's plateau crowns the top. Listeners navigate vertical acoustic niches and habitats as a physical journey, arriving at an embodied understanding of how organisms distribute themselves through this landscape. The beauty of nature is impersonal, and requires receptivity rather than consumption. This understanding develops through encounter and exposure. Spatial audio offers a sense of immersion where understanding emerges through attunement rather than analysis. Audiences close their eyes, smile, move involuntarily toward the sound. They leave with an embodied understanding of—and perhaps connection to—these ecosystems. This presentation considers what such visceral encounter might offer ecoacoustics.

Related topics: *Soundscapes, Future-forward/innovative, Arts*



Presentation format: *Speed talk*

Evaluating Audio Foundation Models for Freshwater Acoustic Monitoring

Toby Gifford[1*]

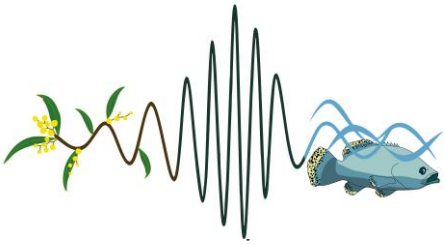
[1] *University of the Sunshine Coast*

** Presenting author*

The rapid emergence of large pretrained audio models offers new possibilities for passive acoustic monitoring in ecological contexts where labelled data is scarce and soundscapes are complex. This presentation revisits a richly annotated freshwater underwater acoustic dataset originally described by Linke et al. (2020), comprising over 8,000 sound events across 44 fine-grained categories recorded continuously over six days in two connected tropical waterholes in northern Australia, and uses it as a testbed for evaluating contemporary AI-based approaches to bioacoustic analysis. A range of methods spanning supervised classification, few-shot sound event detection, neural source separation, and unsupervised representation learning are applied and compared, examining what each can and cannot recover from a complex natural soundscape without domain-specific retraining. The results reveal both promising capabilities and consistent limitations of general-purpose audio models when applied to a specialised acoustic domain for which they were not trained. The implications for monitoring programme design and the role of expert annotation in guiding and evaluating automated approaches are discussed.

Linke S, Decker E, Gifford T, Desjonqueres C. (2020). Diurnal variation in freshwater ecoacoustics: Implications for site-level sampling design. Freshwater Biology 65:86–95.

Related topics: *Soundscapes, Monitoring, Water*



Presentation format: *Speed talk*

Preliminary investigation into the Effects of Traffic Surges on Gibbon Vocal Behavior in a Forested Landscape of West Sumatra, Indonesia

Umar Fhadli Kennedi[1*], Mhd Muhajir Hasibuan[2], Karlina Indraswari[3], and William Laurance[3]

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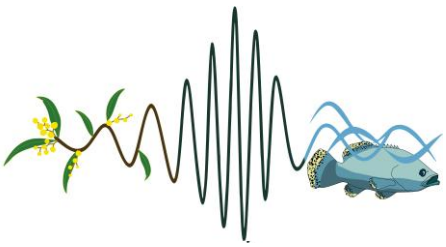
[2] *Department of Forestry Engineering, Institut Teknologi Sumatera, Indonesia*

[3] *Centre for Tropical Environmental and Sustainability Science, and College of Science and Engineering, James Cook University, Australia*

** Presenting author*

The Eid al Fitr holiday in Indonesia triggers a major movement of people travelling back to their hometowns, leading to a sharp increase in vehicle traffic, including on roads that pass through forested areas. This phenomenon creates short term but intense pulses of anthropogenic noise in forested landscapes, with potential consequences for wildlife that rely on acoustic communication. Gibbons are among the primates that depend on long distance vocalizations as a key component of their natural behavior. This study provides a preliminary assessment of how this temporary surge in traffic may influence gibbon acoustic behavior in the Sopo Tinjak forested landscape of West Sumatra. Fieldwork was conducted from 26 March to 2 April 2025 along a road that bisects the Sopo Tinjak Protected Forest, using an Acoustic recorder deployed for seven consecutive days. The recorder captured 30 minutes of soundscape for every hour across a full 24-hour cycle. Acoustic data were manually annotated with a primary focus on primate vocalizations and anthropogenic noise. Acoustic features were extracted from annotations and used to characterize each sound category, and this was followed with statistical comparisons to examine differences in gibbon calls during and after the Eid period. In total, 52 gibbon vocalizations (38 of Agile Gibbons and 14 Siamangs), and 1387 anthropogenic sounds were annotated and revealed significant differences in the acoustic features of Gibbon calls across the three periods. These preliminary findings suggest that short term traffic surges may alter gibbon movement and vocal behavior, with the changes persisting even 2 days after the traffic surge.

Related topics: *Soundscapes, Applied ecoacoustics, Monitoring*



Presentation format: *Speed talk*

A novel spectrogram-matching method for manual verification of wildlife calls: bats as a case study

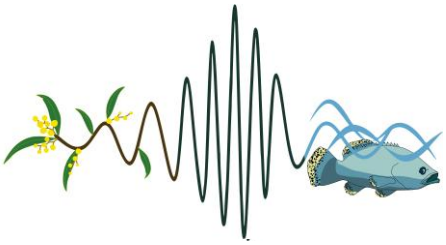
Lachlan McRae[1*]

[1] *Flyway Ecology*

** Presenting author*

Identification of wildlife sounds can be difficult where call shape and characteristics overlaps among taxa, variation within species is high, and existing software does not support efficient fine-scale visual comparison. I present a novel spectrogram-matching workflow using SpectraLayers Pro that enables multiple known calls to be overlaid to create composite visual reference sets. These reference sets capture the range of variation within a species and can be compared directly with unknown calls by visually aligning candidate signals against alternative templates. Using bats as a case study, I demonstrate how this method may support manual verification of difficult calls by providing an intuitive visual comparison workflow that can be used by both experienced and beginner call analysts. Although currently qualitative, the approach shows promise as a flexible tool for ecoacoustic workflows and may be transferable to other taxa, including frogs, birds, mammals and other vocal wildlife.

Related topics: *Applied ecoacoustics, Future-forward/innovative*



Presentation format: *Speed talk*

Using recognisers to identify bird community condition for informing a natural capital account

Jessie Moyses[1*], Dr Simon Linke[2], Dr James Bishop[3], Dr Ayesha Tulloch[4], Queensland University of Technology, Dr Hannah Fraser[5], and Dr Courtney Melton[6]

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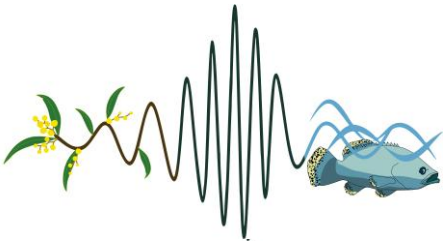
[2] *CSIRO Environment*
[3] *CSIRO Agriculture and Food*
[4] *School of Biology and Environmental Science*
[5] *School of Environment, University of Queensland*
[6] *Bush Heritage Australia*
** Presenting author*

Investment in nature set-aside areas and biodiversity-friendly farming approaches is of growing interest to governments and the agricultural sector. To expand knowledge on the natural values of an agricultural property in the NSW tablelands, Southeastern Australia, we assessed the condition of the woodland bird community, using a new condition scoring approach. We evaluated the consistency of woodland bird community condition scores across time and space from six months of continuous acoustic recordings and compared scores achieved using BirdNET and Perch models. We hypothesised that the degree of clearing at recording locations would influence spatial variation in bird community condition across the property and that the presence and absence of seasonal migratory birds would drive temporal variation. This test case for assessing a fauna community using acoustic data reveals that automated recognisers have strong potential in expanding Australia's natural capital accounting methods and can be used to evaluate the effectiveness of conservation management interventions on agricultural land.

Related topics: *Ecological inference, Applied ecoacoustics*



Presentation format: *Speed talk*

Unique soundscapes reflect the diversity of habitats in a tropical seascape

Clelia Mula[1*], Clelia Mulà[2], Rohan M. Brooker[3], Christopher J. Fulton[3], Miles J.G. Parsons[4], Shaun K. Wilson[3], and Juan Carlos Azofeifa-Solano[5]

[1] *University of Western Australia*

[2] *School of Biological Sciences, The University of Western Australia, Australian Institute of Marine Science*

[3] *Australian Institute of Marine Science, Oceans Institute, University of Western Australia*

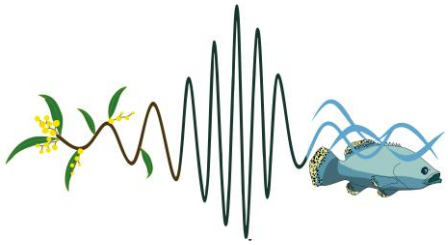
[4] *Australian Institute of Marine Science, Oceans Institute, University of Western Australia, Centre for Marine Science and Technology, Curtin University*

[5] *Australian Institute of Marine Science, Centre for Marine Science and Technology, Curtin University*

** Presenting author*

Underwater soundscapes can provide sensory cues that influence the habitat-use of aquatic organisms, spanning all life-stages from larval settlement to migration and foraging of adults. While coral reef soundscapes have been the focus of growing research interest in the context of larval fish settlement, the role of soundscapes in other common habitats such as macroalgal meadows remains largely unexplored. We found that Sargassum macroalgal meadows within the Ningaloo World Heritage Area of Western Australia possessed a distinct soundscape from adjacent coral reef and sand habitats. Acoustic recordings from 12 sites revealed discrete soundscapes driven by varying levels of snapping shrimps, urchins, and soniferous fishes, with increased biological activity and sound variability observed during dawn and dusk. Using parallel ecological measurements, we also found that macroalgal habitat quality, particularly canopy density and levels of understory cover, explained variations in soundscape characteristics. By linking soundscape attributes to habitat structure, this research highlights how the unique acoustic properties of macroalgal meadows could serve as important cues for larval fishes to select nursery habitats of varying quality during settlement.

