Northern Long-eared Bats and White Nose Syndrome in Minnesota

The northern long-eared bat (*Myotis septentrionalis*) is listed as threatened under the federal Endangered Species Act, largely due to the impact of white-nose syndrome on bat populations. White-Nose Syndrome (WNS) is a disease caused by the fungus *Pseudogymnoascus destructans*. WNS killed almost 6 million bats from 2006 to 2011, and many more bats would have died with the westward expansion of WNS over the last 8 years. WNS appeared in Minnesota in 2016. We used acoustic detectors to listen for bats, and we used mist-nets to capture bats. The main goals of the project were to provide baseline data on distribution of northern long-eared bats in Minnesota, and to identify characteristics of roost trees used by females with pups.

We found northern long-eared bats throughout the forested region of Minnesota. Female northern long-eared bats roost together in maternity colonies in which female bats give birth and raise their young together. Young bats nurse from their mothers and are able to fly after 3-4 weeks. Reproductive success is critically important because WNS typically results in 90% or more reduction in population size in hibernacula. In addition, most bat species have only 1 young per year, which makes it difficult for populations to recover.

We captured 1,202 bats with mist-nets. The most common species captured were the little brown bat and the big brown bat. Most adult female bats we captured were pregnant or lactating. We tracked 84 northern long-eared bats, 13 little brown bats, and 8 big brown bats to roosts in 262 trees and 12 buildings. The average number of female northern long-eared bats in a maternity roost was 15, with a range of 1 to 79 bats. The female northern long-eared bats that were tracked to roosts in trees spent an average of 1.3 days in each roost tree. Unexpectedly, female northern long-eared bats usually spent only one night in a roost tree, even when lactating.

Almost all of the roost trees were in upland forests. In northern Minnesota, aspen (*Populus tremuloides*) was the species most commonly used as a roost tree. In central Minnesota, maple (*Acer* spp.) and aspen trees were most commonly used, and in southern Minnesota, oak trees (*Quercus* spp.) were most commonly used as roosts. About 90% of roosts were in deciduous tree species, and 10% of roost were in conifer tree species. Roosts were in larger trees because it takes time for cavities to develop. Similarly, roost trees were more likely to be damaged or dead, because more cavities would be present than in healthy trees.

In general, our findings for northern long-eared bat mist-netting and roost tree use were consistent with findings reported elsewhere, but there are Minnesota-specific outcomes that will be useful for management. Northern long-eared bats in southern Minnesota, with more development and agriculture, used roost trees located in patches of forest. In northern Minnesota, roost trees were within forest stands instead of on the edges of forest stands, and roost trees tended to be located in areas with trees present in most of an 800 m foraging radius.