

DISTRIBUTION AND HABITAT CHARACTERISTICS OF THE WILLOW FLYCATCHER (*EMPIDONAX TRAILLII*) IN ALBERTA

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Abstract. The status of the Willow Flycatcher (*Empidonax traillii*) has been poorly known in Alberta due to a scarcity of documented records. We surveyed for Willow Flycatchers between May 25 and July 15 of 1999 in southwestern Alberta. The census area was determined from published historical records, specimen evidence from the Provincial Museum of Alberta, and recent datasets, particularly from Atlas of Breeding Birds of Alberta. When territorial males were found, we took a series of 26 measurements to quantify habitat and determine the risk that habitat loss may pose for the species. We found 32 habitat patches containing territorial males with an average of two singing birds per patch. Willow Flycatchers were restricted to the Foothills and Rocky Mountains regions ranging from Waterton Lakes National Park north to Jasper National Park. In Alberta, Willow Flycatchers showed a preference for wet riparian areas, many of which also supported Alder Flycatchers (*Empidonax alnorum*). We could determine no obvious reason why the range of Willow Flycatchers should be so restricted in Alberta, nor any evidence of significant range change compared to historical records.

Key Words: Alberta; distribution; *Empidonax traillii*; habitat characteristics; Willow Flycatcher.

The Willow Flycatcher (*Empidonax traillii*) and the Alder Flycatcher (*E. alnorum*) breed in sympatry and allopatry within Alberta (Semenchuk 1992). The Alder Flycatcher is common in central Alberta and the southern boreal forest (McGillivray and Semenchuk 1998) and is classed as a "green" species (Alberta Wildlife Management Division 1996), indicating that populations are stable and its habitat is not at risk. The Willow Flycatcher, however, is listed "Status Undetermined" (Alberta Wildlife Management Division 1996) due to the lack of information on its distribution and abundance. The specimen-based evidence for the presence of this species in Alberta is limited to a few individuals in the Provincial Museum of Alberta (PMA) collection. Holroyd and Van Tighem (1983) recorded the Willow Flycatcher as a fairly common summer resident in mountain parks. Throughout the five census years of the Breeding Bird Atlas Project (1987-1991), only two confirmed Willow Flycatcher breeding records were reported (Semenchuk 1992). Atlas observations (no confirmation of breeding) were concentrated in the Bow River Valley from west of Calgary to Banff.

In the southwestern United States, *E. traillii extimus* is endangered due to a loss of riparian habitat, cattle grazing, and Brown-headed Cowbird (*Molothrus ater*) parasitism (USFWS 1995). In other areas such as Ontario, the Willow Flycatcher is thought to be expanding into habitat previously used by Alder Flycatchers (Prescott 1987), while in British Columbia (Campbell et al. 1997) and historically in Wisconsin (Robbins 1974) the opposite is true. Campbell et al. (1997) noted that both species are expanding their range south and east in British Columbia.

Habitat characteristics for the Willow Flycatcher and Alder Flycatcher vary throughout their ranges. In Ontario, the Willow Flycatcher is associated with drier, upland habitat and the Alder Flycatcher with wetter, low-lying areas (Barlow and McGillivray 1983), while elsewhere, such as British Columbia, Willow Flycatchers can be found in wet areas (Campbell et al. 1997).

To update the range and assess habitat characteristics of Willow Flycatchers in Alberta, we censused areas of suitable habitat and quantified the vegetative and physical aspects of occupied habitats.

MATERIALS AND METHODS

STUDY AREA

Based on previous records of Willow Flycatchers from the PMA collection, the Federation of Alberta Naturalists' Birdlist database (which includes the records from the Breeding Bird Atlas), and Pinel et al. (1993), we established a census route north from Waterton Lakes National Park to Jasper National Park then east from the British Columbia border to Cadomin, and south to Sunde. This area covered all the documented sightings of the Willow Flycatcher in Alberta along the Eastern Slopes. Given the large geographic area, census routes were restricted to roads, major trails, and surrounding areas a short hike from road access. We assume that some suitable areas for this species exist away from roads in the foothills and mountains and were not surveyed.

CENSUS

Censuses were conducted from 04:00 to 13:00 between 25 May and 4 July 1999. We censused all sites which had a previous Willow Flycatcher record, or appeared to have suitable habitat. We broadcast taped vocalizations recorded from the Peterson's Western Bird Songs CD from the edges of the habitat patches, to elicit vocal responses from territorial Willow Fly-

catchers unless males were already singing. If a habitat patch was large enough (> 200 m in length or width), we performed playback in several spots in the habitat to estimate the number of males on territories. We used intervals of 30 sec playing the tape and then 30 sec of silence. Depending on habitat size, playback would last 2–5 min. As Willow Flycatchers and Alder Flycatchers were sympatric throughout the census area, identification was confirmed only if a bird produced species-specific song. Once a bird responded to the playback, we obtained the latitude, longitude, and elevation using a Garmin GPS 12XL, and noted the number of Willow Flycatchers and a brief habitat description.