Related topics: *Soundscapes, Ecological inference, Monitoring*



Presentation format: *Speed talk*

Bridging Zoology and Conservation to Sustain Biodiversity in Australian Farmland

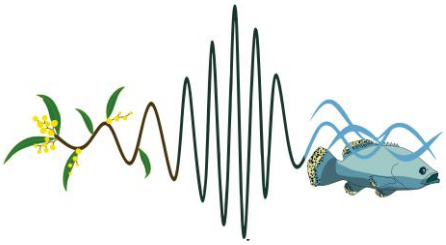
Clara Orford[1*], Carla Archibald[1], and Kate Buchanan[1]

[1] *Deakin University*

** Presenting author*

Biodiversity in Australian agricultural landscapes is declining due to habitat loss, intensification, and climate change. Wildlife provides crucial ecosystem services, such as pollination, pest control, and seed dispersal, but can also generate disservices, including crop damage or predation. Effective biodiversity-positive management requires understanding not only where species occur, but how their traits, behaviours, and physiological plasticity determine resilience to agricultural pressures and conservation interventions. This project combines comparative trait analysis, field studies, and spatial mapping to deliver practical strategies for biodiversity-friendly farming. The PhD integrates zoology, ecology, and conservation science to support evidence-based interventions that benefit both wildlife and agriculture under changing climates. To assess and manage biodiversity within Australian agriculture, this study will focus on native bird species on vineyards. This study uses passive acoustic monitoring to track seasonal and daily activity patterns of key farmland bird species across contrasting agricultural contexts. Passive acoustic monitoring devices will be deployed across properties, measuring species abundance and diversity. By analysing acoustic detections across seasons, farm habitat types, and crop growth stages, the study quantifies variation in arrival timing, duration of presence, and activity peaks for species linked to pollination, pest regulation, seed dispersal, and crop damage. Integrating acoustic phenology with both farm design (e.g. shelterbelts, intercropping, adjacent native vegetation) and crop phenology (e.g. flowering and fruiting stages) allows assessment of whether structurally complex farms buffer climate-driven shifts in timing, and whether simplified systems increase the risk of phenological mismatches between birds, crops, and management actions. This provides a scalable, policy-relevant approach to anticipating when ecosystem services may strengthen, weaken, or flip into disservices under future climates.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Speed talk*

Revealing termite behavioural responses to drought using ecoacoustics

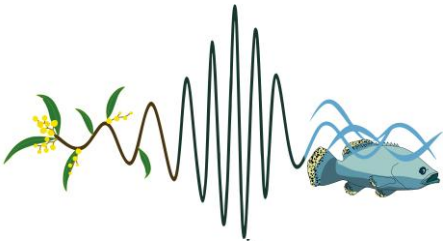
Alex Flynn Taylor[1*], Chloe Bassett[1], Martin Breed[1], Mackenzie Van Der Jeugd[1], and Jake Robinson[1]

[1] *College of Science and Engineering, Flinders University, Australia*

** Presenting author*

Termites are key soil engineers that underpin ecosystem functioning across many terrestrial environments. However, existing monitoring approaches are largely invasive and may alter natural behaviour. Ecoacoustics offers a promising non-invasive alternative for detecting and quantifying soil invertebrate activity. As extreme climate events such as drought increase in frequency and severity, there is growing need for sensitive methods to monitor at-risk keystone taxa. Here, we compare ecoacoustic and traditional sampling approaches to assess termite activity in grey box grassy woodland in South Australia. We monitored 19 termite colonies during a severe drought in May 2025 and at 6, 12, and 18 months post-drought. We quantify termite activity using acoustic indices (Acoustic Complexity Index, Bioacoustic Index) and power spectral density, and compare these with traditional measures of termite abundance. We hypothesise that acoustic activity will be reduced under drought conditions relative to post-drought periods, reflecting temperature-driven stress. We further predict that acoustic metrics will positively correlate with traditional abundance estimates. This study provides a foundational test of ecoacoustics for monitoring termite activity and evaluates its potential as a non-invasive tool for assessing soil ecosystem responses to climate stress.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Speed talk*

Linking Ecoacoustic and Soundscape Indices to Assess Tourism Pressure in a Thai World Heritage Site

Jiraporn Teampanpong[1*], Chathraphas Phongcharoen[2], Noraset Khiowsree[3], Siriphong Banjongsuwiwat[1], and Sitthichai Jinamoy[4]

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[2] *Department of Forest Biology, Faculty of Forestry, Kasetsart University, Thailand*

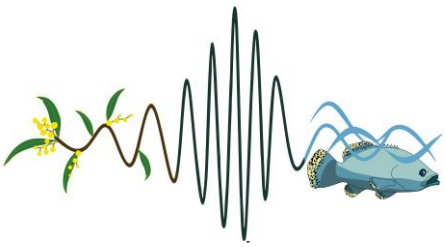
[3] *Sanam Chai Khet Forestry Research and Training Station, Forestry Research Center, Faculty of Forestry, Kasetsart University, Thailand*

[4] *Thailand Hornbill Project, Faculty of Science, Mahidol University, Thailand*

** Presenting author*

Tourism is a leading threat to biodiversity in protected areas, yet recreation management rarely accounts for ecological or psychological carrying capacity. This study addresses that gap by investigating how ecoacoustic and soundscape perception indices vary with tourism intensity at Khao Yai National Park, part of a UNESCO World Heritage Site in Thailand. Ecoacoustic indices will quantify soundscape changes and assess biodiversity and habitat quality, while soundscape perception indices will capture psychoacoustic responses of tourists. Applying this dual-acoustic approach, the study will identify thresholds at which recreational use degrades soundscapes, impacting wildlife and visitor experience. Findings will provide empirical evidence supporting soundscape-informed policies, visitor capacity limits, and spatial zoning strategies that balance tourism pressure with conservation goals. We will deploy autonomous recording units across gradients of visitor activity and distance from roads, capturing diurnal, nocturnal, and seasonal variation across high and low tourism periods. Paired ground-truth surveys will accompany recordings to quantify detection gaps under increasing anthropogenic noise. Concurrent questionnaires will assess tourists' perceptual soundscape responses. Acoustic indices including Acoustic Complexity Index (ACI), Acoustic Diversity Index (ADI), Normalized Difference Soundscape Index (NDSI), Acoustic Evenness Index (AEI), Bioacousitc Index (BIO), Acoustic Entrophy (H), Median of amplitude envelope (M), Acoustic Richness (NR), Number of Peaks (NP), Mid-band activity (MID) will be calculated and evaluated for sensitivity to anthropogenic noise and consistency across seasons. Generalized linear mixed models will assess relationships between acoustic indices and tourism-related variables, while Spearman's correlation will examine relationships between acoustic and perceptual soundscape indices. Threshold analyses will identify points of biological decline indicating habitat disturbance and degraded visitor experiences. This project will establish soundscape monitoring as a practical decision-support tool for protected area management, offering science-based benchmarks for acceptable visitor use that minimize wildlife impacts while preserving tourism quality at KYNP and across Thai protected areas.

Related topics: *Soundscapes, Applied ecoacoustics, Monitoring*



Presentation format: *Speed talk*

Predicting ecological condition in agricultural landscapes using a simulated reference point framework: passive acoustic monitoring, satellite remote sensing, and elastic net regression

David Tucker[1*], Marina Scarpelli[2], Callan Alexander[3], Susan Fuller[3], Mark Bonner[4], Ella Dewilde[4], Sandra McEwan[4], and David Rowlings[4]

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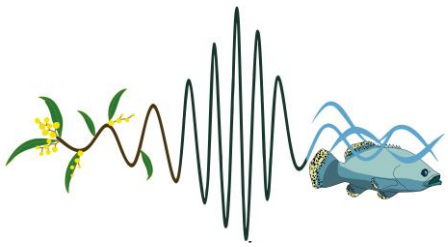
[4] *Sustainable Agroecosystems, School of Biology and Environmental Science, Queensland University of Technology, Australia*

** Presenting author*

Ecological condition assessment across privately managed agricultural land traditionally requires physical surveys at intact reference sites, limiting scalability. There is a need for approaches that can predict farm-scale condition from remotely collected data without physical access to the conservation estate. We describe a simulated reference point (SRP) framework integrating passive acoustic monitoring, satellite-derived vegetation indices, and landscape patch metrics with eBird-derived indicator bird assemblages to predict ecological condition remotely. AudioMoth recorders were deployed across 33 survey points on three cattle properties in the Brigalow Belt South bioregion of Queensland, spanning six vegetation types. Nine SRPs representing low, moderate, and high condition states were constructed using contemporaneous satellite-derived Enhanced Vegetation Index (EVI) and Fractional Vegetation Cover (FVC), patch metrics, and indicator bird assemblages from eBird records within protected areas. Bird species lists were generated from BirdNET applied to 14-day recordings, and elastic net regression models were evaluated using leave-one-out cross-validation against BioCondition survey scores. LOOCV model performance was consistent across all three properties despite variation in survey timing (R^2 range 0.76 to 0.84; mean 0.80). FVC was the strongest predictor of ecological condition, followed by EVI and patch context. High-condition indicator birds including Eastern Yellow Robin, Grey Fantail, and White-throated Treecreeper were positively associated with BioCondition scores, while generalists showed negative associations. Brigalow woodland points were systematically overpredicted, reflecting the absence of brigalow-specific SRP calibration. The SRP framework predicts farm-scale ecological condition without physical reference site surveys. Temporal anchoring using contemporaneous satellite imagery resolves the seasonal standardisation challenge inherent in static reference approaches, enabling year-round assessment. This work has been published in Ecological Indicators, and current work is extending the approach to additional Queensland bioregions to test transferability of indicator bird assemblages.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Speed talk*

Cross-Modal Alignment via Dual-Stream Architecture and Category-Level Contrastive Learning for Audio-Visual Bird Species Classification

Jie Xie[1*], Zhe Wu[1], and Zhishu Xiao[2]

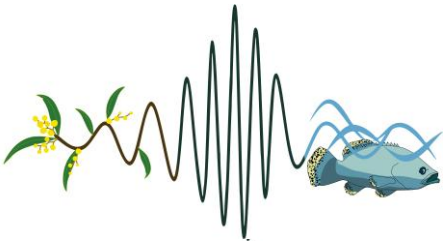
[1] *School of Computer and Electronic Information /School of Artificial Intelligence, Nanjing Normal University, China*

[2] *Institute of Zoology, Chinese Academy of Sciences China, China*

** Presenting author*

Advances in audio and imaging sensor technologies have enabled multimodal data collection in ecological research. While multimodal approaches typically outperform unimodal methods, real-world audio-visual data comprise unpaired samples from different individuals of the same species with varying quality, limiting conventional fusion approaches. To address this, we propose a dual-stream classification network featuring ResNet50 and CNN14 as visual and acoustic feature extractors, enhanced by spatial-channel dual attention mechanisms for improved local and global representations. To tackle cross-modal misalignment, we introduce a category-level bidirectional contrastive learning loss that aligns independently encoded features within a shared semantic space. Experimental validation on the CUB-200 based multimodal dataset demonstrates that our method effectively overcomes heterogeneity and noise interference, achieving substantial improvements in classification accuracy and macro F1-score. These findings provide an effective semantic alignment strategy for non-strictly paired multimodal fusion and offer new possibilities for continuous, non-invasive intelligent wildlife monitoring in complex natural environments.

