Illinois' smallest tree squirrel is not out of the woods—yet.

Finding Red Squirrels

Story By Tom Nelson, Corinna Hanson and William Beatty
Photos By Adele Hodde

Whether you know them as red squirrels, pine squirrels, fairly-diddles or chickarees, Illinois' rarest tree squirrel can be hard to find in the Prairie State. To most Illinoisans, red squirrels are associated with camping in the northwoods or hiking along mountain paths. Few realize that this little chatterbox is native to our state.

The status of Illinois' red squirrels (*Tamiasciurus hudsonicus*) has long been a mystery to biologists. Red squirrels probably were found throughout northern Illinois at the time of European settlement. In the book "Mammals of Illinois," author Donald Hoffmeister noted that museum specimens and reliable reports show that the species was found from the Wisconsin line as far south as Hennepin in Putnam County and throughout the Chicago area. However, after 1910, the little squirrel was not seen again in the state and was thought to be locally extinct.

Then, hunters and naturalists started seeing red squirrels again during the 1970s near Kankakee and Momence in northeastern Illinois. Biologists questioned whether these animals had persisted in the area since the 19th century or were recent immigrants from Indiana. Both explanations were possible.

Red squirrels along the Kankakee River have been studied to determine if they represent a remnant or immigrant population.

Red squirrels can be mistaken for young fox squirrels, so the presence of a small population could go unnoticed. On the other hand, red squirrels inhabit parts of Indiana, so they may have immigrated into Illinois as part of a natural range expansion. However, a third possibility also arose. Local rumors persisted that these squirrels were offspring of released pet squirrels from Minnesota.

Understanding the history of Illinois' red squirrels and their habitat requirements became a research priority for the Department of Natural

Biologists baited live traps with a variety of seeds, and checked traps twice a day during the sampling period.

(Photo by Jeremy Everitts, Eastern Illinois University.)

Resources in recent years, in part because the species' conservation status hinged on where the squirrels originated. If they were a surviving native population, then listing the species as endangered or threatened may be appropriate to protect this unique population. However, if red squirrels were expanding naturally into the state, then they are likely increasing in numbers and not threatened. Finally, if they were clearly descendants of released pets, they would not qualify for special status or management.

With these unanswered questions, DNR partnered with Eastern Illinois University to investigate the status, conservation needs, and genetic origin of red squirrels in Illinois so that management decisions could be based on the best scientific information available. Red squirrels have been studied in the field and laboratory for the past two years, supported by federal and state funds through the State Wildlife Grant Program. The focus of the study was a seven-county region of northeastern Illinois, south of Chicago, where the ecology, behavior and genetics of Illinois' smallest tree squirrel has slowly come into focus.

So, where did these squirrels originate? A genetic analysis of the DNA fingerprints of more than 50 Illinois squirrels was compared with those of 200 red squirrels from Indiana, Michigan, Wisconsin and Minnesota. Genetic fingerprints are similar for close relatives, but dissimilar for distantly related individuals. Research shows that Illinois' squirrels are closely related to squirrels in Indiana and southern Michigan. In contrast, squirrels from Minnesota, Wisconsin and the Upper Peninsula are closely related to each other, but are less like Illinois' squirrels. Furthermore, no evidence was found that Illinois' squirrels were genetically unique. These results suggest that Illinois' red squirrels are not a unique remnant population, nor offspring of transplanted squirrels. Instead, they appear to be recent immigrants from Indiana. That's good news because it indicates that red squirrels have naturally expanded their range into the Prairie State after years of absence.

With their origin determined, the next research questions became where the squirrels are found, what environmental factors limit their distribution and what can be done to conserve this species.

How do you find a rare, elusive squirrel in the scattered woodlots and parks of the state? Extensive interviews were conducted and public notices published asking knowledgeable biologists, bird watchers and hunters for input. In addition, woodlots were systematically searched using playback surveys, broadcasting the squirrel's rattle-call and listening for responses. Slowly, this work started to bear fruit and

Live traps were placed on the ground and in trees, and covered with burlap to provide cover.

(Photo by Jeremy Everitts, Eastern Illinois University.)

Trapped squirrels were weighed, measured and tagged, and some were fitted with a radio collar, then released.

researchers were able to delineate the current range as a four-county area that includes Will, Grundy, Kankakee and Iroquois counties.

Results show that the species has expanded its range by nearly 30 miles to the south and west since the 1980s. Current locations suggest that red squirrels probably have dispersed along forested corridors adjacent to the Kankakee and Iroquois rivers and their tributaries. Furthermore, although the squirrels may be slowed by agricultural fields and highways, these landscape features do not block their movements. Squirrels were found on both sides of major rivers, Interstates 55 and 57, and even inhabiting a 10-acre woodlot surrounded by 1,000 acres of restored prairie. While red squirrels appear to tolerate forest fragmentation fairly well, this is not the case for another Illinois native, the gray squirrel. Recent research in Indiana suggests that grays may be declining as forests and fencerows disappear and woodlots become more isolated.

So, why aren't red squirrels more common in Illinois? One possibility is that their prime habitat—pine forests—were lost in Illinois during the 19th century to agriculture and development. However, after more than 1,800 hours in the field radiotracking 40 individuals to investigate their habitat needs and behavior, researchers found that many squirrels had established home ranges that were completely devoid of pines, instead using hardwood forests, fencerows and shrub-savanna habitats. Pine plantations were used when they were available, but were not preferred to hardwoods, or necessary for survival. Obviously, red squirrels are capable of inhabiting forests different from the conifers from which the species draws its other common name, the pine squirrel.

Again, this is good news for Illinois' smallest tree squirrel. DNR is actively removing non-native pine plantations on many public lands in an effort to restore native plant communities. Prior to this research, there was concern that the loss of pine plantations might mean the loss of red squirrels—a point research suggests is not likely. Providing good habitat to conserve red squirrels will mean protecting forested river corridors, maintaining mast-producing hardwood (particularly walnuts) stands and managing for areas of thick, shrubby understory where red squirrels can elude predators.

This study shows that research partnerships between the state's wildlife agency, universities and private landowners can be vital to conserving and restoring our native species and natural ecosystems. While Illinois' red squirrel population isn't out of the woods yet, the species appears to be coping and adapting to our contemporary landscapes.

By implementing proactive, science-based management, hope exists that the scolding chatter of red squirrels will be heard by future generations of Illinoisans.

Dr. Tom Nelson is a professor in the Department of Biological Sciences at Eastern Illinois University. Nelson and Dr, Zhiwei Liu supervised graduate students Corinna Hanson and William Beatty.

Radio tracking was used to determine the home range of Illinois red squirrels.