

Management Indicator Species for the New Plan

Success in maintaining and restoring composition, structure, and function of forest ecosystems within desired ranges of variability is reflected by both changes in forest condition and by levels of management and other effects that are shaping these communities. Monitoring will include tracking the abundance of major forest cover/community types and levels of management activities conducted to maintain and restore desired conditions. Population trends and habitats of Management Indicator Species will be monitored to help indicate effects of national forest management within selected communities.

Indicator: Acadian flycatcher (*Empidonax virescens*)



From USGS Patuxent Bird ID InfoCenter

Reasons for Selection: Trends in presence and abundance of this species in mature riparian forests will be used to help indicate the effectiveness of management in achieving desired conditions within these habitats.

Ecology & Life History

Basic Description: A small bird (flycatcher).

General Description: Length 5.75 in (15 cm). Sexes similar. Olive above, with yellow eye ring, two buffy or whitish wing bars; very long primaries. Bill proportionately long and broad-based, with mostly yellowish lower mandible. Under parts vary; most birds show pale grayish throat, pale olive wash across upper breast, white lower breast, and yellow belly and under tail coverts. Worn late-summer birds show almost no yellow below. Molts before migration; fall birds have buffy wing bars. Juvenile is brownish-olive above, edged with buff; wing bars buffy; under parts whitish with olive wash on breast. The only *Empidonax* in the southeastern low lands in summer (NGS 1987).

VOICE: Call is a loud but soft "peek", extended in song to an emphatic "peet-sah", usually accented on first syllable, but sometimes with equal accent on both

syllables (Kaufman 1990). On breeding grounds, this species also gives a flicker-like "ti ti ti ti" (NGS 1987). Usually gives an impression of lethargy, doing very little flicking of the wings or tail except when excited. Often perches with the wings drooped somewhat (Kaufman 1990).

NEST: Frail, saucer-shaped, shallow basket swung hammock-like between horizontal twigs of a slender limb. Built of fine, dry plant stems, plant fibers, tendrils, catkins, Spanish moss (in south). Slight lining of grass stems, fine rootlets, plant down, spider webs. Invariably long streamers of dried grass, grapevine, fibrous material hang below nest 1-2 ft (0.3-0.6 m), giving it misleading trashy appearance from below. Outside diameter 3.5 in (8.9 cm); inside diameter 1.5 in (3.8 cm), depth 7/8 in (2.2 cm).

EGGS: average size 18.4 x 13.8 mm. Oval to long oval. Shell smooth, very little or no gloss. Creamy to buffy white, sparingly marked with small brown spots or dots, mainly near large end. Life history accounts are provided by Bent (1942), Mumford (1964), and Walkinshaw (1966).

Diagnostic Characteristics: Adults share similar light eye ring and two whitish wing bars with four other eastern Empidonax flycatchers: Yellow-bellied Flycatcher, Least Flycatcher, Willow Flycatcher, and Alder Flycatcher. When breeding, they are readily distinguishable by voice, habitat, and way of nesting; the nest is unique and unmistakable from other species (refer to Harrison 1975). In late summer and fall, most easily confused with the Yellow-bellied Flycatcher. Both are very green-backed and can have conspicuous yellow wash on the under parts (including the throat). Acadians with yellow throats may also be seen in early spring (before the arrival of the Yellow-bellied, which is typically a late migrant). Despite these similarities, the two species differ in structure: the Acadian is a larger bird, with a larger bill. The Acadian's primary extension is usually conspicuously longer, and the Acadian also has a longer and broader tail. When the Acadian does have yellow on the throat it is usually a clear pale yellow, slightly different from the grayish yellow tones of the Yellow-bellied. Also similar in structure to Alder and Willow Flycatchers, the Acadian usually has a longer primary extension. Its face is paler than that of Willow or Alder, usually contrasting much less with the white throat, and on the Acadian the lower part of the face is usually washed with a fairly bright pale green. The Acadian's call, a loud flat "peek", is very different from the "whit" of Willow Flycatcher, and recognizably different from the "kep" of Alder Flycatcher (Kaufman 1990).

Reproduction Comments: Pair bonds tend to be long-term (multi-year). Nests late May to mid-August (peak early June to early July) in the mid-Atlantic region (Bushman and Therres 1988). Nests built by female alone. Occasionally nests from previous years are re-used (Whitehead and Greenberg, pers. comms.). Clutch size is 2-4 (usually 3). Incubation, by female, lasts 13-15 days. Young are tended by both parents, leave nest at 13-15 days, fed by parents for about 12 days more. In Ohio, recently fledged young occur from late June through early

September, are most abundant in July (Peterjohn and Zimmerman 1989). Individual females produce one or two broods each year. In Maryland, six breeding pairs were found in a 4-ha sample plot (see Bushman and Therres 1988).