Related topics: *Applied ecoacoustics*



Presentation format: *Speed talk*

A call for water – investigating the water requirements for the Endangered Australasian bittern Botaurus poiciloptilus.

Elizabeth Znidersic[1*], Rupert Mathwin[1], Sarah Talbot[2], Andrew Hall[1], Michael Towsey[1], and Skye Wassens[2]

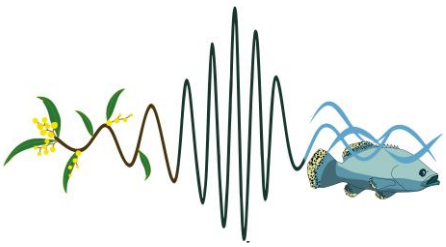
[1] *Gulbali Institute, Charles Sturt University*

[2] *School of Animal, Environmental and Veterinary Science, Charles Sturt University*

** Presenting author*

Water extraction for agriculture and human consumption, compounded by climate change-induced weather events, has disrupted the natural flow regimes of river and wetland systems globally. These changes critically impact species dependent on wetland ecosystems. This study focused on the Endangered waterbird, Australasian bittern (Botaurus poiciloptilus). In Australian regulated river systems, managed delivery of water (environmental water) is increasingly being delivered to maintain Australasian bittern habitat and trigger breeding. However, little is known about their response to varying hydrological conditions, particularly calling patterns in relation to environmental water and unregulated floodplain inundation. We investigated the vocalisation phenology of the Australasian bittern in five wetland complexes in Australia's Murray-Darling Basin from 2016–2022. Using continuous acoustic monitoring, we identified the onset, duration, and spatial and temporal variation in bittern calls. We also developed a predictive model using 11 environmental features that predicted calling behaviour with an accuracy of 93.5%. The highest ranked features related to water depth and watering duration. Site specific trends in bittern calling and a preference for austral summer conditions were also evident. Our results demonstrate that of the 10 detected calling events, four were associated with a combination of environmental water and unregulated flows, four with environmental water, and two with unregulated flows. We detected unexpected winter calling events which highlights the value of year-round monitoring. Our findings highlight the critical role of hydrological regimes to support Australasian bittern occupancy and breeding and suggests the potential for managing environmental water flows with other wetland species temporal vocalisation patterns.

Related topics: *Conservation technology, Applied ecoacoustics, Water*



POSTER

Presentation format: *Poster*

Do you know what I mean? Cross-taxa communication in mixed-species groups

Geetika Aggarwal[1*], and Kartik Shanker[2]

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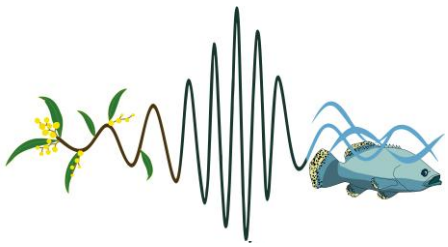
[2] *Centre for Ecological Sciences, Indian Institute of Science, India*

** Presenting author*

Animals frequently associate with individuals beyond their own species, forming mixed-species groups (MSGs) that span a remarkable diversity of taxa — including birds, mammals, fishes, and insects — across habitats as varied as forests, wetlands, oceans, and grasslands. Such associations are rarely incidental; they are often mediated by active communication, with participants exchanging information about predators, food resources, and group cohesion. Among the various sensory modalities available, acoustic signals are particularly well-suited for information transfer in dense visually obstructed habitats, where sound propagates over long distances with relatively lower attenuation compared to visual or chemical cues. Despite growing research interest in heterospecific acoustic communication, significant gaps remain. Here, we present a comprehensive review of the role vocalizations play in MSGs — from initial group formation and the reinforcement of interspecific social bonds, to coordinated anti-predator responses. We included ~110 articles that have been published in this field until date, that address any form of acoustic exchange in MSGs studied using observational or experimental approaches. Our review reveals a strong taxonomic bias in the literature, with the majority of studies focusing on birds and primates, while other taxa remain comparatively understudied. Antipredator behaviour – alarm calling and mobbing – dominate the field of research, alongside growing evidence that MSG participants actively recognise and interpret heterospecific calls — associating them with specific ecological contexts — suggesting that interspecific familiarity plays a meaningful role in group-level decision-making. We suggest avenues for further exploration in the field: broadening taxonomic and geographic representation beyond the well-studied avian and primate systems; integrating emerging methodological tools such as passive acoustic monitoring, machine learning-based call classification, and animal-borne sensors; and developing theoretical frameworks that can accommodate the complexity of multi-species acoustic networks. Together, these advances will move the field from descriptive documentation toward a mechanistic understanding of heterospecific communication.

Related topics: *Ecological inference, Applied ecoacoustics, Behaviour; Mixed-species grouping; Species interactions*



Presentation format: *Poster*

Marine Ecoacoustics: Exploring Ocean Soundscapes and Cultural Knowledge for Conservation on Kabi Kabi Sea Country in Southeast Queensland with 'Beeyali Tallo Billa'

Leah Barclay[1*], Lyndon Davis, and Tricia King

[1] *Creative Ecologies Research Cluster, University of the Sunshine Coast, Australia*

** Presenting author*

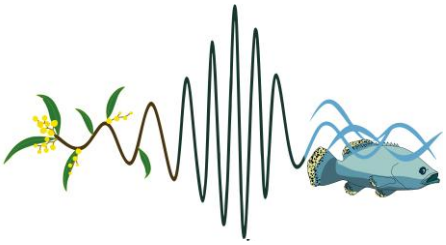
Marine conservation in Australia is constrained by critical knowledge gaps and limited community engagement with underwater ecosystems. Integrating First Nations ecological knowledge with ecoacoustics offers significant potential to address these challenges, yet few models exist that meaningfully bridge Indigenous knowledge systems, acoustic monitoring, and public participation. This paper presents outcomes from an interdisciplinary initiative on Kabi Kabi Sea Country in southeast Queensland, supported by a Queensland Government Engaging Science grant, that combines hydrophone-based marine monitoring, Kabi Kabi cultural knowledge, and community engagement through the Beeyali Tallo Billa project, Tallo Billa being the Kabi Kabi word for humpback whale.

The initiative comprised three integrated components: a live-streaming hydrophone platform near Mudjimba Island, a culturally significant site within the Sunshine Coast Biosphere Reserve, providing real-time access to underwater soundscapes; community-based ecoacoustics masterclasses training participants in hydrophone technology and marine sound identification to support citizen science; and immersive deep listening ocean tours combining live humpback whale vocalisations and marine ecoacoustics with cultural storytelling by Kabi Kabi artist Lyndon Davis.

The combination of real-time ecoacoustic listening, cultural connections, and creative visualisation proved effective in inspiring ecological empathy and connection to Sea Country, engaging diverse audiences including schools, older adults, and community groups. Results demonstrate that ecoacoustics, when grounded in cultural knowledge and interdisciplinary creative practice, can inspire meaningful public participation in marine science while elevating First Nations perspectives in conservation.

This poster will showcase the Beeyali Tallo Billa experience through an augmented reality component and underwater soundscapes, bringing the marine environments of Kabi Kabi Sea Country to life through sound, animation, and visualisation.

Related topics: *Conservation technology, Future-forward/innovative, Arts*



Presentation format: *Poster*

Rat chat: vocalisations of adult fawn-footed mosaic-tailed rats (Melomys cervinipes) across ecological contexts.

Sanne Boland[1*], Tasmin Rymer[2], and Lyanne Brouwer[2]

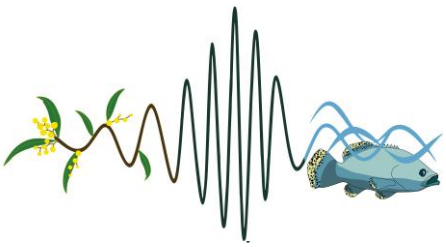
[1] *James Cook Univeristy*

[2] *College of Science and Engineering, James Cook University, Australia*

** Presenting author*

The ability to recognise species-specific vocalisations is a prerequisite for being able to monitor species using ecoacoustic methods; however, the acoustic repertoires of many terrestrial mammals remain poorly understood. This study describes the vocal repertoire of adult fawn-footed mosaic-tailed rats (Melomys cervinipes), a common but acoustically understudied Australian rodent, across five ecologically relevant behavioural contexts. We recorded audible and ultrasonic vocalisations from 31 captive adults (12 males and 19 females) in a laboratory setting during five behavioural tests designed to represent ecological contexts: open field (exploration of a novel environment), novel object (exploration of something new in the environment), handling (simulating a predation event), social interaction (between conspecifics of same or different sexes) and feeding. Each individual experienced each context three times (where possible). Calls were classified based on spectrogram shape, and key acoustic parameters (including peak frequency and call duration) were quantified. We identified 36 distinct call types, spanning peak frequencies from 0.4 to 84 kHz, indicating a broad vocal repertoire. Several call types and acoustic characteristics were significantly associated with specific behavioural contexts, suggesting context-dependent vocal production and potentially distinct communicative functions. Vocal output and call parameters such as peak frequency and duration also differed significantly across contexts. This study provides the first description of the vocal repertoire of M. cervinipes, including the first evidence of ultrasonic vocalisations. These findings provide foundational knowledge of vocalisations in M. cervinipes and highlight the importance of investigating vocal repertoires in acoustically understudied species. Rodents comprise a substantial proportion of mammalian biodiversity and yet their acoustic behaviour is often poorly understood. Although knowledge of vocalisations does not necessarily mean that a species can be monitored acoustically, describing these signals is an important foundational step for understanding and interpreting information within acoustic recordings and for informing potential future ecoacoustic approaches for these species.

