Acoustic Monitoring of Threatened and Endangered Species in Inaccessible Areas

Conservation
CS-1185

Background:

Many U.S. military installations find it difficult or impossible to monitor the status of federally listed threatened and endangered species on large portions of land because these areas are inaccessible to ground personnel. Military activities, such as live-fire exercises, and safety hazards, such as unexploded ordnance, restrict or prohibit direct ground access to these areas. Biologists, therefore, are unable to use traditional ground-based survey methods in these areas. However, the Department of Defense (DoD) is required by the Endangered Species Act to collect such data and to use this information to develop management plans for minimizing the impacts of military activities on threatened and endangered species.

Objective:

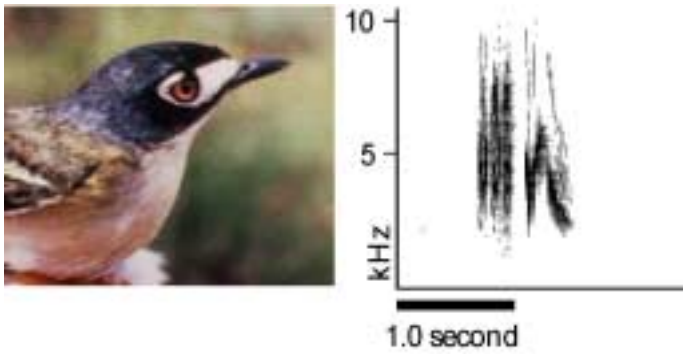
This project will develop an autonomous airborne monitoring system for censussing acoustically active animal species in inaccessible areas by recording, identifying, and localizing their sounds. The system will be developed and initially deployed for use in monitoring populations of two federally endangered songbirds (golden-cheeked warbler and black-capped vireo) at Fort Hood, Texas. The ability to extend this technology to other bases and species will also be demonstrated.

Summary of Process/Technology:

The monitoring system will consist of the following three components: (1) a microprocessor-controlled digital data recording system that can be deployed either on the ground or on an airborne platform; (2) a helium-filled lift vehicle that can carry the recording system aloft for drifting or tethered deployments; and (3) a software package for automatic extraction, identification, and localization of sounds of interest. The completed system will enable long-term or wide-area acoustic monitoring, with fully automatic data reduction. Post-deployment processing will be capable of producing a map of sound source locations and a log of species and time of call for all detections of interest. Summary statistics regarding call density, the estimated density of animals, and measures of the uncertainty of these estimates will be produced.

Benefit:

The data collected by this system can be used to determine the presence or absence and the estimated population density of target species in areas where such data are presently unavailable. These data can be used by DoD resource managers to support the development of effective management plans for threatened and endangered species on many U.S. military installations.



A black-capped vireo (left), one of the endangered songbird species to be monitored in this project. Sound spectrogram of a song of a black-capped vireo (right).

Accomplishments:

This is a FY01 New Start project.

Contact Information:

Dr. Kurt Fristrup
Cornell University
Cornell Laboratory of Ornithology
159 Sapsucker Woods Road
Ithaca, NY 14850
Phone: (607) 254-2438
Fax: (607) 254-2415
E-mail: kmf6@cornell.edu