

Research on Fox Squirrel Reaps Rewards

by Erin Kulynych

National Wildlife Refuges, such as Chincoteague NWR in Virginia, have been instrumental in providing habitat and contributing to the knowledge of Delmarva fox squirrels (*Sciurus niger cinereus*). At Chincoteague, University of Maryland Eastern Shore graduate students (who are also U.S. Fish and Wildlife Service employees) have conducted valuable research on the local squirrel population.

The Delmarva fox squirrel is one of the largest tree squirrels in the Western Hemisphere, achieving a body mass of 0.8 to 1.4 kilograms (1.8 to 3 pounds). It once ranged throughout the Delmarva Peninsula of Delaware, Maryland, and Virginia, and up into southeastern Pennsylvania and southern New Jersey. This squirrel prefers to forage and travel

on the ground and selects mature forests with relatively open understories.

The primary cause for the decline of this species, which led to its 1967 listing as endangered, is the loss of these open mature forests in the region. Its range has been reduced to 10 percent of its historic distribution, where remnant populations are restricted to discontinuous areas on the Delmarva Peninsula. However, recent indications show its status is improving, and we may someday see it recovered. An important step toward recovery is research, so biologists can learn more about the species and monitor the effects of management activities on the populations.

As part of the recovery program for Delmarva fox squirrels, 30 squirrels were released at Chincoteague from 1969 to 1971. Research conducted by Service Biologist Kendra Willett in 2001 indicates that this translocation site was successful and that Chincoteague is now home to a stable population of Delmarva fox squirrels. Willett focused her study on the effects on the squirrels of timber that was removed because of an infestation of southern pine beetles (*Dendroctonus frontalis*). In addition, she learned about home range, population size, and monitoring techniques.

To assess the population, Willett and refuge staff trapped squirrels in the spring and fall using cage traps baited with pecans. Each squirrel was marked using Passive Integrated Transponder (PIT) tags, which are inserted under the skin for individual identification. These tiny cylindrical capsules contain microchips with copper coils. The microchip is encoded with a 10-digit identification number and is only activated with a scanner; therefore, a PIT tag can have a

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Left: Erin Kulynycz tracks radio-collared Delmarva fox squirrels.
Photo by Robert E. Wilson

lifespan of 99 years. Using this technology, each squirrel received a permanent identification number that aids with monitoring the population and individuals. Willett's comparisons to standard ear tags demonstrated that PIT tags are a superior way to mark the squirrels because of a lower rate of loss and lack of effect on the animal's health or activities. Ear tags, which can be torn from the ears and cause infections, are no longer used by the refuge because of Willett's findings. Based on the capture pattern of individual squirrels, Willett used population models to estimate the number of Delmarva fox squirrels at Chincoteague NWR at approximately 180 squirrels.

Another important component to Willett's research was home range analysis. Refuge staff attached radio-collars to individual squirrels and tracked them to assess the response to timber harvest. (Using radio collars allows biologists to track the animals frequently from a distance without subjecting them to undue disturbance.) Biological technicians recorded the locations using Global Positioning System (GPS) units. These locations were entered into a Geographic Information System (GIS) computer program to determine the home range size and the types of habitat that are most important to the squirrels.

Willett found no changes in home range size due to the removal of infested trees. This indicates that the population has the necessary resources in the available habitat to maintain stability. Fundamental to the recovery program is the translocation of squirrels off the refuge to suitable sites. The population at Chincoteague could be used for future translocations if it continues to be viable.

Ongoing research focuses on improving habitat at Chincoteague by studying the effects of prescribed fire on Delmarva fox squirrel habitat use. Because the squirrels prefer open understories and mature trees, biologists hope to use prescribed fire to reduce the thick vine and shrub layer of the forest. Through techniques similar to those used by Willett, movements of squirrels between a burned and unburned site will be compared. Refuge staff also conducted vegetation surveys to determine changes in composition due to fire. Mast trees important to the squirrels are red maples (*Acer rubrum*), loblolly pines (*Pinus taeda*), and oaks (*Quercus* spp.). The removal of understory vegetation, such as greenbrier (*Smilax rotundifolia*), would aid in the movement and predator vigilance of the Delmarva fox squirrel. This study will be the first of its kind to assess the effects of prescribed fire on fox squirrels. We hope the fire, planned for the spring of 2003, will provide a new tool for managers and landowners to improve the status of Delmarva fox squirrels and make habitat more suitable throughout the region.

Future studies will test high-tech methods to improve capture techniques. Innovative methods such as using DNA analysis on hair samples taken by "sticky traps," rather than actually catching squirrels, will be studied as well as using cameras and laser sensors at bait sites to assess the presence of Delmarva fox squirrels in new areas.

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