Related topics: *Ecological inference, Future-forward/innovative, foundational bioacoustics (descriptive)*



Presentation format: *Poster*

Acoustic repertoire analysis of California towhee (Melozone crissalis): A case study in coastal sage scrub soundscape ecology

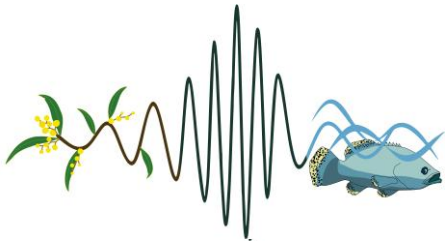
William Cowie[1*]

[1] *Miami University, United States*

** Presenting author*

Acoustic data can reveal patterns of biodiversity, behavior, and ecological change, providing key information for assessing ecosystem condition and informing conservation and management of critical habitats. Understanding how individual species contribute to local soundscapes improves these interpretations of community patterns. As vocalizations are often shaped by social behaviors, the structure of a species' vocal repertoire may reflect aspects of larger social organization and community patterns within an ecosystem. This study establishes a preliminary methodological and ecological foundation for vocal repertoire analysis by examining variability of vocalizations in coastal sage scrub focal resident species California towhee (Melozone crissalis). The objective of this study was to test whether dimensionality-reduction of acoustic frequency data could reveal variability within the species' vocal repertoire and provide comparative data for future soundscape analyses. I predicted that the California towhee's dynamic social behaviors would influence the variability of their repertoire and that therefore I would primarily find graded vocalizations with minimal discrete clusterings. Autonomous recording units were deployed at three coastal sage scrub sites within the San Diego Zoo Safari Park Biodiversity Reserve and recordings were processed using ⅓ octave band spectral analysis to generate multivariate acoustic datasets. These data were analyzed using an unsupervised dimensionality-reduction method (t-SNE) to visualize multivariable data similarity and assess the distinctiveness and variability of vocal repertoire across samples. Visual clustering results revealed mixed variations in vocal complexity, primarily graded vocalizations with several tightly grouped clusters suggesting discrete call types. This pattern is consistent with expectations based on the species' social behavior and demonstrates that dimensionality-reduction methods can detect vocal variability within complex acoustic repertoires. This case study provides proof of concept for repertoire analysis as preliminary acoustic context and methodological insight for future comparative soundscape research, supporting conservation management and expanding ecological understanding of coastal sage scrub ecosystems.

Related topics: *Conservation technology, Monitoring*



Presentation format: *Poster*

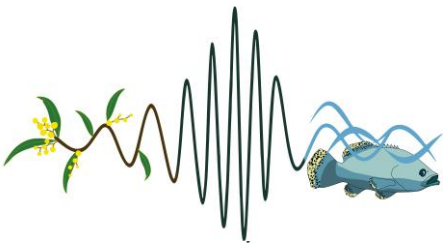
Higher-order ambisonics in ecological soundscape recording, processing, and archival

Charles DELUGA[1*]

[1] *Music, Ecology and Climate Justice (ARC Laureate Program), University of Sydney, Australia*
** Presenting author*

Higher-order ambisonics (HOA) is a powerful technology for high-resolution spatial recording and reproduction of acoustic environments, yet HOA content is significantly underrepresented in ecological soundscape archives. Existing collections primarily feature first-order ambisonics and urban scenes, while field recordists working with HOA have rarely made their multichannel recordings available for long-term applications in open science, art, and education. The project Ambisonic Earth is an ongoing effort to address these gaps by recording and publicly archiving HOA soundscapes of global biodiversity. Since 2022, over 600 hours of third-order ambisonic soundscapes have been recorded across 35 RESOLVE ecoregions and nine terrestrial biomes, including 30 U.S. National Wildlife Refuges, 21 Key Biodiversity Areas, six Ramsar Wetlands of International Importance, and two UNESCO Biosphere Reserves. This presentation outlines the recording, processing, and archival methods employed, with the aim of making these tools and techniques more accessible to ecoacoustics practitioners. Methods include a portable and replicable system for HOA recording of full circadian cycles with the 19-channel ZYLIA ZM-1 microphone array and a custom Raspberry Pi-based field recorder, a noise reduction workflow for HOA soundfields, and a layered sonic time-lapse technique for condensing the timescale of long-form, multichannel recordings. The results of this work will be shared through immersive listening to HOA soundscapes via binaural rendering on headphones or quadraphonic decoding on a compact speaker system in front of the poster (supplied by presenter if space allows). Content includes curated soundscape selections from high-integrity ecosystems, dawn choruses, and time-lapses, illustrating acoustic niche partitioning with spectrogram images and video. QR codes provide access to the project's Zenodo archive, YouTube channel, and interactive sound map. This work aims to demonstrate how ecoacoustics practitioners can use higher-order ambisonics for spatial audio applications and reach new audiences through immersive listening experiences.

Related topics: *Soundscapes, Arts*



Presentation format: *Poster*

Can different farm management practises be identified in the soil sonoscape?

Luke Edwards[1*]

[1] *Victoria University of Wellington*

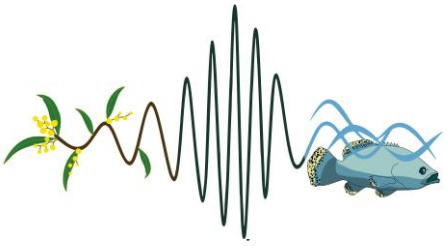
** Presenting author*

Ecoacoustic approaches have the potential to support sustainable agriculture. Recent research has shown analysis of sounds recorded within the soil can be a useful proxy for soil insect activity and diversity. Less advanced is research into how the soundscape may represent, or be correlated to, wider soil health measures.

The paddock, with a delineated fenced boundary, is a commonly used unit for farm management. To begin exploring the practicality of ecoacoustic methods on-farm, it seemed necessary to first ask: do paddocks that are managed differently, sound different?

Soundscape recordings are being taken across 2 farms part of Whenua Haumanu, New Zealand's most comprehensive research programme on the effects of contemporary and regenerative pastoral practices. The impact of 4 treatment types on the soundscape, using acoustic indices and spectrogram comparison, is being investigated. This poster presentation will present findings visually on a farm map, creating an interactive display where conference-goers can decipher what paddocks may be managed under what treatment type.

Related topics: *Soundscapes, Applied ecoacoustics, Future-forward/innovative*



Presentation format: *Poster*

Juveniles explore more: age-related ontogenetic shifts in behavioural expression across habitat types in the Lava Gull (Leucophaeus fuliginosus)

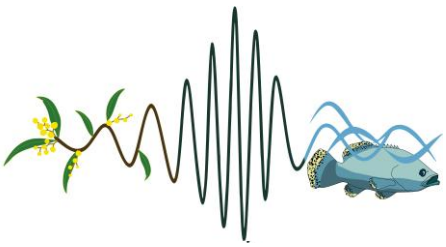
tatiana fonseca[1*], and Dominique Potvin

[1] *sunshine coast univeristy*

** Presenting author*

Lava Gull (Leucophaeus fuliginosus) is an endemic and vulnerable seabird of the Galápagos Islands, yet its behavioural ecology remains poorly understood. This study investigated how age and environmental context shape behavioural patterns by analysing n = 425 validated citizen-science and field observations collected between 2005 and 2025. Individuals were assigned to three age classes (juvenile, subadult and adult), and behaviours were classified using a species-specific ethogram. Behavioural composition varied across habitat groups and age classes. Resting behaviours increased with age and dominated adult observations, whereas juveniles showed higher proportional representation of feeding and locomotion behaviours. Object interaction was more frequently recorded in juveniles compared to older age classes. Behaviours related to reproduction and territoriality were primarily associated with adult individuals and occurred at lower frequencies in juveniles and subadults. Behavioural patterns also varied across islands and habitat types when examined independently. In human-modified habitats, juveniles and subadults exhibited a higher proportional representation of self-maintenance and resting behaviours, whereas adults were dominated by resting and feeding behaviours. In natural habitats, behavioural composition was more consistent across age classes, with resting, feeding and locomotion predominating. At the island scale, behavioural patterns differed between human-impacted and less-impacted islands across age classes, suggesting that spatial context and habitat structure jointly influence behavioural expression. These results indicate that ontogenetic development and fine-scale habitat context jointly shape behavioural expression in Lava Gulls. Our findings highlight the importance of considering age-specific habitat use in conservation planning and underscore the value of long-term monitoring to detect demographic and behavioural shifts in this high-priority species.

