

The Acadian flycatcher is a common host for the brown-headed cowbird (*Molothrus ater*); however, the parasitism rate is lower than for many other forest songbirds (Whitehead and Taylor 2002). Parasitism rate is usually related to the degree of forest fragmentation and positively correlated with percentage of forest cover, patch size, and percentage of forest interior (Whitehead and Taylor 2002). Parasitism varies annually and geographically, with rates from 0 percent to 50 percent across its range (Whitehead and Taylor 2002).

CONSERVATION AND MANAGEMENT NEEDS

In the southwestern portion of the state, large mature, riparian deciduous forest patches that remain should be identified, protected, and fragmentation reduced to provide suitable breeding habitat and maintain current population levels. In addition, a large-scale plan to protect hemlock habitat is necessary. The best plan of action toward this goal will be to support the Pennsylvania Department of Conservation and Natural Resources in its hemlock woolly adelgid management, to increase host resistance in eastern hemlock and continue trials of released predatory beetles. Finally, further management objectives should be outlined once the long-term reproductive effects of hemlock decline on Acadian flycatchers have been identified.

MONITORING AND RESEARCH NEEDS

The existing monitoring protocol from the Pennsylvania Department of Conservation and Natural Resources, as well as local volunteers, should allow for adequate monitoring of hemlock stands, while the Breeding Bird Survey and Breeding Bird Atlas should provide sufficient generalized statewide monitoring. In addition, researchers with experience monitoring hemlock health should be consulted to identify monitoring gaps or regions of special concern within hemlock habitats. The effectiveness of conservation actions can be determined through existing surveys. Besides regular statewide monitoring of the Acadian flycatcher and its habitat, a number of research needs exist. It is important to characterize the transition of flycatcher habitat selection from preferred riparian deciduous forests in the Southwest to hemlock habitats in the North and determine the variables that affect this habitat shift. In addition, researchers should evaluate the effects of hemlock decline on flycatcher ecology. While a few studies have evaluated the effects of hemlock decline on bird communities (Ross 2001, Tingley et al. 2002, Becker et al. 2008) long-term

research is needed to determine shifts in habitat selection following hemlock decline and how these affect reproductive success. On the breeding grounds, research is needed to evaluate minimum-area requirements to determine better estimates for minimum viable population size and the effects of fragmentation (NatureServe 2004), determine the number of young produced per pair, annual survivorship, effects of cowbird parasitism, postbreeding dispersal, and natal dispersal using marked populations. Additional focus should be placed on evaluating source-sink landscape dynamics and understanding the scale at which patches are linked as metapopulations. The most effective method, as a result of low recapture rates of hatch-year individuals, would be DNA microsatellite markers (Whitehead and Taylor 2002).

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Alder Flycatcher

Order: Passeriformes

Family: Tyrannidae

Empidonax alnorum

The alder flycatcher is a small flycatcher in the confusing genus *Empidonax* (fig. 5.139). It so closely resembles its look-alike congener, the willow flycatcher (*E. traillii*), that until 1973 they were considered a single species, Traill's flycatcher (American Ornithologists' Union 1973). As most published studies of Traill's flycatcher have been of willow populations, relatively little is known about many aspects of alder behavior and ecology. Alder flycatchers were selected as a Species of Greatest Conservation Need because of their limited range in Pennsylvania and their association with high-elevation shrub/scrub wetlands. Breeding populations in Pennsylvania are considered Vulnerable. Global populations are Secure (G5, NatureServe 2009).

GEOGRAPHIC RANGE

The alder flycatcher has the northernmost breeding range of any *Empidonax* flycatcher, extending across sub-Arctic Canada and Alaska, south to Ohio and Pennsylvania and through the Appalachians to North Carolina and Tennessee (Lowther 1999). It generally ranges north and east of the willow flycatcher, though the two species are widely sympatric, including in Pennsylvania (Lowther 1999). Alders migrate predominately east of the Great Plains to their winter-



Fig. 5.139. The Alder Flycatcher, *Empidonax alnorum*. Photo courtesy of Josiah LaCelle.

ing grounds in lowland areas of northern and central South America, south of the winter range of willow flycatcher (Stotz et al. 1996).

