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Introduction

The Willow Flycatcher (*Empidonax traillii*), a member of the family Tyrannidae, is a small bird (length: 140 mm, weight: 11 g) that is associated with willows bushes and other deciduous shrubs in open habitats across North America. Until 1973, the American Ornithologist's Union (AOU 1973) considered the Willow and the Alder Flycatcher (*E. alnorum*) as geographic variants of one species called the Traill's Flycatcher. Before the split, it was thought that the Traill's exhibited two song types; a two-note, *fitz-bew*, more common in the south and a three-note, *fee-bee-o*. Stein (1963) observed that sympatric populations of *fitz-bews* (Willows) and *fee-bee-os* (Alders) did not interbreed which led to the taxonomic split. Subsequently, Seutin and Simon (1988) found populations of Willow and Alder Flycatchers in southeastern Canada to be genetically distinct and reproductively isolated.

There is geographic variation within the Willow Flycatcher. Pyle (1997) recognizes five subspecies which differ in color, size and body proportions. In the southwestern United States, the subspecies *E. traillii extimus* has experienced a population crash due to loss or modification of riparian habitat primarily from cattle grazing, and reduced productivity due to Brown-headed Cowbird (*Molothrus ater*) parasitism. The distribution and abundance of the Willow Flycatcher populations in Alberta is poorly documented, in part due to the confusion of the split. This has led Alberta Environmental Protection to classify the Willow Flycatcher as "Status Undetermined" (Alberta Wildlife Management Division 1996). This category is for species whose information is insufficient to designate a status but are not known to be at risk.

This report summarizes recent and historical information gathered on the Willow Flycatcher in Alberta and elsewhere in order to provide an update on the status of the species in the province.

Habitat

The Willow Flycatcher breeds in a variety of shrubby habitats across North America. Its habitat preferences are well documented for eastern North America (Stein 1963, Walkinshaw 1966, Barlow and McGillivray 1983), the southwestern United States (Sedgwick and Knopf 1992, Sogge *et al.* 1997) and the Pacific Northwest (King 1955, Stein 1963, Campbell *et al.* 1997). Typically, upland sites supporting a mixture of shrubs including willow (*Salix* spp.), hawthorn (*Crataegus* spp.) and rose (*Rosa* spp.) are preferred. Alder Flycatchers are commonly found in more mesic sites but Willow Flycatchers are found in riparian shrubs in the southwestern United States (Sogge *et al.* 1997) and in willow swales in British Columbia (Campbell *et al.* 1997) and Ontario (Barlow and McGillivray 1983). In Alberta the Willow Flycatcher has historically occupied relatively dry, upland, shrub-dominated sites (Semenchuk 1992, McGillivray and Semenchuk 1998). In our 1999 assessment of Willow Flycatchers in Alberta, they were found in the mesic habitats typical of Alder Flycatchers (Semenchuk 1992). The survey provided no evidence that dry, upland habitats supported any Willow Flycatchers.

We performed detailed habitat assessments on 26 sites supporting Willow Flycatchers in Alberta along the eastern slopes. The sites are in low-lying areas where water tends to collect such as valley bottoms, lake edges, or ditches along roads (Fig. 1). Habitat patches that support breeding pairs range from 2-50 ha in size with the mean being 8.4 ha. Willow bushes, of course, are an integral part of the bird's habitat. The average height of the willows in territories of Willow Flycatchers is about 2 m. The willow bushes are often densely packed but the habitats are patchy with water or grassy areas interspersed among the willow patches. The majority of territories contain open water while the rest of the sites had water nearby. Standing water is typical of willow sites although some sites contained moving water. The average size of the largest patch of open water on each site is 0.35 ha with the maximum size being 1.5 ha. A common feature of most Willow Flycatcher territories in Alberta is the presence of a few to many spruce trees or snags that rise above the canopy amid the willow patch (Fig. 2). These trees are used for perching and as launching points for display and foraging flights.



Figure 1. Willow Flycatcher habitat north of Hunter Valley. Note water is abundant and the willow bushes 1-2 m tall.



Figure 2. Spruce trees and snags are common features of many Willow Flycatcher sites. They are used for perching, foraging and display.

