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## **Heard but not seen: Acoustic monitoring as a potential tool for conserving wild tiger populations**

Imagine being able to track and identify tigers without ever stepping into the forest. Such a far off dream is becoming a quick reality thanks to the work of The Prusten Project. From analyzing the social vocal communications of tigers, The Prusten Project was able to find individual tigers do have unique voices, much like humans, which provide the identity of the caller as well as the caller's sex. Though the recording equipment may simply look like green boxes, those bland boxes are actually powerful automated recording units (ARUS) created by the company Wildlife Acoustics. The ARUs are able to automatically record tigers based on a schedule programmed prior to deployment and can sit at study site for weeks at a time. Once recording is finished, the memory cards are offloaded into cloud storage where they are able to be search for vocalizations using a sound analysis software, Raven Pro. This work has been supported by the Association of Zoos and Aquariums Tiger Species Survival Plan as well as made possible by the research contributions from AZA facilities which house tigers. Although the first portion of the study was only conducted with the Bengal subspecies, the project is currently looking to record Malayan, Sumatran, and Amur individuals.

Determining that tigers do have unique vocalizations is leading to new methods of remote monitoring which would allow a more efficient as well as minimally disruptive census of critical populations where dense jungle prohibits visual confirmation. This is particularly important given that tiger populations have plummeted by over 50% throughout ranges which currently only occupy 7% of their historic lands 8. Currently rangers primarily track tigers on foot by looking for pugmarks. These outdated tracking methods

may cause more harm than good due to their low efficiency. Although camera-traps can provide sufficient information, tigers may cross a trap's path without a quality photo taken, and camera-trapping techniques are costly in equipment and labor. Better census of populations is essential for habitat protection and anti-poaching enforcement.

Acoustic monitoring, an underutilized tool, holds the promise of more efficient protection efforts and decrease in the potential for local crime rates related to poaching rings, as a more accurate census would allow law enforcement to focus on core areas. More importantly, the ARU would be able to pick up the calls of many other groups of animals including birds, amphibians, and bats which communicate largely through vocalizations. This form of census, known as soundscape monitoring, would allow a wide range of conservation organizations to work together in one ecosystem with minimal effort and ease.

Citizen science volunteers have worked through hundreds of hours of recordings searching for the smallest chuff, groan, or roar to help the project reach its goal of an ARU network for tigers. Collaborators from the Fauna Communications Research Institute, Elephant Listening Project, Smithsonian Conservation Biology Institute, Panthera, and the Cornell Bioacoustics Research Lab have made this research endeavor become a reality. The project continues to be funded by The Dallas World Aquarium, The Minnesota Zoo, and the American Association of Zookeepers.