Related topics: *Conservation technology, Monitoring*



Presentation format: *Poster*

Juveniles explore more: age-related ontogenetic shifts in behavioural expression across habitat types in the Lava Gull (Leucophaeus fuliginosus)

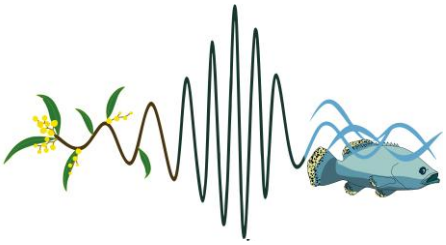
Wendy Fonseca[1*], and Dominique A. Potvin[1]

[1] *School of Science, University of the Sunshine Coast, Australia*

** Presenting author*

Lava Gull (Leucophaeus fuliginosus) is an endemic and vulnerable seabird of the Galápagos Islands, yet its behavioural ecology remains poorly understood. This study investigated how age and environmental context shape behavioural patterns by analysing n = 425 validated citizen-science and field observations collected between 2005 and 2025. Individuals were assigned to three age classes (juvenile, subadult and adult), and behaviours were classified using a species-specific ethogram. Behavioural composition varied across habitat groups and age classes. Resting behaviours increased with age and dominated adult observations, whereas juveniles showed higher proportional representation of feeding and locomotion behaviours. Object interaction was more frequently recorded in juveniles compared to older age classes. Behaviours related to reproduction and territoriality were primarily associated with adult individuals and occurred at lower frequencies in juveniles and subadults. Behavioural patterns also varied across islands and habitat types when examined independently. In human-modified habitats, juveniles and subadults exhibited a higher proportional representation of self-maintenance and resting behaviours, whereas adults were dominated by resting and feeding behaviours. In natural habitats, behavioural composition was more consistent across age classes, with resting, feeding and locomotion predominating. At the island scale, behavioural patterns differed between human-impacted and less-impacted islands across age classes, suggesting that spatial context and habitat structure jointly influence behavioural expression. These results indicate that ontogenetic development and fine-scale habitat context jointly shape behavioural expression in Lava Gulls. Our findings highlight the importance of considering age-specific habitat use in conservation planning and underscore the value of long-term monitoring to detect demographic and behavioural shifts in this high-priority species.

Related topics: *Ecological inference, Monitoring, Future-forward/innovative*



Presentation format: *Poster*

Reliable acoustic monitoring of Bridled Terns (Onychoprion anaethetus) on the Great Barrier Reef.

Jennifer GODFREY[1*], N Friedman[2], G Maurer[3], and M van de Pol[4]

[1] *James Cook University*

[2] *Associate Professor of Ecosystem Processes Research, James Cook University, Australia*

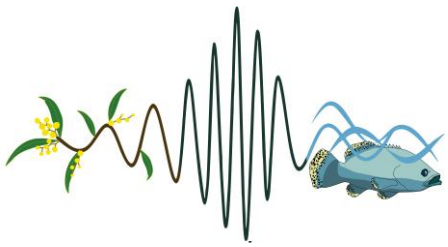
[3] *Director of Bird Conservation Strategy, BirdLife Australia, Australia*

[4] *Head of Zoology and Ecology Department, James Cook University, Australia*

** Presenting author*

Seabird monitoring is a challenging undertaking as the birds are often found in remote, difficult to access locations. Visual survey methods are often unfeasible due to the costs and logistics involved in reaching the sites. Furthermore, many species have cryptic habits, complicating census methods that rely on visual detections. I will test Passive Acoustic Monitoring (PAM) as an alternative method to traditional visual surveys, offering the potential to monitor isolated or cryptic species for long periods of time remotely. This study uses Bridled Terns on the Great Barrier Reef (GBR) as a test species to explore if PAM can (1) be used to obtain accurate population abundance estimates, and; (2) assess breeding success. Bridled Tern populations on the GBR are of global importance but their population dynamics are difficult to monitor due to the species' cryptic nesting habits on offshore islands, and their pelagic habits during non-breeding months. Low Island off Port Douglas is a small (2ha), flat island with a breeding colony of Bridled Terns and regular access via tourist ferry. Using Low Island as a model system, I will refine existing methods of relating PAM data to population size and breeding success by deploying a grid of Solar BAR autonomous recording units to gather acoustic data, as well as gaining reliable monthly population counts. These data, along with further supplementary data, will be used to verify the reliability of the acoustic data results. Once established, this alternative to traditional visual surveys will equip environmental managers on the GBR and globally with the tools to monitor fluctuations in the populations of Bridled Terns and other isolated seabird colonies in a cost-effective and large-scale manner. This outcome is particularly relevant in ecosystems like the GBR that are predicted to change dramatically due to human-induced climate change.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Poster*

Ecoacoustic Media Experiences - towards discovering audience preferences

Leah GUSTAFSON[1*], and Dr Leah Barclay[2]

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[2] *School of Business and Creative Industries, University of the Sunshine Coast, Australia (lbarclay@usc.edu.au)*

** Presenting author*

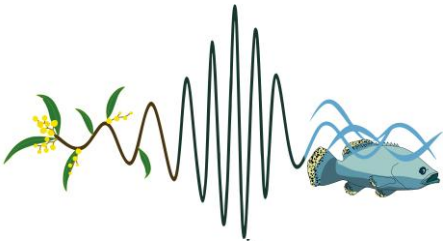
Part of my PhD research is to discover the elements of creative digital visualisations that enhance audience engagement with ecoacoustic recordings. Creating a series of short ecoacoustic visualisation media clips and embedding them into an online survey formed the basis of my first journey of discovery into finding out what makes people most engaged with an ecoacoustics media experience.

Survey participants answered 17 questions via online survey platform Typeform, ranging from demographical questions to requests for their personal opinion. All responses were anonymous and general demographic data was only used to link specific demographics with specific preferences. Qualitative questions included rating which of the three creative digital visualisation media clips they preferred, and if they believed accompanying visualisations added value to the experience. Qualitative questions were designed to generate perception data. On conclusion of the survey, there were 22 usable responses from 24 responses in total. The researcher then cleaned up the data by collating all of the responses into a spreadsheet. Quantitative data was analysed using simple graphs and tables, and qualitative data was analysed using a combination of basic sentiment and word frequency analysis techniques.

The 25-35 year old demographic preferred the visually stylistic treatment, while other age demographics equally preferred the live action clip or a seeing blank screen. The reverse was true of the least enjoyed media clips. Words used to describe how they felt during the experiences were distinctly positive, with the most common words used including “calm”, “relaxed”, and “peaceful”.

This research was completed using a very small sample size, however the researcher discovered that viewers had a distinct visual treatment preference based on their age demographics. This result indicates that visually engaging audiences while sharing ecoacoustic findings may have the potential to be harnessed as a powerful science communication tool.

Related topics: *Soundscapes, Arts*



Presentation format: *Poster*

Integrating ecoacoustics and remote sensing to model waterbird community dynamics in intermittent floodplain wetlands

Ume Habiba[1*], Andrew Hall[2], Elizabeth Znidersic[3], and Skye Wassens[4]

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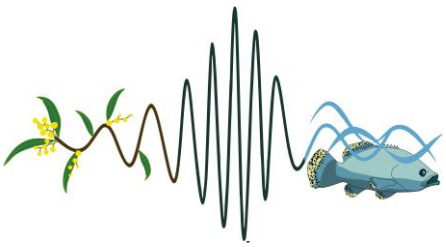
** Presenting author*

Waterbird communities in intermittent floodplain wetlands change rapidly in response to fluctuating inundation, often outpacing what traditional snapshot ground surveys can capture. While passive acoustic monitoring (PAM) offers continuous data, linking these acoustic shifts to landscape-scale hydrology remains a significant challenge. This PhD project investigates waterbird dynamics across 12 Murray-Darling Basin wetlands over a five-year period. Using a multi-scale approach, the study integrates continuous PAM, depth loggers, and satellite imagery. Acoustic detections will be compared with bi-annual visual surveys to evaluate method overlap and temporal detection limits. To track pseudo-abundance, the continuous calling activity of functional bird groups will be paired with spatial depth mosaics (the proportion of a wetland inundated at specific depth ranges). Additionally, acoustic occupancy will be combined with remote sensing to examine the relationship between wetland inundation and primary productivity. The study aims to establish ecological thresholds linking water depth and productivity to the acoustic dominance of distinct groups, such as wading birds versus diving ducks. By coupling ecoacoustics with remote sensing, this research will model wetland transitions between functional state, such as foraging, breeding, and refuge, providing water managers with a scalable tool to evaluate habitat viability.

Related topics: *Ecological inference, Applied ecoacoustics, Water*



Presentation format: *Poster*

Running Aground: Feasibility, Observability, and the Field Reality of Passive Acoustic Monitoring in Nearshore MPAs

Andrea Hempshall[1*], and Sammy Murphy

[1] *Marshall Day Acoustics*

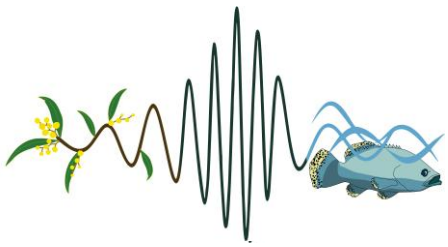
** Presenting author*

Passive acoustic monitoring (PAM) is increasingly promoted as a way to infer ecological processes. Yet for Marine Protected Areas (MPAs) in tidal, shallow-water environments, the physical and operational realities that govern whether meaningful acoustic patterns are observable are rarely acknowledged. As a result, many PAM frameworks, especially those adapted from offshore contexts, assume operating conditions that nearshore environments do not provide.

This paper identifies the environmental thresholds and field constraints that determine when PAM in nearshore MPAs becomes meaningful, and when it does not. Drawing on deployments across Victorian bay systems in summer and autumn conditions, we show how tidal forcing, wind-driven surface action, shoreline access, substrate coupling, and shallow-water acoustics collectively define the “interpretability window” for soundscape metrics.

We distinguish between controllable and non-controllable factors and demonstrate that interpretability is frequently constrained prior to deployment. Building on this, we present a method for quantifying acoustic listening space retention within defined interpretability windows, enabling consistent and ecologically meaningful comparison of soundscape condition.