DISTRIBUTION AND RELATIVE ABUNDANCE IN PENNSYLVANIA

In Pennsylvania, the alder flycatcher breeds primarily in the Glaciated Northeast and Northwest, and less commonly at higher elevations from the Allegheny High Plateau south through the Allegheny Mountains (McWilliams and Brauning 2000; fig. 5.140). Because of its specialized habitat requirements, the alder is local in distribution, having been recorded from only 7 percent of blocks (but two-thirds of the state's counties) in the first Pennsylvania Breeding Bird Atlas (Mulvihill 1992b). It probably occurs as a migrant in spring and fall across the entire state, but distinguishing it from the willow flycatcher in these seasons is difficult. Nowhere abundant within Pennsylvania, the alder flycatcher becomes increasingly common to the north of the state but is scarce and local to the south. Although ranked as Vulnerable, alders may be becoming more abundant in Pennsylvania; Breeding Bird Survey results suggest populations within the state have increased at a rate of 9.6 percent per year since 1980 ($P = 0.001$), although confidence in that estimate is not high (Sauer et al. 2004). Nationally, alders have increased since 1980 at a rate of 1.1 percent annually ($P = 0.04$; Sauer et al. 2004; fig. 5.141).

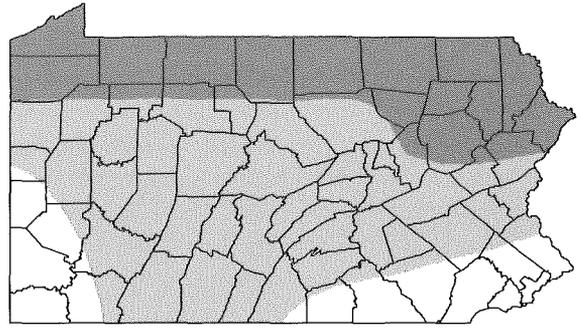


Fig. 5.140. Primary (darker shading) and secondary (lighter shading) distribution of the Alder Flycatcher, *Empidonax alnorum*.

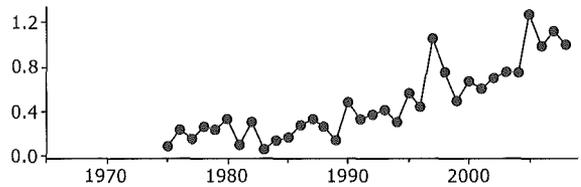


Fig. 5.141. Alder Flycatcher, *Empidonax alnorum*, population trends from the Breeding Bird Survey.

COMMUNITY TYPE/HABITAT USE

Alder flycatchers breed in a variety of wet shrubby habitats, including brushy swamps, alder bogs, edges of beaver ponds, and wet meadows with woody vegetation. They occur less commonly in more upland habitats, such as overgrown fields or regenerating clear-cuts three to twenty years after harvest (Erskine 1984, Hobson and Schieck 1999). Elsewhere in the species' range, rights of way maintained in shrubs can support high densities of alder flycatchers (e.g., Marshall and Vandruff 2002), but whether they do so in Pennsylvania is not known (Yahner et al. 2002). Alders generally are found at higher elevations and in wetter, more wooded habitats than the willow flycatcher, although the two species can sometimes be found at the same site (Gorski 1970, Barlow and McGillivray 1983). Typical wetland breeding habitat consists of dense shrubby growth of willows (*Salix* spp.), alders (*Alnus* spp.), or dogwoods (*Cornus* spp.). More upland sites support shrubby viburnums (*Viburnum* spp.), *Spiraea* spp., hawthorns (*Crataegus* spp.), elderberries (*Sambucus* spp.), roses (*Rosa* spp.), and briars (*Rubus* spp.; Mousley 1931, Mulvihill 1992b, Lowther 1999).