Conservation biology

The Willow Flycatcher is a sparrow-sized bird with a medium-dark, brownish olive to grayish olive back and head, two light wing-bars and light underparts with a brownish olive breast band and slight yellow wash to the vent (Pyle 1997). Like all the members of the genus *Empidonax*, the Willow Flycatcher is insectivorous and catches insects on the wing. Prescott and Middleton (1988) found Willow Flycatchers to have a strong preference for Diptera (true flies) and to a lesser extent, Hemiptera (true bugs).

The only reliable method of identifying *Empidonax* flycatchers in the field is by their songs. This is especially critical when trying to distinguish the visually identical Willow and Alder Flycatchers. Both male and female Willow Flycatchers have been found to sing (Seutin 1987). The standard advertising song of the Willow is a *fitz-bew* but will also sing a wheezy *fizz-bew*. It will also emit a sharp, dry *creet* as well as a *zbeu*. Many sources have noted that the Willow begins to vocalize much earlier in the day than the other bird species within its habitat (Bent 1942, Weydemeyer 1973). In Alberta, vocal displays are often performed from tall spruces within the willow habitat. These spruces offer an unobscured view of the bird's territory. Where spruce is not present, bare willow branches are often used and in some sites the Willow Flycatchers use overhead powerlines as perches. These display perches are also used to initiate foraging sallies.

The Willow Flycatcher arrives on its breeding grounds in Alberta in late May (Pinel *et al.* 1993, McGillivray and Semenchuk 1998). Males have been found to arrive up to two weeks earlier than females to set up territories (Sedgwick and Knopf 1992). The sites we found supported an average of two pairs. In our study, territories were not mapped but Willow Flycatchers responded to playback by approaching the source of the sound from distances up to 200 m. Prescott and Middleton (1988) found territories of Willow Flycatchers in Ontario to average 0.3 ha. McCabe (1991) reports several studies which found Willow Flycatcher territories to be between 0.1 ha – 0.44 ha.

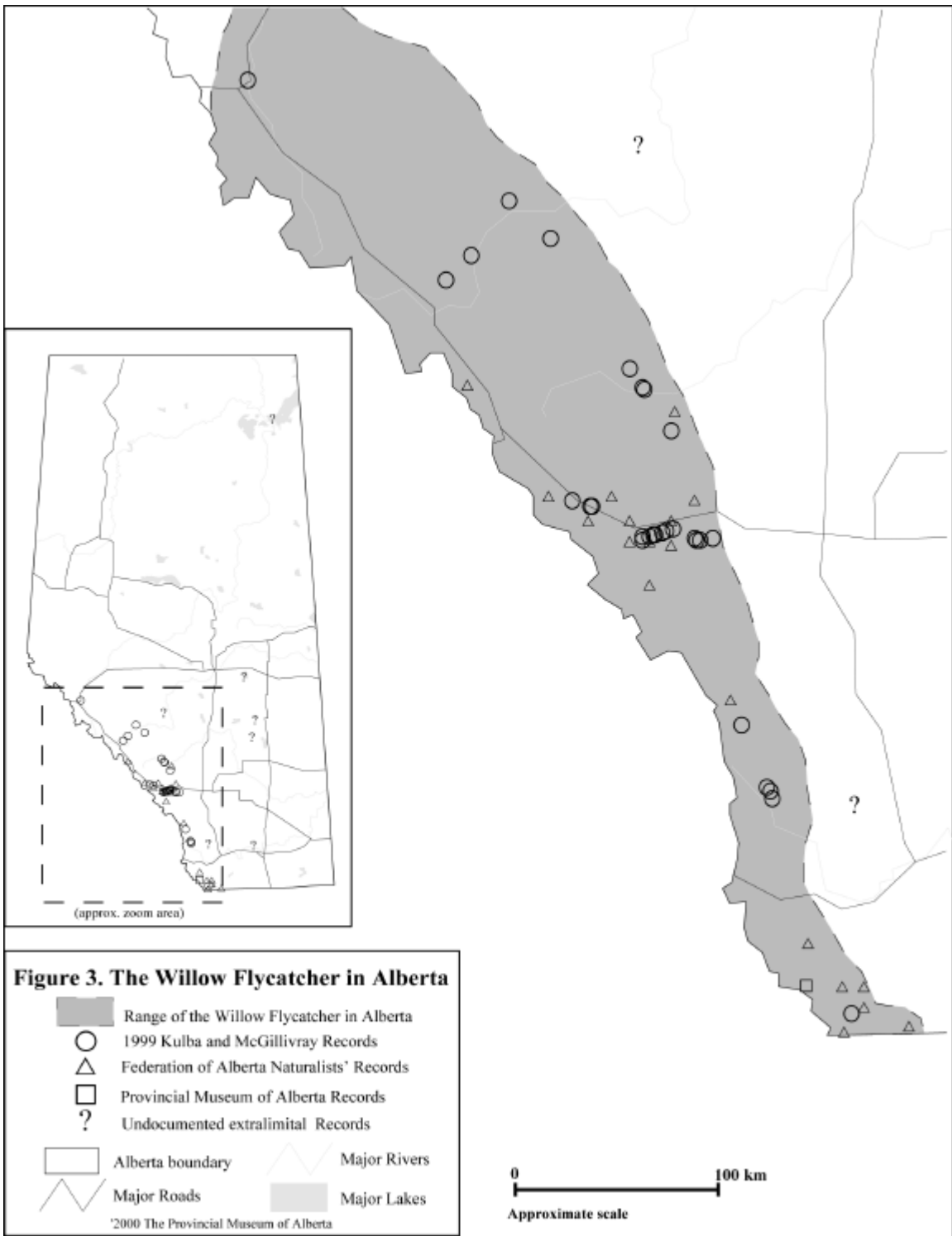
The nests are built at a fork in a bush. McCabe (1991) found if the habitat is all willow, it will be selected as a nest site but if there are other bushes, they will be chosen instead. The height of the nest above the

