**Materials and Methods**

*Study sites*

We surveyed six sites that are part of the Australian Acoustic Observatory (Table X). Each site contained four 100 x 100 m plots. Plots were arranged in pairs (500–5000 m between pairs), and each pair contained a wet plot (≤50 m from a body of water) and dry plot (≥50 m from a body of water and (500–5000 m from the wet plot). When possible (see Table X) we surveyed each site twice in 2021. Each survey lasted for seven days (excluding setup days), and all four plots within a site were surveyed simultaneously.

*Audio recorders*

*Field surveys*

For each survey plot, we used a standardized series of survey and trapping methods to document that fauna present. All methods were used continuously for 7 days during each survey period and methods were consistent across plots. Each plot contained: two drift fences, 12 arboreal cover boards, four cage traps, and 24 Elliot traps (Figure 1).

Drift fences (30 cm tall) were X-shaped, with four 10-m long arms and five 20-L pitfall traps (one in the center and one at the end of each arm). Additionally, each arm contained two funnel traps (18 x 18 x 79 cm; one in the middle of each side of the arm) with an opening on each end (eight funnel traps per fence). To improve capture rates, a “wing” (18 x 50 cm) of fence fabric was placed at a 45° angle to each opening of each funnel trap to guide additional animals into the traps (McKnight et al. 2013). To prevent desiccation and overheating, wet sponges were placed in each funnel and pitfall traps, shade cloths were placed over the funnel traps, and all traps were checked twice daily (in the morning and evening).

Arboreal cover boards consisted of foam mats (50 x 50 cm) attached to trees by two elastic straps (Nordberg and Schwarzkopf 2015). They were placed on 12 haphazardly selected trees and checked every morning. They were placed at the start of each survey period and removed at the end.

Cage traps were 66 x 26 x 25 m and were placed in each corner of the plot (~10 m from the corner at a 45° angle to the plot boundaries). Eliot traps were 8 x 9 x 33 cm and were placed in a line (six per line) starting in each corner ~5 m from the cage trap and ending near the center of the plot (~5 m between each trap). Cage and Eliot traps were baited with bait balls made of peanut butter, oats, and vanilla. Each trap was opened in the evening, checked the following morning, and closed during the day.

For camera traps, we used Campark T85 20MP cameras with IR flash. A camera was placed in the center of each edge of the plots facing towards the center of the plot. They were set to take the photos and one 10-sec video each time they were triggered, with a 1-min waiting period between triggers. They were baited with a bait ball (as per mammal traps) encased in a ventilated PVC housing and partially open sardine can. They ran continuously during the surveys.

In addition to trapping methods, we conducted visual and auditory searches each morning and night. During the searches, two researchers meandered through the plots for 15min recording any animals that were seen or heard. While researchers stayed within the plots, animals seen or heard off the plots were also noted. Morning searches focused on birds, while nocturnal searches used head torches and focused on reptiles and amphibians. During each 7-day survey, researchers rotated among teams and plots to minimize observer bias. Finally, throughout the 7-day surveys, we noted incidental encounters with animals that were seen or heard outside of our 15-minute search periods.

*Diversity and audio indices*

To compare manual survey results with acoustic indices, we split the data into four groups: all (containing all observations regardless of taxa or method of detection), amphibians (all amphibians detected by any method), avian (only birds observed during the morning birding surveys), and non-avian (all taxa other than birds detected by any method). The amphibian and avian subsets were chosen because both taxa call and are likely to be detected on acoustic recorders (thus directly testing acoustic indices), and the remaining two categories were intended to test the possibility that diversity in acoustic species would be reflective of diversity more generally and, therefore, acoustic indices would be useful for describing the broader vertebrate diversity. For each plot, we calculated the richness (total species observed, Shannon’s diversity (which combines richness and evenness), and the total count of observations for each data subset.