LIFE HISTORY AND ECOLOGY

Alder flycatchers are summer residents only and migrate to their wintering grounds in the Neotropics.

They are among the last birds to arrive in the spring and the first to leave in the fall (Hussell 1991), rarely appearing in Pennsylvania before late May or staying beyond early September (McWilliams and Brauning 2000). On the breeding grounds, they establish and vigorously defend territories, which they advertise with their persistent, if undistinguished, song. Estimates of territory size vary considerably, from 0.2 to 3.0 ha. In some (but not all) areas of sympatry with the willow flycatcher, alders maintain interspecific territories but tend to be subordinate to the willows (Prescott 1987b, Lowther 1999). More often they segregate by habitat, alders preferring the taller, denser, and wetter areas. The diet of the alder flycatcher has not been quantified. Range-wide assessments of Traill's flycatcher diet (which included populations of both alder and willow) found the birds feed on a wide variety of arthropods, including bees and wasps (Hymenoptera), beetles (Coleoptera), flies and midges (Diptera), and butterflies and moths (Lepidoptera; Beal 1912, Bent 1942). Prey are caught primarily by aerial sallies or are gleaned from foliage.

Breeding usually begins well into June after females arrive on the breeding grounds. Female flycatchers select nest sites and build a somewhat sloppy nest relatively low (< 1 m) in a shrub. Pairs normally produce a single brood per season, though they are likely to rebuild and lay an additional clutch if their first attempt fails early. Alder flycatchers are sometimes parasitized by brown-headed cowbirds (*Molothrus ater*), although few data exist on species-specific parasitism rates. Alder populations in British Columbia, Ontario, and Quebec experienced brood parasitism rates of 10.5 percent, 15.0 percent, and 6.1 percent, respectively (Lowther 1999 and sources therein). The incidence of parasitism probably varies regionally and seasonally. Alders may respond to parasitism by abandoning the nest or burying the cowbird egg within the nest lining. Pairs that accept and raise cowbird chicks are likely to raise few or none of their own young, as is the case with willow flycatchers (Sedgwick and Iko 1999).

THREATS

The principal threats to the sustainability of this species in Pennsylvania are the loss and conversion of its shrubby habitats. Between 1956 and 1979, Pennsylvania lost 6 percent of its vegetated wetlands; the most extensive losses have been in the Northeast, especially in the Pocono Plateau and Glaciated Northwest (Tiner 1990)—the areas of greatest alder flycatcher abun-

dance. Early successional forests in the form of regenerating clear-cuts have decreased because of declines in timber harvests, shifts to uneven-aged management, and maturation of existing stands. Forest Inventory and Analysis data indicate that the area of Pennsylvania's forests in the sapling-seedling class has declined by more than 50 percent since 1950 (McWilliams et al. 2004). Chronic high deer densities can constrain or prevent forest regeneration and can limit the extent and height of new growth (Horsley et al. 2003) and therefore the suitability of such habitats for alder flycatchers. Also, in some areas (e.g., central New York), alders have been partly displaced by expanding populations of willow flycatchers (Stein 1963) but whether this pertains to Pennsylvania is unknown.

CONSERVATION AND MANAGEMENT NEEDS

The increasing population trend of alder flycatchers within the state suggests no urgent need for conservation or management activities for the species. Over the longer term, it would be worthwhile to monitor trends in vegetated wetlands within the state through coordination with the National Wetland Inventory. Maintenance and restoration of shrubby wetlands could be encouraged through the development of an outreach program to educate private landowners, land managers, and wetland-oriented nongovernmental organizations (especially those involved with wetland restoration activities, e.g., Ducks Unlimited) about the importance of shrubby and forested wetlands (in addition to emergent wetlands) to nongame wildlife, including alder flycatchers.

