



Northern Flying Squirrel

Glaucomys sabrinus macrotis



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CURRENT STATUS: In Pennsylvania, the northern flying squirrel is endangered, listed as a priority species in the state's Wildlife Action Plan, and protected under the Game and Wildlife Code. It is secure nationally.

POPULATION STATUS: Two species of flying squirrels are found in Pennsylvania. The rare northern flying squirrel is limited to northern conifer forests, while the smaller southern flying squirrel is widespread. Despite very specific habitat preferences, the northern flying squirrel (*Glaucomys sabrinus macrotis*) was once found across Pennsylvania's northern tier. An extensive study in Pennsylvania conducted from 2003 through 2007 found only 33 northerns. Most known sites are in the Pocono region, with the exception of one in Warren County and one in Potter County.

IDENTIFYING CHARACTERISTICS: Flying squirrels have skin flaps (patagia) that extend between the wrists and ankles, and a tail that is flattened top to bottom so they can steer when gliding from tree to tree. The northern flying squirrel travels principally by gliding, with an average distance of about 65 feet. Through a series of short jumps, it can reach a ground speed of eight miles per hour. Their large eyes are an adaptation for nocturnal activity. Northern flying squirrels are similar in appearance to the common southern flying squirrel, but can be slightly larger, with an overall body length of eight to 11 inches, compared to eight to 10 inches for its slightly smaller cousin. The northern flying squirrel has tan or brown fur on its back, while the southern flying squirrel may range from tan to reddish-brown. The best characteristic to distinguish the two species is the color of the belly hair between their front legs. If the hairs are all white from tip to base, the squirrel is a southern flying squirrel. If the hairs are white at the tip but lead colored near their skin, it is a northern flying squirrel.

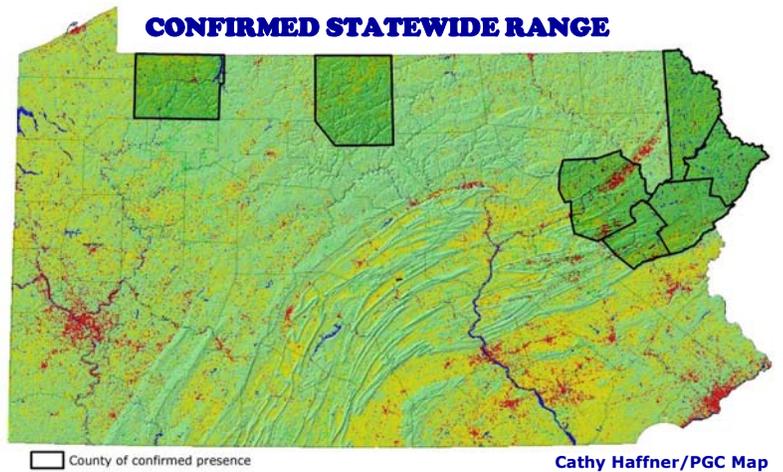


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BIOLOGY-NATURAL HISTORY: At certain times of year, fungi and lichens collected from trees or the ground are staples for the northern flying squirrel. Other important foods are acorns, beechnuts, and conifer seeds. Unlike other species of tree squirrels, food-hoarding behavior has not been documented in northern flying squirrels. Most active during evening hours, the northern flying squirrel may emerge briefly during the day. They are active year-round, foraging mainly in the treetops during in winter. During severe cold, they may cluster together to keep warm. Tree cavities provide the best nest sites, but outside nests on the sides of trees are built as well using bark, twigs, and roots. All nests in Pennsylvania are

lined with shredded strips of bark, moss or lichens. Information about reproduction of northern flying squirrels in the eastern United States is limited, but available data suggests that in Pennsylvania one litter is produced in mid to late May, ranging in number from one to four with an average litter size of two. At six weeks of age, young leave the nest for short periods and begin to eat solid food. Weaning occurs at about two months. Young northern flying squirrels take their first "test flights" at about three months. Predators include barn, barred, and great horned owls; goshawks and red-tailed hawks; foxes; bobcats; weasels; raccoons; house cats; and snakes.



PREFERRED HABITAT: Northern flying squirrels prefer old-growth boreal forests that contain a heavy coniferous component, moist soils, and lots of downed woody debris. Pennsylvania's forests do not provide the old-growth conifer stands that are optimum habitat for northern flying squirrels and most remaining old-growth and appropriate hemlock/spruce habitat exists only in small, isolated fragments. As a result, our northern flying squirrels use forests that contain a mix of coniferous and deciduous trees that often are second-growth age class. Second-growth forests can provide habitat if they contain some old trees or are adjacent to older forest stands. Limiting factors in younger, highly managed forests include both a reduced quantity of natural cavities and lower production of desired fungi for food.

REASONS FOR BEING ENDANGERED: Habitat factors influencing the northern flying squirrel's decline in Pennsylvania include loss of older conifer and mixed forest stands to development, especially in the Pocono Region, forest management practices geared towards wood products and early successional forest dwelling species, as well as the declining health of hemlock forest stands due to the hemlock wooly adelgid (an invasive insect). Northern flying squirrels rely on specific fungi that are dependent on hemlock and spruce trees. Although smaller in size, the more numerous southern flying squirrel appears to be an aggressive competitor for tree cavities as well as food resources. It also carries a parasite that



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may be debilitating or lethal to the northern flying squirrel. Studies in Michigan and Ontario, Canada found evidence that the southern flying squirrel's range is expanding northward while the northern species' range is simultaneously contracting. In both studies, these shifts appear to be related to warming trends. Three subspecies of northern flying squirrel occur in the eastern United States, with two subspecies (*Glaucomys sabrinus fuscus* and *G. s. virginianus*) that occur south of Pennsylvania currently listed as federally endangered. The subspecies found in Pennsylvania (*G. s. macrotis*) is disjunct and our state is the southern end of that subspecies' range. Despite its decline in Pennsylvania, the *macrotis* subspecies is still a common inhabitant of boreal forests of the Pacific coastal and Rocky Mountain states, states bordering the Great Lakes, and throughout Canada. It is considered rare, but can be found in small isolated pockets of suitable habitat along the Appalachian Mountains from Pennsylvania to Tennessee.

MANAGEMENT PROGRAMS: Beginning in 2001, the PGC Board of Commissioners approved a series of three federal State Wildlife Grants Program cooperative projects by Wilkes University and Penn State Altoona that monitored more than 500 nest boxes to gather population and reproduction information and evaluate habitat use. Many of the 33 northern flying squirrels captured were fitted with radio transmitters that allowed research to investigate their habitat which overlapped



habitat used by southern flying squirrels. Not only did this research show that the competing squirrels foraged in the same habitat, but they were even documented to use the same nest boxes. The Commissioners granted approval for the northern flying squirrel to be designated as a state endangered species in June 2007. Following a public comment period, final approval was granted in October 2007. Management **proposed in Pennsylvania's Wildlife Action Plan for the** northern flying squirrel includes determining its precise range, regularly tracking population and reproductive trends, and documenting patterns of habitat and space use by northern flying squirrels, as well as its interactions with southern flying squirrels. Monitoring of statewide nest boxes distributed in both potential and occupied forest stands should continue. Live-trapping is recommended for habitat where popula-

tions may occur, but have not been documented in the past 20 years. Intensive study is recommended at sites where local population status, behavior, and ecology can be followed closely. The draft also recommends statewide efforts to protect older hemlock and mixed-stand forests and development of guidelines for forest protection within a five-mile radius of known northern flying squirrel populations.

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