

Bat Men: Scientists Help Protect Bats on Military Installations



By Ms. Stefanie A. Gardin

In a joint project between the Engineer Research and Development Center (ERDC) Environmental Laboratory (EL) in Vicksburg, Mississippi, and its sister laboratory—the Construction Engineering Research Laboratory (CERL) in Champaign, Illinois—a team of scientists are combining technologies to study activities that may threaten bats on military installations. Increasingly, military installations are becoming hot spots for endangered species such as the Indiana and gray bats. For the past 30 years, many of these installations, which were once in remote locations, have become surrounded by suburban developments, causing wildlife to seek refuge on the less inhabited training lands. As a result, protection and conservation of plants and wildlife—particularly threatened and endangered species—on military installations and Department of Defense land is becoming an increasingly important mission for the Army and the US Army Corps of Engineers.

Most major installations have conducted at least a preliminary survey of their fauna, which has included a survey of bats. The surveys identified a couple of endangered species on approximately 20 installations. Of the 45 species of bats in

the United States, about half are considered species of concern, and six species are endangered. From a biological diversity aspect, bat populations are in need of help.

At Fort Knox, Kentucky, the team is in its last year of a three-year study on the effects of military noise, which has been identified as an environmental concern on bat activities—specifically bat navigation and feeding. The Army is sponsoring the study as part of the Army Environmental Quality Research Program.

Fort Knox is home to the US Army Armor Center. With six active tank ranges, there was a high probability of getting the high-caliber weapons fire at night that the team needed for their project. Fort Knox was also selected because the Indiana and gray bats are located there. In addition, personnel at Fort Knox, both in the environmental office and in the range control office, were willing to cooperate on the project.

The concern is that military noise, primarily high-caliber weapons fire, might have some impact on the bats' ability to feed and use their resources for survival. The team is focusing on the fire from 120-millimeter tank rounds, but it is also recording, translating, and interpreting noise from 25-millimeter rounds from Bradley M2A3 fighting vehicles, .50-caliber machine guns, and helicopter overflights.

Several other technologies are being used to carry out the research. One such technology is the Anabat II, an ultrasonic bat detector. The Anabat II picks up the high frequency of bats calling to a distance of 30 to 40 meters. These signals are then relayed to another device and on to a computer. Several software programs are used to interpret the signals so that the scientists can locate the bats and, to a large degree, determine what species they are hearing.

The problem with ultrasonic bat detection is that sometimes it is difficult to hear the different species of bats that inhabit an area. That is where thermal infrared imagery comes in. Basically, a thermal infrared camera is used to observe bat



Gray bat



Anabat II ultrasonic bat detector

activity using heat sensors. It picks up bat activity to about 100 meters. The bats appear as warm shapes against a cool background. Thermal infrared imagery indicates to scientists the number of bats in an area and, to some extent, what they are doing—whether the bat is flying in a feeding pattern or just flying by.

The team of scientists is taking a new approach using several different technologies. It is believed to be the first time that all this is being combined, and that is the innovation of the project—trying to pull these technologies together to get more and better information than we have in the past. The team has set up 31 sample sites at Fort Knox—some right behind firing lines, others farther away. Using the Anabat II, thermal infrared imagery, and sound data from military guns, the team can look at bat activities before, during, and after firing at the various sites and determine what effect the noise has on the bats.

Still in the analyzing data stage, outside factors such as the weather can also heavily impact bat activities and must be taken into account. The team completed its last field event during the summer of 2004. When it finishes the study, the team will offer appropriate management recommendations to Army installations, based on the results and interpretations.

The team experienced long and trying days in the field, but because of the research conducted, a difference is being made in the Army and the environment—increasing awareness and protection of threatened and endangered species. 

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