NESTING SUCCESS: Walkinshaw (1966) found 319 nests in mixed coniferous-deciduous forests in Michigan: nest success (as a fraction of the number of eggs) was estimated as 57%, 28% of eggs were lost to predation, 4% of eggs were lost to Brown-headed Cowbird (*MOLOTHRUS ATER*) parasitism, 68% of eggs survived incubation, and 85% survived the nestling stage. Robinson (1992) found only two nests in Illinois: using the Mayfield (1975) Index, daily probability of survival was estimated to be 0.972, with an overall probability of survival of 0.46 (this was the highest survival rate of all open cup-nesting forest birds documented); one nest was parasitized by cowbirds with two cowbird eggs being laid.

Ongoing research by Whitehead (1992) found lower rates of brood parasitism and nest predation in south-central Indiana than found by Robinson (1992) in central Illinois. Whitehead (1992) found only 8.2% of nests to be parasitized by cowbirds overall. Landscape context may explain these lower rates of parasitism and predation: Whitehead (1992) studied interior forest sites (>6 km from fields where cowbirds feed), exterior forest edge sites (forests adjacent to agricultural fields), and forest sites adjacent to young clear cuts, and found both parasitism and predation to be lower in the interior sites. For 257 nests, parasitism was higher in forest adjacent to clearcuts (18.3%) than in either the exterior (4.2%) or the interior (zero) sites. Daily survival rate of nests was highest in the interior sites, intermediate in the exterior sites, and lowest in the clearcut sites. This pattern of daily survival of nests appeared to result almost entirely from differences in predation rate during the nestling stage, and not during either the egg-laying or incubation stages; flycatchers therefore suffered heavy predation during the nestling stage in both of the edge contexts (Whitehead et al., un-publ. data). Whitehead's (1992) preliminary data (1991 and 1992) indicate significant annual variation in demography. In 1991, 11% of nests in interior sites were parasitized, whereas none were parasitized in 1992. In 1991, 33% of nests fledged, whereas 50% fledged in 1992. In 1991, an estimated 54 pairs fledged 55 young, whereas 60 pairs fledged 91 young in 1992.

Ecology Comments

POPULATION DENSITY: Published information on densities from breeding bird censuses in the southeastern U.S. between 1947 and 1979 are summarized by Hamel et al. (1982): mean density was 14.5 pairs/40 ha with a range of 1-43 pairs/40 ha. Two studies of bottomland hardwood forests provide data from similar censusing techniques: Mitchell and Lancia (1990) found densities to be highest within the interior of forests (an average 0.57 birds per 25 m radius 10 minute point count) in South Carolina; on the Roanoke River National Wildlife

Refuge in North Carolina, R. Sallabanks (unpubl. data), found highest densities in the interior of small swamp patches (an average 1.48 birds per unlimited radius 10-minute point count) and flycatchers were the second most abundant species detected along the Roanoke River floodplain, after Prothonotary Warblers (PROTONOTARIA CITREA). High numbers were also detected in levee forest patches, an average of 1.37 and 1.32 birds per 10 minute point count being detected in wide and narrow levee patches, respectively. Whitcomb et al. (1981) summarized census data from several studies in Maryland, and found that density decreased from 82 males/square kilometer in mature forest in 1947, to only 48 males/square kilometer in 1976. Stewart and Robbins (1958; cited in Bushman and Therres 1988) reported a density of six breeding pairs on a 13 acre (4 ha) sample plot in an extensive lowland seepage swamp in Maryland. 4.9 territories/40 ha were recorded by Robinson (1992) in Illinois, but numbers have declined to zero in recent years.

TERRITORY SIZE: Quantitative accounts of territory size are rare, although several studies document numbers of males per area (see above). Nesting territory size generally is 0.5-1.7 ha (see Page and Cadman, 1994 COSEWIC report). Bent (1942) cites anecdotal observations, which suggest that flycatchers may confine themselves to a narrow territory during the nesting season. Mean territory size in Indiana was found to be 1.63 ha for 15 pairs (Whitehead and Greenberg, pers. comms.). Males apparently maintain their summer territories during their lifetime; Walkinshaw (1966) found eight of 12 males to return to their same identical territories the year after banding. Five returned the next year, two the next, and one the next. Of 19 banded females, six came back the next year to the same territory, all mating with their original mates; five returned the next year, and four the next. Territory size for 80 pairs averaged across all of Walkinshaw's (1966) study areas in Michigan was 2.97 acres. D. R. Whitehead and G. M. Greenberg (pers. comms.) found 100% site fidelity of successful banded males and females in Indiana in 1991 and 1992. Apparently territorial in winter (Stiles and Skutch 1989).