ground is usually between 1.0 and 1.5 m (Campbell *et al.* 1997). Three to four eggs are laid with an incubation time of approximately 16 days (Campbell *et al.* 1997). Feeding of the nestlings has been found to be performed equally by both parents (Ettinger and King 1980). Polygyny has been reported in Willow Flycatchers (Prescott 1986, Sedgwick and Knopf 1991). Nest success for Alberta has not been studied but in British Columbia, nest success was 28% (Campbell *et al.* 1997). Fledging occurs after about two weeks (McCabe 1991). The Willow Flycatcher is believed to leave the province for its wintering grounds in August (McGillivray and Semenchuk 1998).

Distribution

Alberta

McGillivray and Semenchuk (1998) reported the breeding distribution of the Willow Flycatcher in Alberta to range along the eastern slopes of the Rocky Mountains from the Bow Valley south to Waterton Lakes National Park. The bulk of the Alberta records for the Willow Flycatcher are south of the Bow Valley but records exist to the north to Jasper, although mainly in the Foothills rather than within the Rocky Mountains. Areas of high concentration of records are the Bow Valley, Sibbald Flats, and south of the Highwood Pass along Highway 40. The sites north of the Bow Valley would suggest that the range of the Willow Flycatcher could be expanded north towards Jasper and east towards Nordegg (Figure 3). Forty-four percent of the sites we found in 1999 were within parks and protected areas. Pinel *et al.* (1993) notes a number of records north of Jasper up to the Kakwa-Grande Prairie area. Many dry upland sites that have historically had Willow Flycatcher records did not yield any sightings during Kulba and McGillivray's (in prep.) 1999 survey. In some areas of North America, there have been expansions of the Willow Flycatcher's range northwards (Stein 1963, Prescott 1987) but there is insufficient information to determine any range changes in Alberta.



Many published maps show the breeding distribution of the Willow Flycatcher as extending across the southern portion of Alberta, but there are no confirmed breeding records and only a few possible records from this area. A possible explanation would be that the eastern subspecies (*E. traillii campestris*) of the Willow Flycatcher in Saskatchewan and the western subspecies (*E. traillii adastus*) in British Columbia were assumed to meet in Alberta. The Breeding Bird Survey (BBS) also shows no records for Alberta in the south (Sauer *et al.* 1999). It is likely that southern Alberta represents a gap between the two subspecies which otherwise meet south of the Canadian border.

