Acoustic recognizers for non-invasive citizen science monitoring of Leach's storm-petrel (*Hydrobates leucorhous*)

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Passive acoustic monitoring (PAM) is a non-invasive technique that enables anyone to contribute to the conservation of Species at Risk. The Leach's storm-petrel (*Hydrobates leucorhous*) is an endangered seabird that breeds on islands and nests in burrows. Of their two main calls, the purr indicates a nesting pair. Since current population monitoring techniques are highly invasive, the species was a perfect candidate for application of PAM and development of acoustic recognizers. In July 2021, we placed 18 AudioMoths in plots of different burrow densities in a storm-petrel breeding colony on Bon Portage Island, NS, Canada. We used Kaleidoscope Pro to create a detector and classifier for purrs and chatters. The detectors performed well, with 84% recall for the chatter. The classifiers, which performed better, were used to extract calls in the entire set of recordings and explore relationships between call rates, burrow density and weather. Call rates were similar throughout the colony, although low rates were associated with high windspeeds. The lack of relationship between burrow density and call rate suggests that PAM is unlikely to replace more invasive methods for monitoring the density of breeding pairs. However, the detectors and classifiers were effective at detecting the presence of multiple birds and breeding pairs. Our results suggest that PAM and automated detection can be valuable tools for non-invasive storm-petrel monitoring, primarily for the purpose of extensive monitoring to identify islands with breeding colonies. These classifiers and detectors can be used by citizen scientists to participate in monitoring this species.

Keywords: Leach's storm-petrel, classifier, detector, citizen science, PAM, SAR

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