

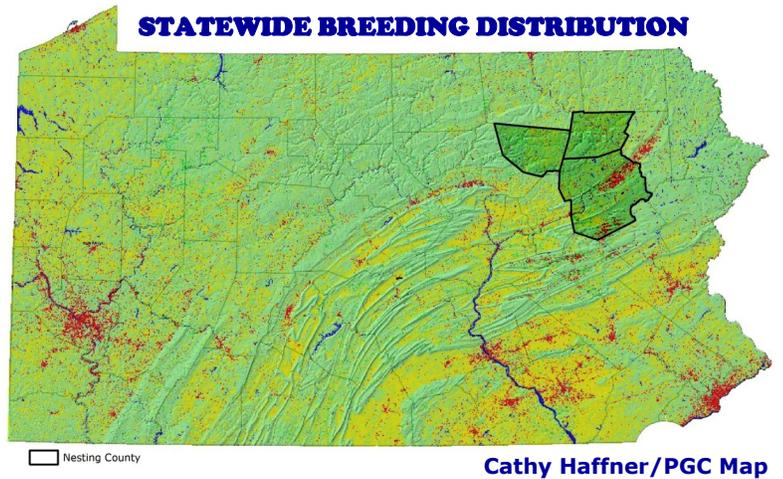


**CURRENT STATUS:** In Pennsylvania, the yellow-bellied flycatcher is listed as state endangered and protected under the Game and Wildlife Code. Although not listed as endangered or threatened at the federal level, this bird is a U.S. Fish and Wildlife Service Migratory Bird of Conservation Concern in the Northeast. All migratory birds are protected under the Migratory Bird Treaty Act of 1918.

**POPULATION TREND:** This is one of the rarest nesting birds in the state; it generally nests in remote areas, so trends are difficult to determine. Nesting pairs have been found since 1987 in isolated conifer swamps and mossy streamside woods in Luzerne, Lycoming, McKean, Sullivan and Wyoming counties. The largest and most stable population is the North Mountain boreal conifer wetlands in western Wyoming County and northwestern Luzerne County, including Coalbed Swamp, part of State Game Lands 57. Yellow-bellied flycatchers (*Empidonax flaviventris*) have occupied some sites for multiple years, reproducing successfully, which indicates that the habitat is good quality. It formerly nested in the Pocono Mountains where there is good habitat, but has not been found nesting there since the 1930s. The conservation status of the yellow-bellied flycatcher was changed from threatened to endangered in 2005 by the Game Commission, following the advice of the Ornithological Technical Committee, because of its extreme rarity. The Appalachian Mountain populations of this and other boreal forest species have declined over the last decades. Pennsylvania has the southernmost regularly occurring population in the Appalachian Mountains. It formerly nested occasionally in scattered high elevation locations as far south as North Carolina in the Appalachian Mountains. The nearest nesting population is about 100 miles away in the Catskill Mountains of New York.

**IDENTIFYING CHARACTERISTICS:** The yellow-bellied flycatcher is a small tyrant flycatcher in the American tyrant flycatcher family (Tyrannidae) in the genus *Empidonax*, a taxonomic group with a reputation of being difficult to identify. Although this account will emphasize the visual field marks, the most effective way to identify this species and other small flycatchers is by their voice. Yellow-bellied flycatchers are the most distinctly-plumaged small flycatcher in eastern North America. Brownish-olive above and yellowish below, this five-inch long flycatcher has whitish eye rings and wing bars. The eye ring is bold, complete, and usually yellowish. In adults, the wing bars are fairly broad and white, contrasting sharply with the blackish wing; juveniles have more buff coloration on their wing bars. This species may be misnamed since several flycatchers have yellowish bellies, but this is the only eastern *Empidonax* flycatcher that has a yellow throat in adult plumage, a diagnostic field mark, and a dark band across its chest. So colored, it blends in very well with its forested habitat. Perhaps, the moniker "moss tyrant" is a more appropriate name since it often is associated with mossy, moist woods. It is small and compact in appearance with a big-headed, big-eyed, and short-tailed appearance that makes it the "cutest" of the group. By contrast, the similar Acadian flycatcher (*E. virescens*) looks more like a woodpecker with a longer profile, larger bill, relatively long wings. It also is separated from Acadian Flycatcher by its yellow chin and throat. Least flycatcher (*E. minimus*) has lighter-colored undersides. Like other tyrant flycatchers, the males and females look alike.