The *Atlas of Breeding Birds of Alberta* (Semenchuk 1992) produced relatively few confirmed breeding records for the Willow Flycatcher. Several observations were significantly north and east of the expected range. In addition to the Atlas data, records of Willow Flycatchers migrating through and breeding in central Alberta continue to arise (Edgar T. Jones pers. comm). Some experts argue that these extralimital records are misidentifications. The lack of supporting evidence in the form of recorded vocalizations and the uncertainty surrounding the reliability of identification by color differences and physical measurements (Seutin 1991, Pyle 1997) makes the inclusion of these records in this status update problematic. Experienced birders acknowledge that the distinction between the Alder and Willow Flycatcher's call is not as clear-cut as some commercial recordings would suggest. A variation of the Eastern Phoebe's (*Sayornis phoebe*) song is remarkably similar to a *fitz-bew* (T. Thormin, pers. comm.). Tape recordings of the songs of Willow Flycatchers are virtually a requirement before extralimital observations can be authenticated. Consequently, we are reluctant to consider any records outside of the eastern slopes region as confirmed Willow Flycatcher records.

Continental range

The Willow Flycatcher has a reported transcontinental breeding range from southern British Columbia, east across the southern prairies (but see note above for Alberta) east to Quebec and Maine. Its southern range limit is from the west coast in California and eastward across the southern United States to North Carolina

and Virginia. A gap in the distribution from Montana south to Texas is apparent (Figure 4). The Willow Flycatcher winters from Mexico to northwestern Colombia (DeGraaf and Rappole 1995).

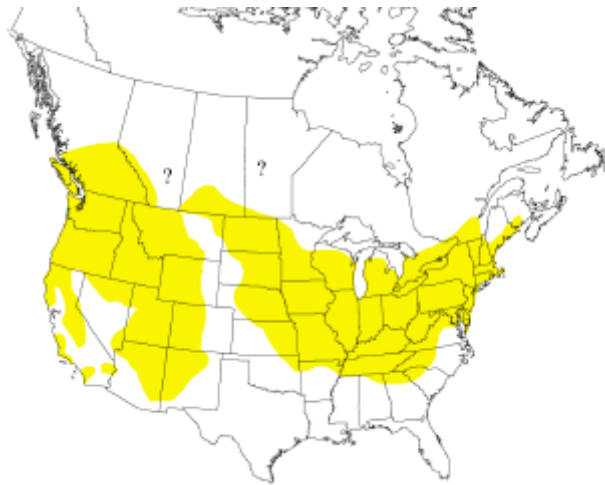


Figure 4. North American breeding distribution of the Willow Flycatcher. Adapted from Dickinson 1999, Sauer *et al.* 1999. Population size and trends

Alberta

Throughout the five census years of the Breeding Bird Atlas Project (1987-1991), only two confirmed breeding records were reported. There were remarkably few observations of this species with most concentrated in the Bow Valley from west of Calgary to Banff. Holroyd and Van Tighem (1983) recorded the Willow as a fairly common summer resident in the mountain parks. By contrast, the Provincial Museum of Alberta (PMA) collection has only a handful of specimens to document the presence of this species in Alberta. In 1999, we found over 30 Willow Flycatcher sites in a census from Waterton to Jasper. The average number of males singing per site was two. These sites represent a sizable fraction of the accessible sites in the province. It is difficult to estimate the extent of available habitat because unlike forested habitats, willow swales have no commercial interest and are not mapped. Undoubtedly the province supports more than 100 pairs but given the lack of reports for this species it is unlikely that the provincial population is greater than 250 pairs.

There has been no published study in Alberta examining population trends. BBS data provides a rough estimate of population trends and the evidence for this species in Alberta is not encouraging (Figure 5). *The*

Canadian Breeding Bird Survey (Downes *et al.* 1999) reports Alberta's Willow Flycatchers have experienced a 0.8% mean annual drop in population (number of routes used to calculate trend = 66) from 1966-1996. Although this trend is not statistically significant ($P > 0.15$), it represents the highest provincial decline for the species in Canada.