MONITORING AND RESEARCH NEEDS

Focused surveys using tape playback methodology would provide better estimates of distribution and abundance of both alder and willow flycatchers than are currently available through more general avian surveys, such as the United States Breeding Bird Survey or the Pennsylvania Breeding Bird Atlas. Protocols for such surveys could be readily developed from those already in use for the endangered southwestern subspecies of the willow flycatcher (Sogge et al. 1997). Monitoring the abundance and distribution of both species over time would reveal whether alders are being supplanted by willows in Pennsylvania, which has been reported elsewhere. Monitoring of demography at a subset of nesting sites would better elucidate any potential threats to alders, such as excessive brood parasitism by cowbirds, which, in turn, would deter-

mine whether future conservation actions need to be taken.

Effective management of the alder flycatcher in Pennsylvania would be facilitated through research in the following areas. Determine what features, at a variety of spatial scales (e.g., patch size, shape, connectivity, and landscape context), are correlated with source habitats for alder flycatchers so that managers can identify existing high-quality habitats (i.e., sources) for wetland protection, and incorporate habitat considerations into wetland restoration decisions and strategies. Changes to breeding habitats resulting from human activities or natural processes are likely to affect habitat quality for alder flycatchers, either positively (e.g., Norton and Hannon 1997) or negatively. Understanding how these changes affect productivity and population trends of alders will better enable their conservation in dynamic systems. Willows have supplanted alders in nearby areas of New York (Stein 1963), but whether such displacement occurs in Pennsylvania is unknown. A better understanding of differences in the microhabitat needs of the two species would facilitate the development of management strategies to sustain both species within the state.

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Willow Flycatcher

Order: Passeriformes

Family: Tyrannidae

Empidonax traillii

One of several similar-appearing *Empidonax* flycatchers in Pennsylvania, it is practically impossible to differentiate the willow flycatcher visually from its former conspecific, the alder flycatcher (*Empidonax alnorum*; fig. 5.142). The willow flycatcher was selected as a Species of Greatest Conservation Need because it is a Partners in Flight Priority I (Continental importance) species. Both state and global populations are considered Secure (S5B, G5, NatureServe 2009).

GEOGRAPHIC RANGE

The willow flycatcher is the most widely distributed *Empidonax* in North America (Sedgwick 2000), breeding throughout much of the United States and into southern portions of Canada (Kus and Sogge 2003) and wintering from central Mexico to northern South America (Lynn et al. 2003). Four or five subspecies are recognized, depending on the author; with *Empidonax*



Fig. 5.142. The Willow Flycatcher, *Empidonax traillii*. Photo courtesy of Bill Moses.

traillii traillii and *Empidonax traillii campestris* (which some synonymize with the former) breeding in Pennsylvania (Sedgwick 2000). The subspecies breeding in the Southwestern United States (southwestern willow flycatcher, *Empidonax traillii extimus*) is federally endangered (U.S. Fish and Wildlife Service 1995).

DISTRIBUTION AND RELATIVE ABUNDANCE IN PENNSYLVANIA

The history of the willow flycatcher in Pennsylvania is complicated by its former lumping with the alder flycatcher as Traill's flycatcher until 1973, when they were recognized as separate species (American Ornithologists' Union 1973). Early reports of the Traill's flycatcher in Pennsylvania list the bird only during spring and fall as a transient (Gentry 1877, Warren 1888). The first Traill's flycatcher nest was reported from Allegheny County in 1894 and was most likely that of a willow flycatcher (Mulvihill 1992c). By 1964, Traill's flycatcher bred locally throughout the state (Poole 1964), and this was primarily due to range expansion of the willow flycatcher (McWilliams and Brauning 2000). McWilliams and Brauning (2000) link this range expansion to the creation of suitable nesting habitat through extensive reversion of old farms and forest regrowth in the 1940s and 1950s. Range expansion has also been noted for this period in adjacent states (Mulvihill 1992c).

The species currently has a wide distribution within Pennsylvania (fig. 5.143). It was reported from every county, often as a confirmed or probable breeder, from the first Pennsylvania Breeding Bird Atlas (1983–1989) with the majority of reports coming

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