HABITAT MEASUREMENT

At each site we detected Willow Flycatchers, we diagrammed the site and then measured its dimensions using a Bushnell Yardage Pro 800 range finder. We recorded the following variables for each habitat patch: (1) the type of vegetation surrounding its edges; (2) presence of water (standing or moving); (3) size of the largest area of standing water (estimated by sight if small, or with the Bushnell range finder); (4) patchiness (the percentages of the habitat covered by willows or other shrubs, open grass and water); (5) relative frequency of willow heights (the percentages of willows < 1 m tall, 1–2 m, and > 2 m in height); (6) height of the tallest perch (to the closest m); and (7) the type (species and live vs. dead) and relative frequency of other perches on site.

We defined a perch site as a tree that was regularly observed to be used by the male for singing and foraging. To provide detailed measurements of habitats near each perch site, we quantified the vegetation along four transects running 5 m in each of the four cardinal directions. At 1-m intervals, we recorded the type of ground cover, shrub species present (or absent), and vegetation height. Vegetation categories were willow (*Salix* spp.), other deciduous bush, coniferous (*Picea* spp.), or bare ground (no reading). The height of the vegetation was measured to the nearest 10 cm using a 3-m long pole marked in 10-cm increments. Data were analyzed using Microsoft Excel 97 and SPSS 7.5.

RESULTS

The Willow Flycatcher was not uniformly distributed across its range in Alberta; rather, it was found in concentrated populations in riparian areas dominated by willows (Fig. 1). We located Willow Flycatcher territories in 32 habitat patches, with an average of two males singing per patch (range = 1–4). The elevational range of our detections, 1232 m to 1618 m (average 1391 m), suggested a foothills or montane distribution from Waterton Lakes National Park north to Jasper National Park, and eastward throughout the foothills to beyond the Ram River area in the north, and Sibbald Flats in the south. The Willow Flycatcher was most common in the Bow River Valley.

Habitat patches ranged from 2–50 ha in size (median 27.4 ha). The majority of patches were

in undisturbed areas, but eight sites were in areas clearly modified by human activity such as railroad rights-of-way and campgrounds. Forty-four percent of the sites found were within parks and protected areas. All sites were in low-lying areas where water collects, such as valleys, on flats along lakes, or in ditches along roads. At least seven sites were in areas that were flooded due to beaver dams. All patches were bordered by forest on at least one side; 40% of patch edges were coniferous forest, 6% were deciduous and 23% were mixed. Where Willow Flycatchers were found in valleys and along lakes, the edges of the patch were not often clearly defined because suitable habitat continued along the valley bottom or along the lake edge.

Habitat patches consisted of dense stands of willows, other shrubs, scattered open grassy spots, a few to many trees, dead snags, and open water (Table 1). Over 80% of the willows in the patches were greater than 1 m in height (Table 1). We did not find breeding Willow Flycatchers in riparian areas dominated by short (< 1 m) willows, nor in extensive tall willow stands on relatively dry upland sites (such as Chain Lakes Provincial Park south to Crownsnest Pass).

The majority (80%) of the habitat patches contained standing (56%) or moving (24%) water; the remainder were either bordered by, or within 100 m of, water. The median size of the largest open water within the patch was 0.15 ha (range = 0–1.5 ha).

All of the sites contained many exposed perches, some of which Willow Flycatchers used for song posts and foraging. The majority of sites had both dead and live perches. These perches were normally 2–5 m taller than the willow canopy (Fig. 2). The mean height of used perches was 7.5 ± 0.4 SE m. Although the vast majority of perches were spruce, other species such as willow, pine (*Pinus* spp.), aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*) were present (Table 1).

Vegetation, usually grass or sphagnum, was the predominant ground cover type recorded along the transects centered at the perches (Table 1). Thirty-two percent of the transect points recorded water as ground cover, despite the low percentage (17%) of the patches having areas of standing water (Table 1). In a wetter year, a larger percentage of the total area would be classed as standing water.