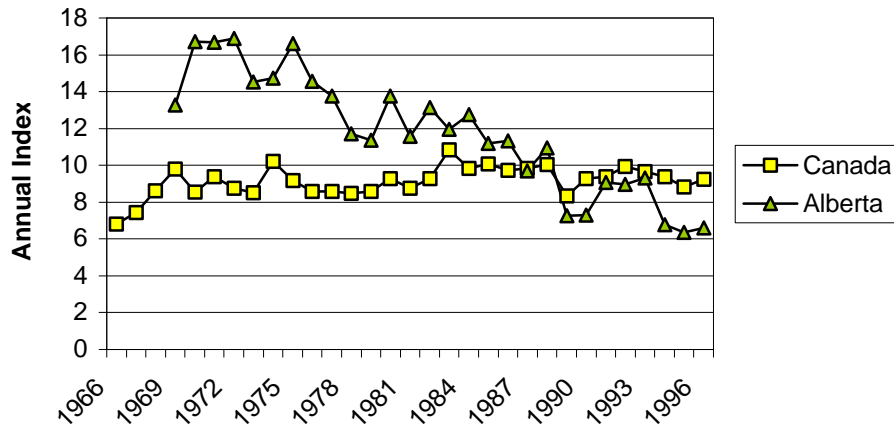


Figure 5. Index of population change of the Willow Flycatcher in Alberta and Canada, 1966-1996. Data from Canadian Breeding Bird Survey (modified from Downes *et al.* 1999).

Other Areas

From 1966 to 1996, Manitoba, Nova Scotia and New Brunswick have experienced declines in BBS reports of the Willow Flycatcher while British Columbia, Saskatchewan, Ontario and Quebec have experienced increases (Downes *et al.* 1999). Ontario's 2.3% growth in reports is the only trend which is thought to be statistically significant ($P < 0.05$). Campbell *et al.* (1997) notes that the Willow Flycatcher is expanding its range south and east in British Columbia. The Willow ranges from "very rare" on Vancouver Island to "uncommon" to "fairly common" in the British Columbia interior (Campbell *et al.* 1997). Smith (1996) reports the Willow Flycatcher to be "uncommon" in southern Saskatchewan with rarity increasing north to central Saskatchewan. The Willow Flycatcher is "uncommon" in the extreme southwest and "rare" elsewhere in southern Manitoba (Rudolf Koes, pers. comm). Only three confirmed nest records for the

Willow in Manitoba are reported by De Smet and Conrad (1988). From 1966 to 1996, Canada has experienced an overall 0.6% growth in reports of Willow Flycatchers for the BBS (Downes *et al.* 1999).

In the southwestern United States, the estimated size of the endangered *E. traillii extimus* population is between 300 and 500 pairs (Sogge *et al.* 1997). Significant growth in Willow Flycatcher populations has occurred in Oregon due to willow habitat preservation and a reduction of cattle grazing (Taylor and Littlefield 1986). Zink and Fall (1981) found Willow Flycatchers to be "common" in suitable habitat in southern Minnesota. The Willow Flycatcher ranges from "common" to "uncommon" in North Dakota (Stewart 1975) and "fairly common" in South Dakota (Peterson 1995). Boone and Krohn (1998) list the Willow as "common" with a "stable" population trend in Maine.

Limiting factors

Limiting factors are considered to be those conditions which degrade habitat suitability, reduce survivorship of young or adults, or decrease nesting success of adults once they are established to a site (Prescott 1997).

Livestock grazing and habitat loss

Livestock grazing has been found to be detrimental to the Willow Flycatcher because of the associated cowbird parasitism, and destruction of vegetation (Taylor 1986, Saab *et al.* 1995). Grazing in willow or brushy habitat often removes the vegetation at the level which the Willow Flycatcher nests (Taylor and Littlefield 1986). Loss of habitat through cattle grazing does not seem to be of significant concern in Alberta. Few sites supporting Willow Flycatchers are currently found in association with cattle. In fact, most of these sites would not be suitable for grazing. Willow Flycatcher habitat in Alberta is usually too moist and the willows too dense to be accessible for grazing. Some of the sites on the eastern edge of the Willow's range in Alberta may be suitable for grazing which might limit eastern expansion of the Willow Flycatcher.

Many locations that have historically had Willow Flycatcher records did not yield any sightings during our 1999 survey. These were mostly grazed dry-upland sites in the southern foothills. These sites support grazing which could explain the lack of recent Willow sightings, or a combination of grazing and cowbird parasitism may limit productivity.

