Digital Radio-Telemetry Monitoring of San Nicolas Island Foxes

07-308

Background:

The island fox is considered a species at risk by U.S Department of Defense. Four of the six island fox subspecies have been listed for protection under the Endangered Species Act (ESA) due to rapid population declines. While the specific mechanisms for the declines differ, all were associated with a sudden increase in mortality. A method for rapid detection of disease outbreaks, novel predators and other threats allows for management action to prevent population crashes (e.g., vaccination or predator removal programs) reducing the need for intensive captive-rearing programs or for further protection under the ESA.

Francesca J. Ferrara

Collared adult female and juvenile island fox

Objective:

Fox densities on San Nicolas Island are unusually high, making this population particularly susceptible to the spread of a novel virulent disease. Our goal is to demonstrate an effective and efficient automated monitoring technique for San Nicolas Island foxes to detect potential threats in time to prevent population declines to critical levels. This project augments previous survivorship data enhancing our baseline estimates of mortality and allows further refinement of management criteria that would trigger intervention or other management actions in case of an epidemic

Summary of Approach:

In Phase 1 of this Legacy-funded project, we established an automated remote telemetry system demonstrating a substantial improvement in efficiency over traditional telemetry. In the current phase, we upgraded that system. Most significantly, we installed self-recharging receiving stations, which relay data to a centralized location, allowing convenient monitoring of foxes via any internet connection. Sixty-three foxes were fitted with radio collars programmed to transmit standard VHF live and mortality signals, as well an individual 3-character ID signal unique to our telemetry system. Each ID signal transmitted by a collar is automatically relayed to a central server for real-time status updates allowing quick detections of mortalities. Mortalities were collected for necropsy to determine proximate cause of death and possible contributing factors (e.g., disease or injury that, while not directly responsible for death, was the ultimate/underlying cause). These data were used to refine management action triggers aimed at reducing the risk of a disease epidemic threatening the San Nicolas Island foxes.

Benefit:

Conservation of island foxes on Navy lands is clearly guided by scientifically justified criteria. The triggering criteria will help prevent fox populations from declining to the point where extensive management is required to prevent extinction or listing under the ESA, without triggering unnecessary responses to “normal” mortality events. An efficient and effective way of monitoring a key species on the Channel Islands under the jurisdiction of the U.S. Navy will facilitate fox conservation efforts and minimize costs to the Navy and third-party funding agencies. Similar techniques could be used on species of conservation concern that live in within military lands.

Accomplishments:

The telemetry system demonstrated in this project is an effective and efficient way to monitor a large number of foxes. We tracked 63 foxes, recorded 68,614 ID signals, and documented 11 mortalities in 13,059 fox-days of monitoring. We confirmed high annual survival of young adults and senescence in older animals leading to reduced survival rates. Although age-class specific survival rates estimated from our study were not significantly different from last year, a higher percentage of younger animals and lower percentage of older animals died in 2007-2008 than in 2006-2007. We did not detect significant temporal patterns in mortality risk.

Contact Information:

Brian Hudgens, Ph.D.
Research Ecologist
Institute for Wildlife Studies
PO Box 1104
Arcata, CA 95518
Phone: (707) 822-4258
Fax: (707) 822-6300
Email: hudgens@iws.org