Willow bushes predominated along the transects (Table 1). Other bushes, primarily alder (*Alnus* spp.), birch (*Betula* spp.) and rose (*Rosa* spp.), were encountered at low frequencies. The average height of woody vegetation measured at the transect points was 207 ± 24 SE cm. All patches had open areas, even in the relatively

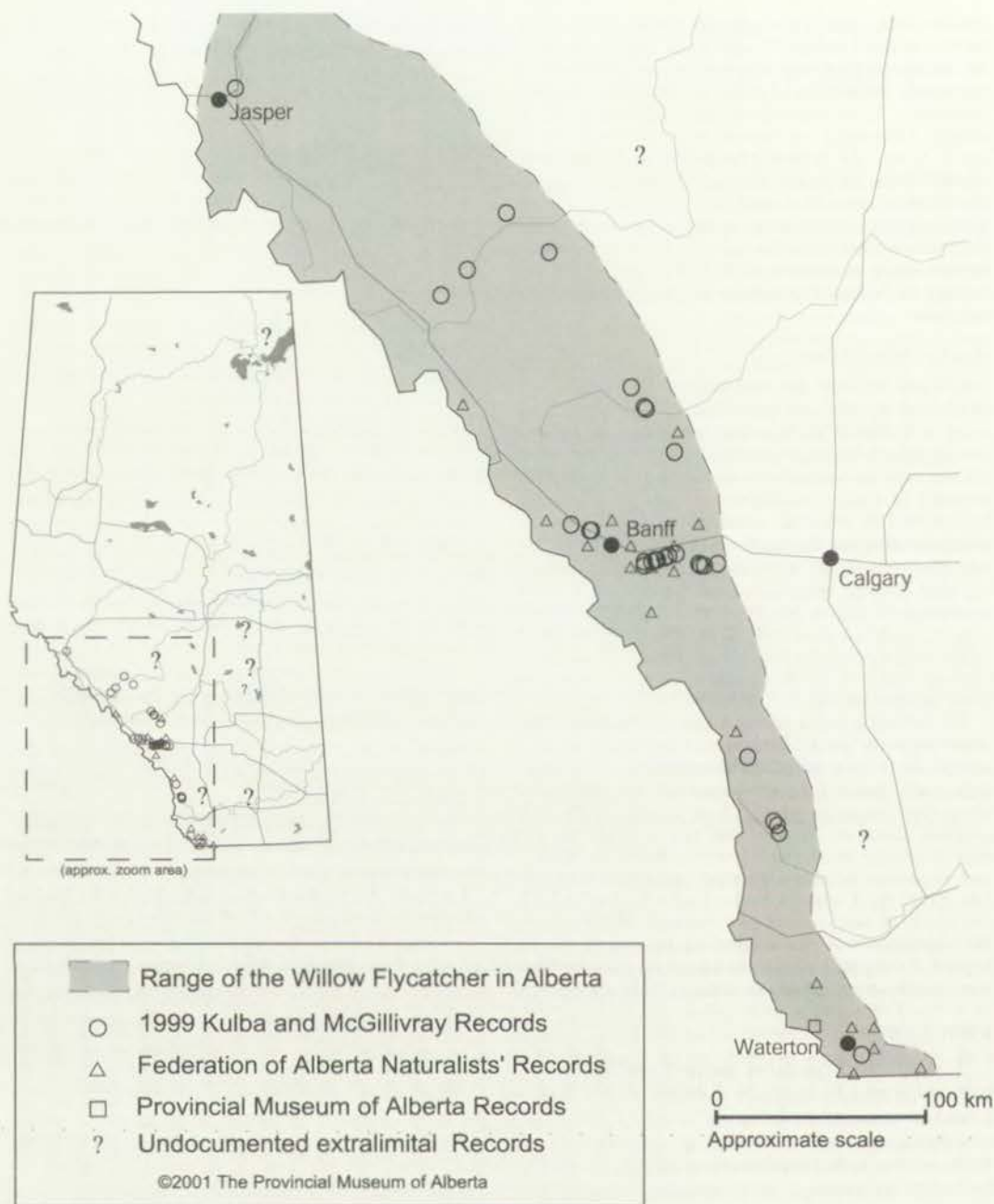


FIGURE 1. Willow Flycatcher distribution in Alberta.

dense vegetation near the perches; we recorded no woody vegetation at 20% of the transect points.

DISCUSSION

Earlier anecdotal observations described a range of Willow Flycatchers in Alberta (Salt and

Salt 1976, Pinel et al. 1993) that is similar to what we documented. We located more Willow Flycatcher sites at the extremes (north and east) of the expected distribution, but that is not surprising when a survey is focused on a single species. In British Columbia, Campbell et al. (1997) noted that Willow Flycatchers have in-