With small flycatchers, including this species, vocalizations are best for identification. Male yellow-bellied flycatchers declare territory with an advertising song: a sharp, distinctive, but leisurely *killik*, *che-bunk*, or *je-bunk* delivered six to eight times per minute (as compared to the similar least flycatcher's frantic pace of at least 50 times per minute), or a quick *kik* or *psek* that resembles the calls of some woodpeckers, or a Henslow's sparrow (*Ammodramus henslowii*). Both sexes give a soft, rising *tu-wee*, *chu-wee*, or *twee* call, resembling the call of the semi-palmated plover (*Charadrius vociferous*) or the short call of the eastern wood-pewee (*Contopus virens*). The yellow-bellied flycatcher's call is shorter in duration than the wood-pewee's. Females use the *tu-wee* call repeatedly when nest-building or during recesses from incubation; both sexes use this call to maintain contact. It is the most commonly-given vocalization by migrating birds. Yellow-bellied flycatchers have many other vocalizations, including an abrupt "brrrt" when they catch prey and twitters when they interact with each other. Males have a flight song usually used before dawn that seems to include all vocalizations the species is capable of giving.



**BIOLOGY-NATURAL HISTORY:** Commonly found breeding in the spruce-fir forests of Canada, this flycatcher reaches the southern extreme of its breeding range in northern Pennsylvania. It is a characteristic bird of the North American boreal conifer forest. The genus name of "*Empidonax*" means "king of the gnats," an appropriate for this denizen of swamps where flying insects can be abundantly pesky. This species feeds mainly on insects and spiders, briskly snatching mosquitoes and gnats from vegetation and small branches. The "moss tyrant" nests on the ground, preferably in thick beds of sphagnum moss where three to five white eggs, sparsely flecked with brown, hatch in mid-summer. Nests are very well concealed in moss, at the base of a tree, in a tip-up, or under a log. Young leave the nest after about two weeks. Some pairs manage two broods with the male tending to the first batch of fledglings while the female builds a second nest and incubates the new eggs. It winters in forests from northeastern Mexico down through Central America as far south as Panama. They migrate north through the eastern United States in April and May. Some birds do not arrive on their breeding ground until early or mid-June. Some individuals leave to go south in mid-July. Among the state's nesting birds, this is one of the species that spends the least time on its nesting ground, usually less than 90 days. Male flycatchers will sing and attempt to establish territories, but fail to breed unless they can attract a female at the site. Many reports of breeding yellow-bellied flycatchers are single, unmated males that sing frequently to attract a mate and wander more widely than mated males. A singing male is no guarantee that there is a mated pair and a nest. Nests are extremely difficult to find, among the hardest to locate of North American birds. Many yellow-bellied flycatchers migrate through the state's forests and thickets on their way to and from the boreal forests of eastern Canada, New York and New England.

**PREFERRED HABITAT:** The yellow-bellied flycatcher is found in shady coniferous forests and forested wetlands at higher elevations. In Pennsylvania, nests have been found in mossy, poorly drained areas (swamps, bogs and old beaver ponds) surrounded by extensive northern hardwood forests. Nest sites are associated with conifer cover (spruce or hemlock), sphagnum moss, cinnamon ferns, and the presence of high bush blueberries (*Vaccinium spp.*), mountain holly (*Nemopanthus mucronatus*), rhododendron (*Rhododendron maximum*), swamp azalea (*Rhododendron viscosum*),