Related topics: *Applied ecoacoustics, Water*



Presentation format: *Poster*

Evaluating soundscape enrichment as a tool for European flat oyster (Ostrea edulis) restoration

Jonny Magnay[1*]

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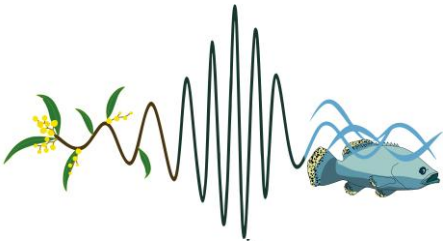
** Presenting author*

A near-universal collapse of European flat oyster (Ostrea edulis) populations over recent centuries has resulted in widespread loss of functionally important marine habitats and accompanying biodiversity. Despite ambitious restoration efforts, the recovery of many degraded systems remains limited by the settlement of oyster larvae onto suitable habitat. Recent advances in ecoacoustic restoration technologies demonstrate that enriching local soundscapes using settlement-inducing sound playbacks can enhance larval settlement in some oyster species. However, major knowledge gaps limit its use in European ecosystems, including the effects of soundscape enrichment on European flat oyster settlement and impacts on non-target organisms including adult oysters. To investigate the response of oyster larvae to soundscape enrichment, we used experimental playbacks of oyster bed noise alongside paired ambient controls in aquacultural spatting pools and marine field sites. Settlement and recruitment rates under ambient and enriched soundscapes were compared, with behavioural monitoring and community sampling used to explore effects on non-target organisms. Lastly, to determine how oyster bed development shapes acoustic cues relevant to larval settlement, we investigated the influence of oyster presence on local soundscapes across oyster beds of varying maturity. Enriched soundscapes are expected to enhance larval settlement, although concurrent biodiversity changes may influence oyster recruitment through shifts in predation and competition. Additionally, the importance of soundscape enrichment may vary between oyster beds of different maturity. These results will help establish whether soundscape enrichment is an effective complementary method of oyster restoration for use alongside existing frameworks.

Related topics: *Conservation technology, Soundscapes, Applied ecoacoustics*



Presentation format: *Poster*

Correcting for the Impact of Noise on Machine Learning Detectability in Multi-Species Abundance Models

Ruari Marshall-Hawkes[1*], Lynn V Dicks[2], Adham Ashton-Butt[3], and Jeff W Doser[4]

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** Presenting author*

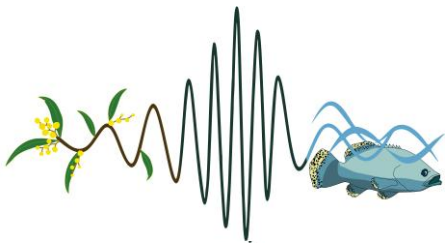
Machine learning models for detecting species vocalizations are now essential for processing large acoustic datasets, and vocalization rates are often used as proxies for relative abundance. However, the acoustic environment of a site can significantly impact the detectability of species using such models – for example, the detectability of a vocalization can reduce from 90% to 10% due to impacts of environmental noise alone – potentially leading to biased estimates of species abundance and distribution. Current manual validation for assessing acoustic detectability are labour-intensive and unscalable for multi-species, long-term monitoring.

We present a framework to account for these differences in acoustic detectability by integrating Noise-Augmented Detectability Estimation (NADE) into abundance modelling. NADE quantifies how noise profiles impact the recall of machine learning detection models for individual species, allowing for a site- and species-specific estimate of detectability. We apply this to a two-year dataset of 10 avian species across 28 sites in Scotland. We utilize a multi-species generalized linear mixed model that incorporates NADE-derived detectability values to refine abundance estimates. Additionally, we evaluate a model that integrates these acoustic detections with paired transect counts to validate the accuracy of the corrected estimates.

A simulation study demonstrates that NADE successfully identifies and compensates for varying environmental noise profiles, reducing the error in abundance trends compared to uncorrected vocalization rates. Preliminary analysis of the Scottish dataset suggests that incorporating NADE values can significantly alter species distribution interpretations, particularly at noisy and acoustically complex sites. We expect to show that the integration of NADE with vocalization rate and transect data provides a more robust estimate of true abundance than traditional methods.

By providing a quantitative measure of how site-specific background noise affects acoustic detectability, NADE can be used to improve the robustness of species abundance and distribution estimates from acoustic data.

Related topics: *Ecological inference*



Presentation format: *Poster*

Revealing Spatiotemporal Calling Patterns in Dryophytes leopardus and Pelophylax nigromaculatus using Passive Acoustic Monitoring

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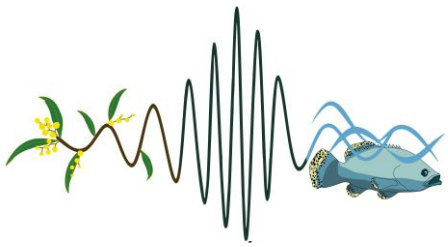
** Presenting author*

Anuran calls provide essential insights into rice-paddy ecosystems and facilitate detection of invasive species during the breeding season. However, simultaneous vocalizations of multiple anuran species hinder accurate separation, identification, and localization of single-species calls. An integrated approach performing both sound source separation and localization improves the effectiveness of Passive Acoustic Monitoring (PAM) in real-world environments. We aim to develop an approach to reveal the spatiotemporal distribution patterns and individual locations of the native Eastern Japanese Tree Frog (Dryophytes leopardus) and the domestically translocated, Black-Spotted Pond Frog (Pelophylax nigromaculatus) in a rice paddy in Iwamizawa, Hokkaido, Japan. Field data were collected using synchronized autonomous recorders deployed within the rice paddy during the breeding season. Nocturnal recordings were processed using a deep learning-based sound-separation model that extracts calls of the two frog species from mixed calls. Sound localization was then performed using a time-difference-of-arrival (TDOA) method between pairs of microphones, combined with information on the geometry of the recorders and the sound speed corrected using field-observed air temperature, to estimate two-dimensional call locations. We then assessed their spatial overlap and its local tendency at each estimated call location. These analyses revealed areas and times with consistently high calling activity, as well as zones of spatial overlap between D. leopardus and P. nigromaculatus, suggesting spatiotemporal differences. These results provide quantitative indicators of habitat use for a deeper understanding of their local distribution patterns. The system scales for real-time biodiversity assessments and supports conservation strategies for invasive amphibians in agricultural landscapes. Moreover, the framework enables estimation of the timing and spatial locations of individuals at the onset of calling for each species. Future analyses of temporal changes, diurnal patterns, and seasonal trends based on calling densities and spatial distributions will contribute to behavioral control strategies for invasive species.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Poster*

Passive Acoustic Monitoring of Pelophylax Breeding Assemblages in Southern Poland: Tracking Community Shifts in a Hybridogenetic System

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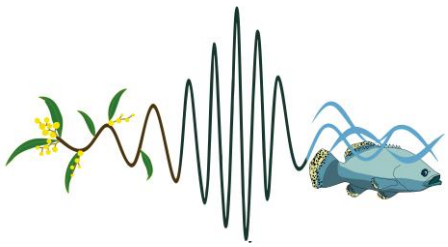
** Presenting author*

Central European waterfrogs of the Pelophylax esculentus complex contain P. ridibundus (RR), P. lessonae (LL) and their hybridogenetic hybrid P. esculentus (LR). The three species differ in habitat preferences: P. lessonae prefers small, shallow ponds in forested areas, while P. ridibundus inhabits large open water bodies, and P. esculentus is a generalist occurring at both. Their mixed populations form distinct assemblage types, the lessonae-esculentus (L-E) system, the ridibundus-esculentus (R-E) system, and rarely a three-taxon assemblage (R-E-L), each maintained through hybridogenesis, a hemiclonal mode of reproduction in which hybrids exclude one parental genome during gametogenesis and backcross with the co-occurring parental species. In southern Poland, the historically predominant L-E system has been progressively destabilized by an expanding P. ridibundus population. Loss of small forested ponds due to land use changes and recent local warming, favoring the thermophilic P. ridibundus, is proposed to have facilitated this expansion. Previous attempts to document this community shift relied on traditional field surveys, which are labor-intensive, inconsistent, and require invasive tissue sampling for molecular identification of the hybrid taxon.

To address these limitations, we implemented Passive Acoustic Monitoring (PAM) across nine historically surveyed fish pond sites in the Oświęcim Basin, Upper Vistula Valley. Eighteen Song Meter Micro 2 recorders were deployed between April and July 2025, with interval recordings during the day and continuous overnight recordings to characterize diel calling patterns across the breeding season. Species-specific call clusters for all three taxa were identified and validated using Kaleidoscope Pro. We are currently employing machine learning approaches to quantify temporal fluctuations in species-specific acoustic recruitment and acoustic niche overlap across sites. This study represents the first acoustics-based continuous record of Pelophylax assemblage dynamics in Poland and aims to establish a scalable non-invasive framework for long-term monitoring of hybridogenetic community change under ongoing environmental pressures.

Related topics: *Ecological inference*



Presentation format: *Poster*

Yell_ID2: A Large-Scale passive acoustic Dataset for Individual Identification in Yellowhammer

Ilaria Morandi[1*], Minkyung Kwak[2], Tereza Petrusková[2], and Pavel Linhart[3]

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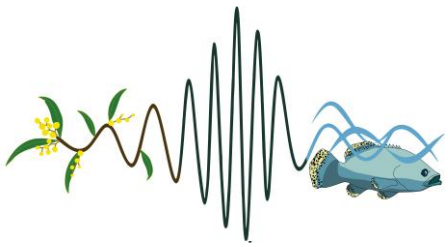
** Presenting author*

Acoustic monitoring is increasingly used to study animal communities, yet monitoring at individual-level remains a major challenge. The yellowhammer (Emberiza citrinella) is a widespread European farmland bird with a short and stereotyped song composed of two distinct parts: an initial phrase and a dialect phrase. Each male possesses a repertoire of 1 to 5 (mostly 2) initial phrase types which remain stable throughout life. Though some phrase types can be shared among males, each individual poses an unique repertoire that makes yellowhamer a promising candidate for developing automated individual identification methods. We deployed 35 AudioMoth devices during the breeding season from February to July 2025 in a long term monitored study site in the Czech Republic. Recordings were collected continuously from sunrise to sunset, resulting in a total of 21 TB of data. A subset of three days was selected to represent the beginning, middle and end of the breeding season. For these days, yellowhammer songs were annotated in recordings using semi-automated procedure, combining automated detection tools with manual validation of detections. Metadata including recording location, time, and, where possible, visually confirmed individual identity were noted for each song. Preliminary analysis indicates the presence of more than 80 individuals throughout the breeding season including both territorial breeders confirmed at least across two dates and "transient males" / “floaters” present only in one of the dates. The dataset was specifically designed to capture both intra-individual variability and inter-individual differences, which are critical for robust classification and individual tracking over time. Although model training and evaluation are ongoing, this work lays the foundation for developing reliable individual recognition systems in bioacoustics, with potential applications in population monitoring, behavioral ecology, and conservation.