TABLE 1. HABITAT PARAMETERS AT WILLOW FLYCATCHER BREEDING SITES IN ALBERTA

Parameter		Mean \pm SE
Relative percent cover comprising occupied habitat	Willow	56 \pm 5
	Forbs, open ground	25 \pm 5
	Water	17 \pm 3
Percent willow shrubs of different height classes in occupied habitat	<1 m high	17 \pm 3
	1–2 m high	40 \pm 3
	>2 m high	42 \pm 5
Percent song and foraging perch types in occupied habitat (all sites combined)	Spruce	62 \pm 8
	Willow	22 \pm 0
	Pine	8 \pm 5
	Aspen	4 \pm 2
	Balsam poplar	3 \pm 2
Percentage of ground cover types along 5-m transects radiating from song and foraging perches	Vegetation	64 \pm 8
	Water	32 \pm 8
	Bare ground	5 \pm 3
Habitat composition: percent hits along transects near song and foraging perches	Willow	62 \pm 7
	Other deciduous bush	13 \pm 0
	Conifers	7 \pm 3
	Bare ground	18 \pm 4

creased their range eastward, but points out that Alder Flycatchers have also expanded into former Willow Flycatcher range. *E. t. adastus*, the subspecies of Willow Flycatcher in Alberta, may have reached its northeastern limit in the Foothills and Rockies of Alberta.

In Alberta, Willow Flycatchers have been reported in both wet and dry shrub-dominated habitats (Semenchuk 1992, Pinel et al. 1993, McGillivray and Semenchuk 1998). We found Willow Flycatchers in the wet habitats normally typical of Alder Flycatchers (Semenchuk 1992,



FIGURE 2. Willow Flycatcher breeding habitat south of Highwood Pass, Kananaskis Country, Alberta (Elevation 1600 m).

McGillivray and Semenchuk 1998) and in some cases, the two species were found breeding sympatrically. Although Willow Flycatchers have been recorded in dry upland habitats, we found no evidence that those habitats supported any pairs.

The habitat characteristics we noted confirm open, wet, willow and spruce-dominated lowland as the breeding habitat for Willow Flycatchers in Alberta. It is noteworthy that sites with relatively short willow bushes did not support Willow Flycatchers. In Alberta, the range of the Willow Flycatcher is limited to the foothills and montane regions. We observed that Willow Flycatchers occur east of the main range of the Rockies but not out of the Foothills ecoregion (Fig. 1).

In addition to the relative wetness of the habitat sites, the abundance of coniferous perches scattered throughout most sites was striking (Fig. 2). These trees are evidence of sites recently or ephemerally flooded. The willow swales that support Alder Flycatchers in the Boreal Forest are more often on the edges of aspen stands, with the coniferous forest restricted to upland sites.

Because males arrive on site and begin singing before the females arrive (Sedgwick and Knopf 1992; B. Kulba, pers. obs.), males are responsible for breeding site selection. Sites with elevated perches, which are used for male display and territorial behavior, would likely be preferred. The majority of the sites we found had perching sites well above the canopy and within the habitat. At sites that did not have perches directly within the habitat, Willow Flycatchers used spruce, pine, or aspen on the periphery of the habitat.

In British Columbia, Willow Flycatchers are found largely in wet habitats (Van Tighem and Gyug 1983, Campbell et al. 1997), mirroring the habitat in which it is found in Alberta. The lack of wet willow habitat in the prairies of southern Alberta may present a barrier to eastward expansion.

We found Alder Flycatchers breeding sympatrically with Willow Flycatchers in many of the sites. In a number of foothills areas that

looked similar to Willow Flycatcher sites, only Alder Flycatchers were recorded. Given this overlap in habitat characteristics of the two species, we would expect regular sightings of Willow Flycatchers in central and northern Alberta, where Alder Flycatchers are common. The lack of Willow Flycatcher records in these northern areas indicates that the environment is not suitable. Whether this is due to subtle habitat differences, the abundance of Alder Flycatchers, climate, or historical factors is unknown.

Although the Willow Flycatcher's range is limited to a narrow band in southwestern Alberta, it appears to have remained stable for 30 years. Loss of currently occupied habitat through cattle grazing and other human modification may not be of much concern in Alberta. Most of the sites were too moist and the willows too dense to be accessible for grazing, though some sites along the eastern edge of the range may be vulnerable. Other forms of human activity such as roads and rail-lines did not seem to hinder Willow Flycatchers from using nearby habitat. The wet willow lowlands favored by Willow Flycatchers are not suited to industrial or recreational development.

Fundamental research on the Willow Flycatcher in Alberta is lacking. Study of reproductive success and cowbird parasitism rates of Willow Flycatchers are needed to assess the population's stability in the province. Further censusing in northeastern BC and northwestern Alberta (north of the 53rd parallel) in the transition between the Rockies and the Boreal Forest would help clarify the northern limit of the species. Finally, the sympatric populations of Willow and Alder Flycatchers in Alberta present opportunities to quantify habitat preferences and their effect on productivity for these sibling species.

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