sheep laurel (*Kalmia angustifolia*), mountain laurel (*Kalmia latifolia*), or other shrubs. The shrub layer and ground-layer plant communities are rich in diversity and often contain rare species and those generally associated with boreal forests and wetlands. Yellow-bellied flycatcher territories often include forest floor plants such as goldthread (*Coptis trifida*), starflower (*Trientalis borealis*), bunchberry (*Cornus canadensis*), creeping snowberry (*Gaultheria hispidula*), and blue bead-lily (*Clintonia borealis*) that are generally associated with northern climates. Ferns, particularly cinnamon fern (*Osmunda cinnamomea*), can be numerous and probably offer the flycatchers some camouflage for nests and their activities as well as foraging substrate. Although conifers are generally dominant in flycatcher territories, as much as half of the tree canopy cover can be composed of deciduous trees. Some pairs nest along shady, cool streams where moss is plentiful. Most nesting pairs are associated with peat-lands at the headwaters of coldwater streams. The vegetation in their territories has some of the characteristics of old-growth forests with a diverse structure of trees, a pit and mound microtopography, a diversity of herbaceous and small woody plants, and a lot of standing and fallen dead timber. They tend to occupy gaps in the forest canopy produced by soil characteristics or windfalls. All nesting territories contain an abundance of mosses, especially sphagnum mosses. The Yellow-bellied Flycatcher often occurs with other species associated with conifer forests. In particular, almost all territories were overlapped with active nesting territories of northern waterthrush (*Seiurus noveboracensis*), white-throated sparrow (*Zonotrichia albicollis*), purple finch (*Carpodacus purpureus*), and Canada warbler (*Wilsonia canadensis*), a continental priority conservation species. Formerly, the olive-sided flycatcher (*Contopus cooperi*) also was found nesting in Pennsylvania's boreal conifer forests. These bird species occupy the habitat that also is home to other wildlife of northern affinities such as the northern flying squirrel (*Glaucomys sabrinus*), snowshoe hare (*Lepus americanus*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasiurus noctivagans*), and fisher (*Martes pennanti*).



**REASONS FOR BEING ENDANGERED:** Extensive development and peat mining in the Pocono Mountains and elsewhere in northern Pennsylvania have eliminated much of the habitat preferred by this species. Spruce forests were cut at a large scale in northern Pennsylvania and have not returned to their former size. Several square miles of North Mountain and the Pocono Mountains that now are northern deciduous or mixed forest were once spruce forest. Hundreds of thousands of board feet of spruce were cut in the late 1800s as part of the massive forest resource extraction prevalent at that time, sometimes in reaction to storm damage or insect infestation. Also, the impoundment of remote bogs in forested habitats has converted much of the habitat used by this species into small ponds and lakes. Overpopulation by deer also reduces the understory vegetation and stunts regeneration of trees needed by this and other wildlife species. This bird's rare breeding status in the state and restricted, fragile habitat requirements led to its listing as an endangered species. Many possible locations have been surveyed for this flycatcher, but few pairs have been discovered. Some locations are occupied only intermittently, perhaps because of the short-lives of these small songbirds. Nesting pairs are found only in large forest blocks, suggesting that forest fragmentation also is a threat to this species. Small forest gaps are not avoided, however. Pests and diseases of native conifers threaten the habitat of this and other conifer-related wildlife species. Also among the existing threats are changes in vegetation and reproductive capacity result-

ing from acid atmospheric deposition, mercury and heavy metal accumulation in mountain ecosystems, and global climate change.

**MANAGEMENT PRACTICES:** As one of the state's rarest nesting species, this flycatcher can survive only if forested wetlands and conifer stands in extensive upland forests are preserved. This is one of a suite of species characteristic of boreal forests that have declined in Pennsylvania. 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 most important locations are recognized as Pennsylvania Important Bird Areas. There is potential for further conservation of its habitat as part of riparian habitat protection; most nesting areas are in the headwaters of high quality cold-water streams. Sites need protection with generous buffers. The spruce forest where this species is found has been recovering from previous timbering and has potential for growth. Restoration of spruce forests is possible with appropriate silviculture application, 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 the yellow-bellied flycatcher and northern flying squirrel in Pennsylvania and the rest of the Appalachian Mountains. Additional fieldwork is required to identify other possible nesting areas and specific nesting habitat needs. It is necessary to monitor breeding populations and productivity, not just singing males. This species is one of many songbirds that spend the winter in the tropical forests of Central America, including Mexico. Conservation of forests in this region is essential for the continued existence of this and many other migratory songbirds.

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