# Remote Monitoring of Island Foxes

06-308

## Background:

The Navy currently manages fox populations on San Nicolas Island and San Clemente Island and owns San Miguel Island, which is managed by the National Park Service. Four of the six island fox subspecies, including the San Miguel Island fox, have been listed for protection under the Endangered Species Act due to rapid population declines and the island fox is considered a species at risk by U.S Department of Defense. While the specific mechanisms causing these declines differ among islands, they are all associated with a sudden increase in mortality rates. Developing 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). This will reduce the need for intensive captive-rearing programs or for further protection under the Endangered Species Act.

Photo by Francesca Ferrara

**San Nicolas Island fox**

## Objective:

Ongoing yearly surveys on San Nicolas Island indicate that fox densities are unusually high, making this population potentially particularly susceptible to the spread of a novel virulent diseases. Funded the by the Department of Defense Legacy Program, the main goal of this project is to demonstrate an effective and efficient technique for monitoring San Nicolas Island foxes to detect potential threats in time to prevent population declines to critical levels. By utilizing the most recent developments in monitoring technology to obtain baseline estimates of mortality, we can establish criteria to trigger management actions allowing us to effectively intervene in the case of an epidemic.

## Summary of Approach:

Radio collars were placed on 64 wild-caught foxes on San Nicolas Island. The radio collars transmit a coded telemetry signal hourly that were received and translated by remote receiving stations placed throughout the island. Data collected by receiving stations were downloaded within 1-3 days and the status of each fox determined. The radio collars transmitted a standard telemetry signal to also allow traditional tracking with directional antennas and telemetry receivers. Necropsy was used 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). Monitoring a population is most useful when observations can be compared to criterion for specific management actions. These data are being 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 refined triggering criteria will help prevent fox populations from declining to the point where extensive management is required to prevent extinction or listing under the Endangered Species Act. Implementing 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 to monitor other 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 64 foxes, recorded 530,837 ID signals, and documented 10 mortalities in 14,906 fox-days of monitoring. A single technician scanned daily survivorship data in order to identify missing or dead animals and allowing time for follow up on those animals. Based on these data, we were able to estimate background mortality rates for two distinct classes of adult foxes corresponding to younger and older, senescent adults, and establish trigger points for management actions.

## 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