Related topics: *Ecological inference, Applied ecoacoustics, Monitoring*



Presentation format: *Poster*

Detecting an invasive frog hidden in the soundscape: a tempo-aware deep learning approach for paddy field monitoring

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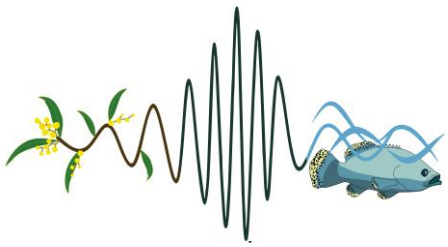
** Presenting author*

Environmental sound classification through deep learning promises effective ecosystem monitoring. In Hokkaido paddy fields, Pelophylax nigromaculatus has established populations that alter local ecosystem dynamics. However, frog soundscape research is substantially limited by overlapping frequency bands among co-occurring species, as exemplified by the geographically widespread Dryophytes leopardus and P. nigromaculatus. Critically, D. leopardus typically dominates the spectrogram in sound pressure, masking the weaker P. nigromaculatus calls and making the latter difficult or impossible to identify from spectral images alone. We therefore developed a hybrid system that processes the two species through complementary pathways. D. leopardus is detected by a simplified convolutional neural network (CNN) operating on Mel spectrograms, exploiting its distinctive and dominant spectral signature. P. nigromaculatus, whose presence is hidden in the spectral domain, is instead identified through a dedicated layer that classifies calls by their temporal pattern (tempo): P. nigromaculatus produces a highly characteristic, periodic call rhythm that remains detectable even when its sound pressure is overwhelmed by D. leopardus. By combining spectral-based CNN detection for the louder species with tempo-based detection for the masked species, the system discriminates four categories from field recordings — D. leopardus, P. nigromaculatus, overlapping calls, and background noise — at 600 segments per second. Detailed quantitative results, including the classification accuracy across the four categories and the specific contribution of the tempo-classification layer to recovering masked P. nigromaculatus calls, will be presented and discussed at the conference. Combining spectral and temporal cues through species-specific pathways shows significant promise for recognising overlapping vocalisations where conventional deep learning, restricted to spectral information, fails.

Related topics: *Soundscapes, Applied ecoacoustics, Monitoring*



Presentation format: *Poster*

Update the models, keep the raw audio: archive requirements from Japan's citizen-science NFC project

hideki OSAKA[1*], and Y. Kato[2]

[1] *toriR Lab., Japan*

[2] *Member of Bird Research, Japan*

** Presenting author*

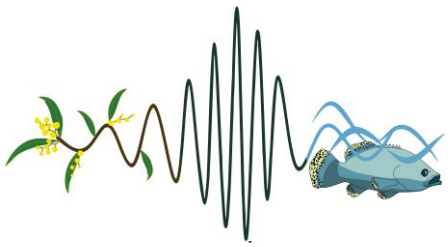
The past five years have transformed bioacoustic analysis: BirdNET (2021), Perch (2023), BirdAVES (2023), NatureLM-audio (2024) and Perch 2.0 (2025) have successively expanded the species and taxa recoverable from a single recording. In the same window, nocturnal flight call (NFC) monitoring — established in Europe (160+ stations) and North America — began in Japan, where a citizen-science initiative supported by Bird Research has grown to 29 sites and approximately 20 contributors. Concurrently, Sandbrook et al. (2021) formulated social-responsibility principles for conservation surveillance technology, calling for technical responses. This report asks how citizen-science acoustic archives should be designed under this dual pressure.

Contributors deploy inexpensive IC recorders in backyards and on balconies, capturing a standardised three-hour overnight core (21–22h, 0–1h, 3–4h). Audio is aggregated via Google Drive and mirrored to on-premise NAS. Detection uses nfc-detect (Kato), a logistic-regression classifier over BirdNET embeddings trained on manually labelled calls from Fukui and Kagoshima. Task redefinition from multi-class call-type classification (zeep, monotonic-down, chi, cha, ...) to binary NFC-presence with random non-NFC negatives raised accuracy from 57.7% to 91.95%. Classifier-positive segments above a precision-oriented 80% threshold are retained as NFC candidates. Processing runs on multi-core CPUs.

Cumulative capture reached approximately 7,800 hours (5 TB), a 5.6-fold increase over year one. Of 2,322 analysed hours, 639,301 candidates were extracted at 80% confidence (259,105 at 95%). Calendar heatmaps reveal a pronounced Japan-Sea-side autumn corridor (Echizen, Kanazawa, Kaga) and a spring northbound signal at Hamanaka, Hokkaido. The classifier exhibits classifier geography: sensitivity drops outside the Fukui/Kagoshima training origin, and some taxa (e.g. shorebirds) lie entirely outside the training set. Incidental human-voice capture, inherent to home-based recording, was also observed. We present an archive architecture built on three requirements — append-only integrity of the raw layer, auditable lineage from raw to every derived product, and privacy-masked derivatives catalogued alongside raw audio — coherent with the Sandbrook principles.

Japan's citizen-science NFC project has begun in synchrony with rapid model updates. Analysis of 2,322 hours revealed classifier geography and incidental human-voice capture, establishing raw audio as the primary deliverable. We present three archive-design requirements — append-only integrity, auditable lineage, and privacy-masked derivatives catalogued alongside raw audio — responding to the dual pressure of model update and social responsibility.

Related topics: *Conservation technology, Monitoring, Future-forward/innovative*



Presentation format: *Poster*

Using sound pressure level in conjunction with audio recognition to map species location

Matthew Ottley[1*], Andrea Hempshall, Marshall Day Acoustics, and Melbourne

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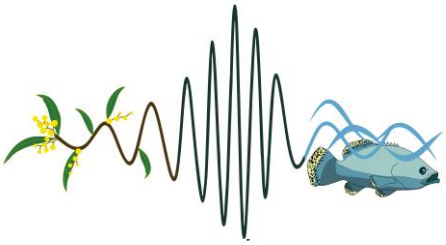
** Presenting author*

Using audio recordings in conjunction with AI or machine learning audio recognisers for species identification is widely used in ecological studies. The absolute sound pressure level of each call is not commonly used in the analysis, however this information can provide additional insight. Where the typical sound power level of the species under study is known the sound pressure level of recorded calls can be used to estimate the distance of the animal from the recording device. Using GIS tools the estimated location of calls can be mapped and overlaid with other relevant (non-acoustic) data to refine these maps. Other methods exist for identifying more precise location of targets, such as acoustic localization using the time difference of arrival of sounds heard by multiple recorders. The subject of this paper has lower precision but provides approximate location from a single recorder, with faster and less complicated processing requirements. This concept was explored with a case study focusing on Powerful Owls. Recordings were first made of a pair of owls in a known location in order to calculate an estimated Sound Power Level for their calls. Subsequent recordings were then made at various locations in the valley in which their nest site was located and estimates of their distance from the recorder mapped using GIS. Additional mapping constraints of the bush reserves were then overlaid with the acoustic mapping in order to refine the likely owl locations.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Poster*

Comparison of monitoring methods for central arid Australian birds

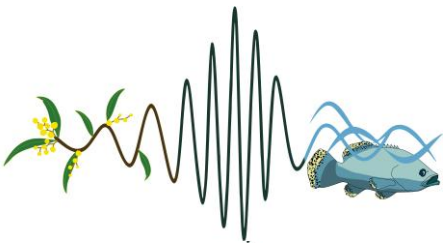
Caitlin Potts[1*], Darren Southwell[1], and Adam Smart[1]

[1] *Centre for Conservation Science, University of Newcastle, Australia*

** Presenting author*

Uluṟu-Kata Tjuṯa National Park (UTKNP) in central Australia is a World Heritage site recognised for its outstanding cultural and natural values. Since 1987, a long-running biodiversity monitoring program has operated across UKTNP to track the status and trends of fauna, including observer-based bird count surveys. Despite this, detection of some species remains low, and therefore their trends within the park are unknown. Acoustic monitoring has been shown to be an effective alternative to traditional observation monitoring of avian populations globally. However, in arid regions, particularly within Australia, where many species are nomadic, there are limited comparisons of these monitoring methods. In this work, we use a case study at UKTNP to compare acoustic monitoring with observer-based surveys to confirm if passive acoustic monitoring provides a suitable and cost-effective alternative for monitoring Australian arid bird species. Having collected data using observer-based surveys and acoustic detectors in Spring 2025 and Autumn 2026, we are investigating differences in detection rates and occupancy for species considered ecologically or culturally significant, with expected results indicating that acoustic methods will offer a viable alternative to observer-based methods. This will provide a framework for future monitoring of central arid Australian birds.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Poster*

TERN's Ecoacoustic database and the Australian Bat Acoustic data collection: a major step forward in the automated identification of batsf

Simon Robson[1*], Guru Siddeswara[2], Chris Corben[3], and Will Edwards[4]

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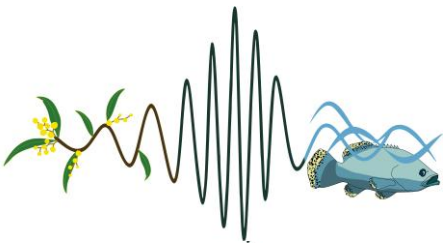
Acoustic surveys have significantly improved our capacity to non-invasively detect relatively cryptic species such as echolocating bats, but require a set of well-curated calls demonstrating the geographic, inter- and intra-species variability in call structure. Despite over 30 years of acoustic research in Australia, in the absence of this information, identifying key groups of the approximately 60 microbat species remains difficult. Our goal has been to develop a centralised open-access database of bat calls that brings together existing call databases and allows users to easily access existing calls and contribute new ones. The database seeks to capitalise on extensive call collections that are not publicly accessible and is encouraging various groups to lodge calls within the Australian Bat Acoustic data collection. Perhaps most importantly, the database accepts both identified and unidentified calls. To achieve these goals TERN has established the Ecoacoustics database https://ecoacoustics.tern.org.au/ along with a set of User Guidelines that maximise the value of contributed calls. The database has rapidly expanded, containing over 5,000,000 bat sound files from 44 countries, and is already being used to develop automated identification systems. The world is full or people with great datasets they want to make available to the general community! We continue to optimise the user-database interface, develop links with other international bat call libraries and target areas in Australia to focus future studies of bat acoustic communities.

