DoD Develops Sound Monitoring Efforts

by Alison Dalsimer and John Thigpen

Cornell Lab of Ornithology

Ever wonder what the Department of Defense uses its high-tech surveillance equipment for? Most would answer, "To gather intelligence on a particular target." And this would be true, especially if the surveillance subject is a threatened or endangered species.

Although training and testing are the military's primary missions, DoD (like all federal agencies) is guided by a variety of environmental laws, including the Endangered Species Act. DoD policy states: "The Department of Defense shall act responsibly in the public interest in managing its lands and natural resources." It goes on to say, "Natural resources under control of the Department of Defense shall be managed to support the military mission. . . ."[1]

1 Source: DoD's policy on natural resources, http://www.dtic.mil/whs/directives/corres/htm12/d47004x.htm.

DoD lands harbor more listed species per acre than any other federal lands. This is likely due to such factors as restricted access, limited on-base development, increasing growth and development on adjacent lands, and the successful implementation of Integrated Natural Resources Management Plans. Additionally, DoD lands have been more intensively surveyed than many federal lands, so it may simply be that the data are more complete. Knowing what's on its lands is a high priority for DoD and the dedicated natural resource personnel who manage those resources.

Acoustic Monitoring

Not surprisingly, imperiled animals frequently take up residence in live-fire ranges and other areas that are inaccessible to ground personnel. Although access restrictions provide excellent protection,

Researchers at the Cornell Laboratory of Ornithology in Ithaca, New York, have developed an autonomous airborne monitoring system (above) for tracking bird presence and abundance in areas inaccessible by humans. This system provides previously unattainable population data on two endangered songbirds, the black-capped vireo* (Vireo atricapilla) *and golden-cheeked warbler* (Dendroica chrysoparia)*, pictured at the right. This project was awarded the SERDP Project of the Year for 2004.

Kelly Barr

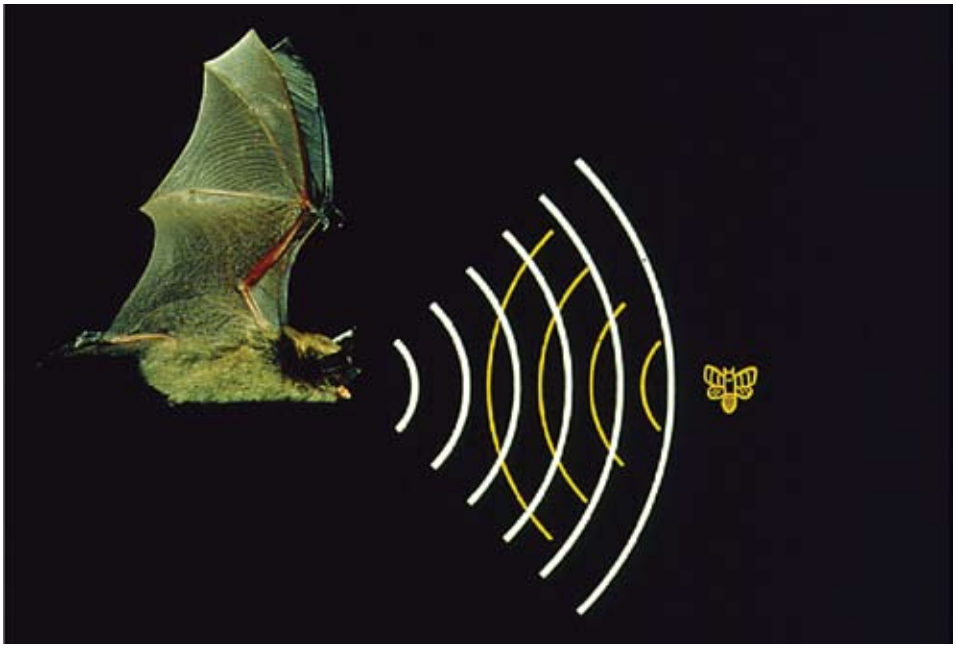

Photo courtesy of Humboldt State University

Researchers at Humboldt State University (HSU) in Arcata, California, are developing a system to monitor bats automatically and continuously for weeks or even months at a time. Because bats are nocturnal, and because it is very difficult to distinguish among their calls, they had been difficult to monitor. HSU's system provides high-resolution acoustical data recordings that will result in more reliable and consistent information about long-term trends and abundance, and will increase the accuracy and consistency of species identification.

they also pose unique challenges to DoD's species management activities, not the least of which is obtaining reliable inventory and monitoring data.

To combat this challenge, DoD's Strategic Environmental Research and Development Program (SERDP) has invested millions of dollars to develop acoustic monitoring technologies that operate independently of human presence. With funding from SERDP, researchers have developed digital acoustic recording tags and airborne monitoring systems, among other technologies, that allow DoD land managers to remotely infiltrate restricted areas and extract valuable data on threatened and endangered species.

The acoustic technologies developed through SERDP record animal sounds autonomously over extended periods, digitize the resulting data, and use it to calculate species density and track migration patterns. Personnel are now using acoustic technologies to track the presence, abundance, and movement of all sorts of listed species. This information provides natural resource managers a baseline against which to measure population size, density, and fluctuations. DoD personnel can then more effectively prioritize management actions and allocate scarce resources.

Successful Results

The acoustic monitoring investments of SERDP are beginning to pay off. At Fort Hood, Texas, personnel can track endangered birds on inaccessible bombing and artillery ranges through mobile, airborne, and long-term recording and monitoring. At sea, the Navy is gaining a greater awareness of marine mammal behavior thanks to information provided by digital acoustic recording tags attached to diving whales.

The military anticipates significant reductions in monitoring costs through the use of inexpensive autonomous monitoring equipment and the reduced need for personnel-based ground surveys. It continues to invest in autonomous detection and tracking technologies so that DoD personnel can base their management on "sound" intelligence.

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Woods Hole Oceanographic Institute

Researchers at the Woods Hole Oceanographic Institution in Massachusetts engineered non-invasive digital acoustic recording tags and attached them to a variety of whales and dolphins, including the elusive beaked whale, to monitor behavioral and physiological responses to various stimuli. For the first time, scientists were able to hear the distinct vocalizations of these whales during very deep foraging dives. This project was awarded the SERDP Project of the Year for 2005.