Long Distance Migrant: Y

Migration Comments: Arrives in nesting area in U.S usually in April-May. Arrives in northern part of nesting range in mid- to late May. Migrates through Costa Rica mid-September to late November and early March to mid-May (Stiles and Skutch 1989). Arrives in Colombia late August, departs by end of April (Hilty and Brown 1986).

Palustrine Habitat(s): FORESTED WETLAND, RIPARIAN

Terrestrial Habitat(s): FOREST - HARDWOOD, WOODLAND - HARDWOOD

Habitat Comments: BREEDING: Key habitat requirements are moist deciduous forests with a moderate under story, generally near a stream (Hamel

et al. 1982). Humid deciduous forest (primarily mature), woodland, shaded ravines, floodplain forest, river swamps, hammocks and cypress bays of south, thickets, second growth, plantations. Requires a high dense canopy and an open under story (Bushman and Therres 1988). Tends to be scarce or absent in small forest tracts, unless the tract is near a larger forested area (see Bushman and Therres 1988). Floodplain forests must be more than 400-500 feet wide before they become suitable for nesting (Peterjohn and Rice 1991).

Nests in tree in horizontal twig fork toward end of lower branch, often over water, ravine, or other clearing, usually at a height of about 2-9 m. Usually nests on a lower branch, far out from trunk; usually shaded by leafy branches. Average nest characteristics have been measured by D. R. Whitehead and G. M. Greenberg (pers. comms.) for forest interior sites in Indiana: dbh of nest tree - 12.46 cm; nest height - 5.67 m; nest tree height - 14.96 m; distance from bole - 4.37 m; distance to watercourse - 20.74 m; and slope - 18.80 degrees. Bent (1942) describes it as a bird of the forest: it is found in cypress swamps, in heavily wooded bottomlands, and in the depths of wooded ravines. Of Wisconsin, Bent (1942) writes, "The essential requirement of the Acadian Flycatcher appears to be a large tract of undisturbed timber. The typical habitat is a deep, well-wooded ravine having a rocky streambed, which is usually dry. It may also be looked for in the heavy timber of the river bottoms and in tamarack swamps in the southern portion of the state." Conner and Adkisson (1975) found it in mature forest with a basal area of 90 ft squared/acre (21 m squared/ha) (Bushman and Therres 1988).

Vegetation types for the southeastern U.S. from Hanel et al. (1982), in order of suitability, are: oak-gum-cypress and elm-ash-cottonwood are listed as optimal habitat at both the sapling-poletimber, and sawtimber stages; cove hardwoods are listed as suitable at the sapling-poletimber stage and optimal at the sawtimber stage; southern mixed mesic hardwoods are listed as only marginal at the sapling-poletimber stage and optimal at the sawtimber stage; bay swamp-pocosin, oak-hickory, and white pine-hemlock are all listed as only marginal at the sapling-poletimber stage and suitable at the sawtimber stage; mixed pine-hardwood is listed as only marginal at both the sapling-poletimber and sawtimber stages. In all cases, mid-story and over story canopy are used for all activities (feeding/foraging, nesting, perching, roosting, and singing) and dead trees or limbs are used for feeding/foraging and singing. Requires snags for foraging with a minimum dbh of 6 in (15 cm) and exposed perches in the mid-story (Hanel et al. 1982). D. R. Whitehead and G. M. Greenberg (pers. comms.) have observed foraging on all types of trees, but usually not snags because they sometimes pick insects off leaves. Data on habitat selection are also given by Hespdenheide (1971); where Acadian Flycatchers overlap with Least Flycatchers (*EMPIDONAX MINIMUS*), the preferred habitat of Acadians has apparently changed in accordance with predictions of competitive effect based on overlap data alone.

MIGRATION: Open scrub and young second growth to primary and secondary forest.

NON-BREEDING: Little is known about this species' wintering habitat. Prefers thickets and gaps in forest under story and edge (Stiles and Skutch 1989). Common resident in under story of humid forest and second growth or cut over woodland in Colombia (Hilty and Brown 1986). Recorded exclusively in forest in Atlantic lowlands of Costa Rica (Hagan and Johnston 1992). Blake and Loiselle (1992) found them to be most common in old (30-35 year) second-growth forest habitats in Costa Rica. Here, small to medium sized trees (< 25 cm dbh) were most common, as were small vines and lianas; canopy was measured as being 13% open. Also common in young (approximately 5 yr post-abandonment pasture in 1985) second- growth forest habitats; here, the canopy was 26% open and shrubs were the dominant vegetation type. Few were found in primary forest (Blake and Loiselle 1992).

Food Habits: INVERTIVORE

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