Related topics: *Applied ecoacoustics, Monitoring, Future-forward/innovative*



Presentation format: *Poster*

From Minutes to Months: High-Resolution Acoustic Monitoring Uncovers Temporal Dynamics of a Vulnerable Island Tree Frog

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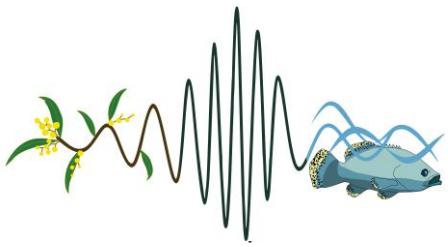
Understanding temporal patterns of reproductive activity is central to conservation yet remains poorly known for insular threatened amphibians. Vocalizations are among the most conspicuous attributes of the reproductive biology of anuran amphibians. Passive acoustic monitoring has emerged as a powerful tool for long-term biodiversity assessment and conservation. We investigated diel and seasonal patterns of calling activity of Scinax alcatraz, a vulnerable frog (IUCN) endemic to a remote Atlantic Forest island, ~35 km off the southeastern Brazilian coast. We combined long-term passive acoustic recordings with automated detection to quantify calling activity across four continuous sampling periods, totaling 251 days. One recorder generated 35,825 WAV files of 3 minutes (19,515 files in March-May/2016) and 15 minutes (4,683 in June August/2016; 5,952 in October-December/2016; and 5,675 in January-March/2017), which were analyzed by a upervised machine learning pipeline in Python. A Random Forest classifier was trained on manually annotated call segments using Mel-Frequency Cepstral Coefficients (MFCC) to capture spectro-temporal structure of vocalizations. Recordings were segmented into 0.5 s windows to compute the probability of calling activity. Diel and seasonal activity patterns were explored in day–hour heatmaps and daily boxplots. Results reveal pronounced temporal heterogeneity, with periods of near-zero activity interspersed with episodes of intense calling. Calling activity was strongly concentrated at night (19:00-03:00 h), while daytime activity was consistently low. Choruses of vocalizations were more frequent and intense between October and December throughout the annual cycle. Sharp transitions between low and high activity periods suggest pulsed reproductive dynamics rather than continuous calling activity. Scinax alcatraz exhibits highly structured diel and seasonal calling behavior. More broadly, our study highlights the value of combining scalable machine learning approaches with soundscape monitoring to uncover hidden temporal patterns in poorly known and threatened species, providing critical information for conservation and management planning. Funding: FAPESP and CNPq.

Related topics: *Applied ecoacoustics, Monitoring*



Presentation format: *Poster*

‘soundMap’: a tool for soundscape mapping using triangulation methods

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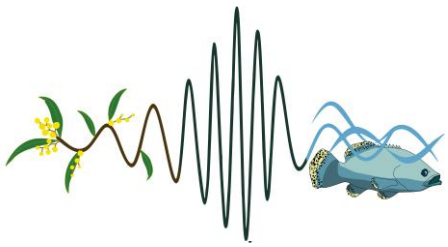
Global biodiversity is increasingly threatened by habitat loss, defaunation, and pollution, compromising essential ecosystem services. Addressing these challenges requires understanding human impacts and developing effective mitigation strategies. In this context, continuous fauna monitoring in impacted areas becomes essential for assessing ecosystem health. Compared to traditional biodiversity assessment methods, passive acoustic monitoring (PAM) has emerged as an accessible and minimally invasive method, enabling large-scale and standardized data collection. However, most PAM studies are concentrated in temperate regions, limiting the development of effective protocols for tropical ecosystems. In addition, current ecoacoustic indices often lack generality across environments, restricting their applicability in biodiversity assessments. Moreover, these approaches are typically unable to provide reliable estimates of biodiversity, as they rely on indirect acoustic proxies that do not account for species abundance. This study aims to address these limitations by proposing large-scale data sampling in Brazilian tropical biomes and developing tools for biodiversity assessment. Our main focus was the implementation of a triangulation-based approach for fauna mapping using acoustic data, based on differences in the time of arrival of sounds at recording units to estimate sound source position. Our methodology consisted of deploying four sampling arrays of three synchronized autonomous recording units (ARUs; Solar BAR, Frontier Labs; Song Meter 2, Wildlife Acoustics) arranged in triangular configurations, enabling sound source localization based on time differences of arrival (TDOA). Each unit was georeferenced, and data were collected on a 50/10 min schedule over 30 days. Recordings were synchronized and organized for sound-type classification. Analyses were manually performed using Raven Pro 1.6.5, including species identification based on vocal signatures and timestamps of detected signals. Based on these data, we developed a Python-based code (‘soundMap’) to automate acoustic triangulation-based soundscape mapping and derive ecological metrics from acoustic data. The code was initially designed to receive timestamps from three independent recorders, calculate relative time differences of arrival (TDOA), and estimate sound source location, incorporating climatic and environmental variables affecting sound speed and propagation as stochastic components in the triangulation model. Preliminary results demonstrate accurate estimation of source positions. Ongoing work includes code validation and implementation as Python libraries and R packages, as well as further automation of analytical steps. These findings indicate that acoustic triangulation is a promising approach for improving biodiversity assessment in tropical ecosystems, enhancing estimates of abundance, richness, and diversity, and supporting conservation strategies at broader scales.

Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



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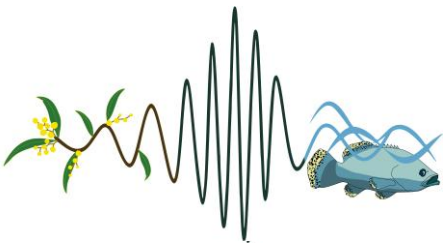
Related topics: *Conservation technology, Applied ecoacoustics, Monitoring*



Presentation format: *Poster*

Linking Ecoacoustic and Soundscape Indices to Assess Tourism Pressure in a Thai World Heritage Site

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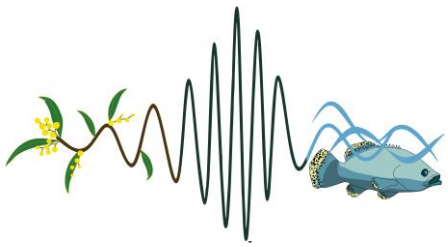
** Presenting author*

Tourism is a leading threat to biodiversity in protected areas, yet recreation management rarely accounts for ecological or psychological carrying capacity. This study addresses that gap by investigating how ecoacoustic and soundscape perception indices vary with tourism intensity at Khao Yai National Park, part of a UNESCO World Heritage Site in Thailand. Ecoacoustic indices will quantify soundscape changes and assess biodiversity and habitat quality, while soundscape perception indices will capture psychoacoustic responses of tourists. Applying this dual-acoustic approach, the study will identify thresholds at which recreational use degrades soundscapes, impacting wildlife and visitor experience. Findings will provide empirical evidence supporting soundscape-informed policies, visitor capacity limits, and spatial zoning strategies that balance tourism pressure with conservation goals. We will deploy autonomous recording units across gradients of visitor activity and distance from roads, capturing diurnal, nocturnal, and seasonal variation across high and low tourism periods. Paired ground-truth surveys will accompany recordings to quantify detection gaps under increasing anthropogenic noise. Concurrent questionnaires will assess tourists' perceptual soundscape responses. Acoustic indices including Acoustic Complexity Index (ACI), Acoustic Diversity Index (ADI), Normalized Difference Soundscape Index (NDSI), Acoustic Evenness Index (AEI), Bioacousitc Index (BIO), Acoustic Entrophy (H), Median of amplitude envelope (M), Acoustic Richness (NR), Number of Peaks (NP), Mid-band activity (MID) will be calculated and evaluated for sensitivity to anthropogenic noise and consistency across seasons. Generalized linear mixed models will assess relationships between acoustic indices and tourism-related variables, while Spearman's correlation will examine relationships between acoustic and perceptual soundscape indices. Threshold analyses will identify points of biological decline indicating habitat disturbance and degraded visitor experiences. This project will establish soundscape monitoring as a practical decision-support tool for protected area management, offering science-based benchmarks for acceptable visitor use that minimize wildlife impacts while preserving tourism quality at KYNP and across Thai protected areas.

Related topics: *Soundscapes, Applied ecoacoustics, Monitoring*



Presentation format: *Poster*

Reconstructing the Soundscape of Dunhuang Music and Dance

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Ecoacoustics has primarily focused on natural and anthropogenic soundscapes, leaving a critical gap: how can we recover lost soundscapes embedded in static visual cultural heritage? This study proposes a framework to reconstruct the historical soundscape of Dunhuang music and dance, as depicted in 7th–8th century murals (Mogao Caves 220, 172, 148), where musical ensembles, dancers, and architectural spaces are visually recorded but their sonic dimensions remain inaccessible. We design a cross-modal mapping framework that translates visual features from these murals into computable acoustic parameters. Three evidence sources will be triangulated: (1) iconographic analysis of instrument morphology (e.g., pipa, konghou, bili), spatial arrangements of musical ensembles, and architectural acoustics of halls; (2) archaeoacoustic data from excavated instruments (to be collected); and (3) historical texts describing Tang dynasty musical practices. A weighted scoring system (40% physical evidence, 35% visual analysis, 25% textual records) is proposed to ensure historical fidelity. The framework will generate a soundscape parameter library covering timbre, spatial coordinates, and rhythmic patterns. Preliminary application to the three caves suggests that key parameters—timbral attributes from instrument morphology, stereo imaging from symmetrical ensemble layouts, and reverberation characteristics from architectural spaces—can be derived with expected consistency above 0.85 based on cross-validation. This approach extends ecoacoustics from present-day soundscapes to cultural-heritage soundscapes, offering a replicable methodology for acoustic heritage preservation and contributing to “ecoacoustics in the arts” by enabling the auditory dimension of visual cultural heritage to be systematically recovered and experienced.

Related topics: *Arts, Soundscapes*