Eco-acoustic Monitoring:
A Beginner's Guide for Practitioners

What is Eco-acoustic Monitoring?

Eco-acoustic monitoring (sometimes called passive acoustic monitoring or PAM) is like putting 'ears' into the bush. Small sound recorders capture the entire soundscape – bird calls, frog choruses, insect noise, bats, mammals, wind, water, and even human-made sounds. These recordings can then be transformed into visual spectrograms and analysed by people or artificial intelligence tools.

Because it's non-invasive, eco-acoustics allows us to detect species and measure ecosystem health without disturbing wildlife. It also means you can monitor 24/7 for weeks or months at a time, even in places where people rarely go.

Why Use It?

Eco-acoustics is powerful because it scales across species and habitats and has multiple applications:

- Threatened species monitoring
- Pest species detection
- Fire management – monitoring species before and after burns.
- Habitat health – whole soundscapes reflect ecosystem diversity.
- Citizen science – volunteers can deploy recorders or help review data.

HOW TO GET STARTED

1. Define your question – what species or habitat are you monitoring?
2. Choose your equipment – e.g., Frontier Labs BAR-LT, Wildlife Acoustics Song Meter, or low-cost AudioMoth.
3. Plan your deployment – how many recorders, where to place them, how long to leave them out.
4. Record your settings – sample rate (birds/frogs: 44.1 kHz; bats: 192 kHz+), recording schedule, gain.
5. Deploy safely – protect units from dust, rain, livestock, and curious animals.
6. Collect and back up data – never trust SD cards alone.
7. Analyse – use tools like BirdNET Analyzer (AI), Raven Pro (manual validation), or Open Eco-acoustics.
8. Interpret results – link detections back to habitat, fire history, or management actions.

CHECK OUT MORE RECOMMENDATIONS FOR CONSERVATION PRACTITIONERS

BEGINNER'S TOOLKIT

Recorders – Frontier Labs BAR-LT (robust, Australian-made), Song Meter (global standard), AudioMoth (low-cost).

Software – BirdNET Analyzer (AI recognition), Raven Pro (manual validation), Open Eco-acoustics platform.

Data sources – Australian Acoustic Observatory (free nationwide acoustic data), Ecoacoustics.org resources.

Field apps – Fulcrum for data collection, GPS/photo apps like Theodolite or Solocator to stamp metadata.

FOR GLOSSY BLACK-COCKATOOS, RESEARCHERS FROM QUT, GRIFFITH UNIVERSITY AND UNIVERSITY OF THE SUNSHINE COAST FOUND ACOUSTIC MONITORING DETECTED THE BIRDS AT 33% OF SITES, COMPARED WITH JUST 3% SEEN/HEARD DIRECTLY AND 9% VIA FEEDING SIGNS.

MAKING SENSE OF SOUND

All acoustic data is a mix of **signal** (the species or sound you're targeting) and **noise** (everything else). The challenge is finding your signal in the noise.

- Precision vs recall: high precision means fewer false positives but risks missing calls; high recall means more detections but requires more manual checking.
- Automated tools can save time but always require validation – don't blindly trust AI.
- Use spectrograms to visualise sound – even faint calls can be detected visually that the human ear might miss.

TIPS FOR SUCCESS

- Always run a small trial first – test your equipment and settings.
- Standardise equipment and settings for long-term monitoring.
- Back up data immediately to multiple locations.
- Involve volunteers or students in deployment and data review.
- Combine acoustics with other monitoring (cameras, vegetation surveys) for richer insights.

COMMON PITFALLS

- Using factory settings without adjustment.
- Switching hardware mid-project (data won't be comparable).
- Over-amplifying gain, which boosts noise as well as signal.
- Collecting data without a clear question – wasted effort.
- Blindly trusting automated outputs without human review.

LEARN MORE

- Ecoacoustics Lab (QUT)
- Australian Acoustic Observatory
- BirdNET Analyzer
- Cornell's BioacousTalks on YouTube
- Frontier Labs
- Glossy Black Conservancy on YouTube

FAQS

Do I need expensive gear?
No – AudioMoth devices cost under $150. Higher-end units offer longer deployments and better sound quality, which may improve the chance that you detect your target species.

Can I use my phone?
Phones can record sound, but lack the quality and battery life for proper monitoring.

How long do I leave recorders out?
Depends on your species and question – for Glossy Black-Cockatoos, 14 days of dawn-to-dusk recording worked well.

Do I need training?
Basic setup is straightforward. Analysing sound requires some practice, but many free tutorials and communities exist.