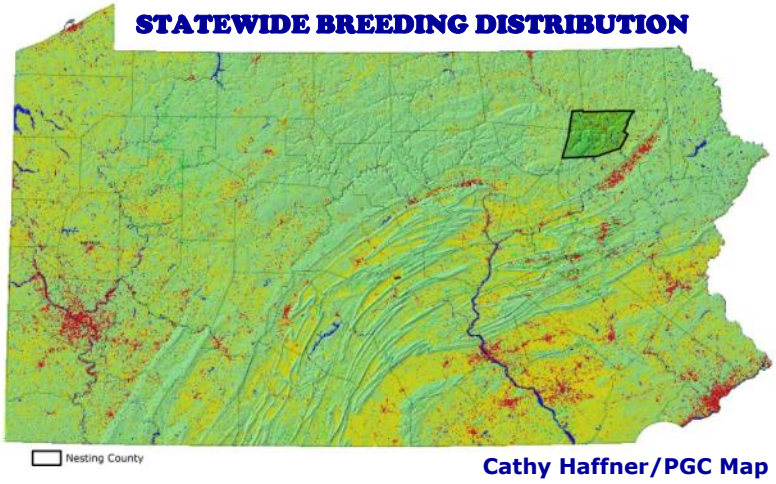
CURRENT STATUS: Pennsylvania, endangered, and protected under the PA Game and Wildlife Code; U.S. Fish and Wildlife Service Migratory Bird of Conservation Concern in the Northeast; federally protected under the Migratory Bird Treaty Act of 1918.

POPULATION TREND: Blackpoll warblers (*Setophaga striata*) are very rare and locally distributed nesting birds in Pennsylvania. Confirmed nesting has been confined to the Dutch Mountain wetlands in State Game Lands 57 of western Wyoming County. These boreal conifer wetlands are part of the Important Bird Area #48. There have been other reports of territorial blackpoll warblers elsewhere in northern Pennsylvania, but no nesting confirmed. The extent of its habitat was greatly reduced by timbering, but the species seems to be returning to spruce and hemlock forests that were cut in the 19th and early 20th century. Over its entire range, blackpoll populations tend to oscillate widely, perhaps as a reaction to prey availability (spruce budworms and other caterpillars). Overall, there has been a range-wide long-term non-significant decrease of 2.6% per year. But it is difficult to assess trend because so much of its nesting range lies in northern Canada, where there is little survey effort for the lack of roads, which give access to its habitat. In Pennsylvania, New York and New England, it often occupies mountain forests with few roads, making its populations difficult to measure or to assess a trajectory over time. Although very rare as nesting birds, blackpoll warblers are common transient migrants in the state.

IDENTIFYING CHARACTERISTICS: The bird gets its name for the male's black cap. The blackpoll warbler is a fairly large wood warbler. The male and female look different, a condition called "sexual dimorphism." The male looks dapper with contrasting black-and-white plumage while the female is more cryptically colored, blending in well with its surroundings. Both sexes have two white wing-bars, long white under-tail coverts, and yellowish legs. The soles of the feet are yellow and can be seen at close range from below. The male looks somewhat similar to the more common black-and-white warbler (*Mniotilta varia*), but can be distinguished from that species by its white cheek framed by black, as well as its yellow legs. The female resembles the pine warbler (*Setophaga pinus*) and other streaky warblers, having an olive cast to its upper parts, streaks on its back and two distinctive white wing-bars, but blackpoll females have a distinc-

tive lateral throat-stripe. Please study a good field guide to better understand how to separate this wood warbler from others with similar plumage. The male's territorial song is a very high-pitched rapid series of short notes on the same pitch that gets louder in the middle before trailing off at the end, often rendered as "*tsit tsit tsit tsit tsit tsit.*" This song is out of the hearing range of many people. Males often sing in migration, so hearing the song is no guarantee of a breeding population. Both sexes also deliver a sharp "chip" note.



Cathy Haffner/PGC Map

BIOLOGY-NATURAL HISTORY: Blackpoll warblers nest in conifer and mixed forests; the only confirmed nesting in Pennsylvania was in spruce forest. Males defend territories by singing from prominent perches and chasing off rivals. Breeding territories are relatively small for a warbler of this size, usually one to five acres. Blackpoll warblers forage by gleaning insects and other arthropods from foliage and twigs and by hawking and hovering maneuvers. This species claims the longest migration over water of any songbird; its fall migration route crosses over the north Atlantic Ocean from the northeastern coast of United States to the north coast of South America. In order to accomplish this feat, blackpolls nearly double their body mass in the form of fat before flight by eating tremendous quantities of insects. They take advantage of shifts in wind direction that provide them the best route over water to their destination. Blackpolls and other cross-oceanic migrants are known as "angels" to radar technicians that see their large flights as groups of small targets over the Atlantic Ocean at night. This species spends the winter in northern South America. It is one of the last species that migrates north in the spring, many still migrating in the last week of May or early June. Males generally arrive on the breeding ground before the females. However, the females choose the nest location and build the open cup nest, generally low in dense conifers. There is strong breeding site fidelity on part of the females. The nest is often next to the tree trunk, sandwiched between trunks, or in criss-crossing limbs. The two nests found in Pennsylvania were very well concealed low in spruce seedlings. The female lays three to five eggs, with more in the first clutch than the second. Incubation begins with the penultimate egg (next to last) and continues 11.5 to 12 days. The young hatch out in a helpless state and fledge after 8 to 10 days. The males' provisioning of females is fairly infrequent for a songbird. The fledglings can be difficult to see high in spruce trees where they can hide.

