

**PENNSYLVANIA GAME COMMISSION
BUREAU OF WILDLIFE MANAGEMENT
PROJECT ANNUAL JOB REPORT**

PROJECT CODE NO.: 06710

TITLE: Special Concern Mammal Species Research/Management

JOB CODE NO.: 70007

TITLE: Surveys of Terrestrial Mammal Species of Special Concern

PERIOD COVERED: 1 July 2015 to 30 June 2016

COOPERATING AGENCIES AND PARTNERS: Pennsylvania Department of Conservation and Natural Resources, Heritage Conservancy

WORK LOCATION: Statewide

PREPARED BY: Lindsey Heffernan

DATE: 3 August 2016

ABSTRACT This report summarizes the results of terrestrial small mammal surveys, including northern flying squirrel surveys. A total of 3 surveys were completed by the Pennsylvania Game Commission, including 2 water shrew surveys and 1 BioBlitz survey. At least 1 northern flying squirrel survey was completed; however, datasheets were not finalized by staff before their positions were unexpectedly eliminated. Finally, no red spruce seedlings were monitored as planned.

OBJECTIVES

1. To assess and monitor the distribution and relative abundance of Pennsylvania's terrestrial mammal species of special concern.
2. To annually examine northern flying squirrel presence/absence at nest boxes, and to replace boxes as needed.
3. To track and monitor the growth and survival of red spruce seedlings planted within northern flying squirrel habitat.

INTRODUCTION

Small mammals

The Pennsylvania Game Commission has been permitting qualified researchers to trap

terrestrial small mammals using a variety of techniques for decades. As a requirement of these permits, researchers must submit a final report including a summary of captures and trap site information. This data, combined with small mammal surveys conducted by the Game Commission, are stored in a database for long-term preservation and future data needs. Records date back to 1984.

Northern flying squirrels

Research and monitoring of northern flying squirrels was initiated in 2001 with a State Wildlife Grant awarded to Wilkes University and Penn State University. Completion of these and subsequent grant projects resulted in the listing of the squirrel as state endangered and the establishment of a long-term monitoring program using nest boxes deployed across the historic range. There are currently about 742 boxes throughout Pennsylvania. The Game Commission's goal is to annually examine each of the established nest boxes. Supplementation of additional nest boxes or the deployment of boxes at new sites has occurred periodically.

In addition to providing nest boxes, red spruce management and planting has been a primary emphasis of northern flying squirrel management. Red spruce trees are associated with multiple genera of hypogeous fungi, and these fungi serve as a primary food source for northern flying squirrels. Increasing these fungi via spruce plantings will increase the overall yield of fruiting bodies and also extend the time frame that food resources are available for the squirrels. In Pennsylvania, most of the conifer component in active northern flying squirrel habitat is comprised of hemlock and white pine.

The initiative of planting native red spruce began when the Game Commission collected seed, and planted 1,500 seedlings at 2 locations (State Game Land 149 and Chapman Dam State Park) known to support northern flying squirrel and have limited evergreen diversity, consisting mostly of hemlock. Subsequently, 2,500 red spruce were purchased from West Virginia via a Wild Resource Conservation Fund grant to Penn State University. Plantings were strategically placed within mature hemlock stands where the hemlock woolly adelgid had been noted, between mature hemlock stands to develop a coniferous corridor, or in stands that contained no spruce at all. In 2012, 10% of the planted seedlings were marked. Also in 2012, 1 bushel of native red spruce cones was collected from State Game Land (SGL) 312 and SGL 127 in the Poconos. Cones were aged, cut open for seed collection, and sown into rows at the Pennsylvania Game Commission's Howard Nursery. These seedlings were cultivated by the Game Commission at Howard Nursery. In 2013, the Game Commission and Penn State Altoona marked and monitored 5% of the 2,500 red spruce seedlings that were planted in 2011. Red spruce exhibited a 98.6% survival rate 1 year post-planting. Approximately 10% had apical stem damage and 28.6% had their apex browsed by deer. Seedlings were scheduled to be monitored every 2 years from that point forward.

The addition or improvement of northern flying squirrel habitat is critical, as the species is being out-competed by the southern flying squirrel. In Pennsylvania, both species have been documented at active northern flying squirrel sites. The northern is distinguished in the field by the combination of several key traits, including its larger mass, longer and wider tail, longer hind foot, and the coloration of hair located on both the tail and thoracic cavity. Specifically, a northern's thoracic cavity hair is lead colored at the base and white on the tip, and the hair located at the terminal end of the tail is often brown with a black tip. None of these traits alone are enough

to distinguish species, as variation in the southern flying squirrel can account for similar traits. Furthermore, hybridization has led to confusing morphological conditions and field identification must be confirmed periodically by genetic analysis.

METHODS

Small mammals

Small mammal data is collected during Game Commission trapping efforts and also the efforts of permitted individuals and companies. Permits issued by the Game Commission for terrestrial small mammal research require a final report including data on captures and trap site locations. This report must be submitted to the Game Commission by a deadline and is entered into the small mammal database as time allows. Small mammal trapping often involved Museum Special snap traps, but may also include techniques such as Sherman traps, camera traps, etc.

Northern flying squirrels

Northern flying squirrel data is largely collected during Game Commission's annual monitoring of nest boxes, though some live trapping has occurred. Nest box checks are performed by placing a ladder against the tree and quickly plugging the entrance of the box with a rag. If animals are present, the box is removed from the tree and the animals are processed and released on the ground. The contents of each box (e.g., nest material, food) are recorded, and every other box that doesn't contain a nest is cleaned out. This clean-out process allows the Game Commission to examine general changes in box use over time.

Red spruce seedlings are to be monitored every 2 years, including the year 2015. Survival, apical stem damage, and deer browsing should be recorded.

RESULTS

Small mammals

Three small mammal surveys were completed this reporting period, 2 targeting water shrews and 1 targeting all mammal species at a BioBlitz. One of the 2 (50%) water shrew surveys was successful in capturing the species. Mammals documented as a result of these 3 surveys included black bear, white-tailed deer, red fox, coyote, raccoon, woodland jumping mouse, water shrew, smoky shrew, white-footed mouse, deer mouse, and southern-red backed vole. There was a total of 270 trap nights comprised of camera trap surveys ($n = 1$), walking surveys (informal inventory while working in an area; $n = 7$), and snap trap surveys ($n = 262$).

Northern flying squirrels

A minimum of 1 northern flying squirrel survey was completed this reporting period and likely more. Datasheets were not completed by staff before their positions were unexpectedly eliminated. No red spruce seedlings were monitored.

RECOMMENDATIONS

1. Hire staff, or contract with vendors, to conduct water shrew surveys within the geographic gap between subspecies, and collect and have analyzed genetic samples.

2. Hire staff to update mammal databases in a timely fashion.
3. Hire staff, or contract with vendors, to conduct red spruce monitoring as soon as possible.