PREFERRED HABITAT: The blackpoll warbler is a characteristic songbird of North America's boreal conifer forest. Its breeding range extends coast-to-coast from Alaska and British Columbia west to the Maritime Provinces of Canada and Maine, and south in the mountains of northeastern United States to Pennsylvania. Our state is the southern outpost for the nesting population of this species. The nearest population is in the Catskills of southern New York only 100 miles away from where they nest in Pennsylvania. In Canada, the blackpoll warbler is a denizen of boreal black spruce forest, but in Pennsylvania it is found in and adjacent to isolated forested wetlands dominated by red spruce and eastern hemlock. The populations in southern part of its range tend to be in isolated "mountain islands" of conifers including mountain summits, bogs and swamps. Territories have a diversity of vegetation, including ericaceous and lauraceous shrubs as well as deciduous trees, but are generally dominated by conifers especially native spruces. Blackpolls forage for insects and other arthropods primarily low in trees and on inner parts of limbs. Locations supporting blackpoll warblers also provide habitat for snowshoe hares (*Lepus americanus*), northern flying squirrels (*Glaucomys sabrinus*), black bears (*Ursus americanus*), fishers (*Martes pennanti*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasiurus moctivagans*), and numerous conifer forest bird species. In Pennsylvania, almost all blackpoll warbler territories overlap with yellow-bellied flycatchers. The olive-sided flycatcher (*Contopus cooperi*) also once occupied

Glen Tepke/pbase.com/gtepke

this kind of forest in the state.

REASONS FOR BEING ENDANGERED: As a nesting species, the blackpoll warbler is very rare and local in Pennsylvania. It is confined to high elevation spruce swamps and forests that have become increasingly rare. The primary limiting factors for this species are the limited size and extent of boreal conifer forests. Development and roads fragment the habitat available to this and other conifer-dependent species in the northeastern Pennsylvania. The blackpoll warbler has been threatened principally by habitat destruction in Pennsylvania and elsewhere on its breeding grounds. Most of Pennsylvania's boreal conifer forests were cut before 1900. The spruce forests of our northern counties were either destroyed or badly fragmented in the 19th century and early 20th century. The conifer forests are still in recovery; red spruces are regenerating well in some parts of the North Mountain forest, especially in the Dutch Mountain area, and blackpoll warblers seem to colonizing new locations. Poor timbering practices, such as the lack of buffers around wetlands and in riparian zones, decrease habitat for conifer species. Other factors such as tree pests and diseases (hemlock wooly adelgid, elongate hemlock scale), excessive deer browse, and atmospheric acid deposition may further stress these forests, slowing regeneration and decreasing diversity of these habitats. Spruce budworm cycles may have a large effect on population size and range expansion for many songbirds in eastern North America, including blackpoll warbler. Reduced reproductive capacity caused by acid atmospheric deposition, mercury and heavy metal accumulation in mountain ecosystems, and global climate change also are threats to continued viability of the population of this and other mountain forest birds in the Appalachian Mountains, including Pennsylvania. The blackpoll warbler also seems especially vulnerable to collisions with man-made objects in migration because of its long-distance nocturnal flights.

MANAGEMENT PROGRAMS: Most nesting sites are well-protected on state game lands where conifers are valued for wildlife habitat. Known nesting sites also are protected because of their wetland status. The only known nesting locations are recognized as a Pennsylvania Important Bird Area. This species will continue to nest in the state only if boreal conifer forests and wetlands are given the protection. Such forests are not well protected on private lands. The "habitat islands" of boreal forest are valuable for a diversity of birds, mammals, and rare plants. There is an increasing concern about the health of North America's boreal forest that supports a large percentage of our continent's nesting birds. Our state's only Blackpoll Warbler population is within Important Bird Area #48, the Dutch Mountain Wetlands Complex of Game Lands 57. Restoration of spruce forests is possible with application of appropriate silviculture, such as basal area thinning of deciduous tree overstory where red spruce is regenerating. This kind of approach may be necessary to speed the recovery of conifer forest to support boreal conifer species such as yellow-bellied flycatcher, blackpoll warbler, and northern flying squirrel in Pennsylvania and the rest of the Appalachian Mountains.

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