Cowbird parasitism

Brown-headed Cowbird nest parasitism is of major concern for Willow Flycatcher populations. In the southwestern United States, nest parasitism usually leads to complete nest failure (Sogge *et al.* 1997). Campbell *et al.* (1997) reported 44% of Willow Flycatcher nests in interior British Columbia were parasitized by Brown-headed Cowbirds. Cowbirds are common in the dry, grazed upland sites in Alberta where Willows were historically reported. We recorded cowbirds at a significant number of ungrazed, wet lowland sites indicating the potential for nest parasitism. Cowbirds benefit from the insects disturbed by grazing cattle and are often found in direct association with livestock. Some studies have found that female cowbirds will commute up to 7 km from its feeding sites to breeding sites (Rothstein *et al.* 1984, Thompson 1994). Due to the high songbird density and diversity in riparian or wetland habitats, they are prime locations for Brown-headed Cowbirds. Several studies in the United States have looked at the effect cowbirds have in these habitats (e.g.) Schweitzer *et al.* (1998) in New Mexico, Staab and Morrison (1999) in Arizona, and Tewksbury *et al.* (1999) in Montana.

Human Disturbance

The Willow Flycatcher typically occupies habitats not traditionally sought after for recreational or commercial developments. In Alberta, the Willow Flycatcher can be found in shrubby wetlands, road and rail ditches and brush around lake margins. Wet, willow lowlands do not lend well to development, logging or any other foreseeable modification. The "cleaning" of willows and shrubs from lake edges could reduce available habitat but the greatest risk is lack of knowledge about the importance of the otherwise insignificant "waste" areas to this species. Road expansion, wetland drainage, or cleaning of rail allowances could easily eliminate a significant number of Willow Flycatcher sites.

Competition with Alder Flycatchers

On the assumption that habitat loss from grazing and cowbird parasitism may be restricting Willow Flycatchers to wet habitats, they can expect to encounter Alder Flycatchers in these habitats. As noted earlier, the outcome of interactions between these two species is unpredictable. We found Willows and Alders together in 10% of the sites and also found only Alders in sites that appeared suitable for Willows. Prescott (1986) noted that both species excluded each other from their territories. If suitable habitat is limited, and the Willow and Alder are competing for this space, historical evidence suggests that one species tends to eliminate the other. In eastern Canada, the Willow Flycatcher is thought to be forcing Alders out of their habitat (Prescott 1987) while studies in British Columbia (Campbell *et al.* 1997) and Wisconsin (Robbins 1974) show the Alder forcing out the Willow. Because Alder Flycatchers are far more common in Alberta, should they move in substantial numbers into current Willow Flycatcher habitat, the Willows may be at risk.

Status designations

Alberta

The Willow Flycatcher was listed as “Status Undetermined” in the 1985, 1991, and 1996 Status of Alberta Wildlife reviews based on the lack of information on the distribution and abundance of this bird (Alberta Fish and Wildlife 1985, Alberta Fish and Wildlife 1991, Alberta Wildlife Management Division 1996). The Alberta Natural Heritage Information Center (ANHIC 1999) ranked the Willow Flycatcher as S2 which means it is rare throughout its range or in the province (6 to 20 occurrences) and may be vulnerable to extirpation.

Other areas

British Columbia does not list the Willow Flycatcher as a species that is rare, endangered or vulnerable (British Columbia Conservation Data Centre 1999). Saskatchewan ranks the Willow Flycatcher as S4 (abundant, apparently stable, Saskatchewan Conservation Data Centre 1998). The Willow Flycatcher is ranked as S3 (uncommon) in Manitoba (Manitoba Conservation Data Centre 1998) while Ontario ranks it

as S5 (widespread and stable, Ontario Natural Information Centre 1999).

Washington and Montana list the Willow Flycatcher as S5 (Washington Natural Heritage Program 1997, Montana Natural Heritage Program 2000). Oregon lists the status of the Willow Flycatcher subspecies *E. traillii brewsterii* as "vulnerable" and *E. traillii adastus* as "undetermined" (Oregon Natural Heritage Program 1998). In the southwestern United States, the Willow subspecies *E. traillii extimus* is considered "endangered" due to a population crash from loss of riparian habitat, cattle grazing and Brown-headed Cowbird parasitism (USFWS 1995). Arizona, New Mexico, Nevada, California and Utah all list the southwestern Willow Flycatcher subspecies as "endangered", or a species of concern.

Empidonax traillii is listed under the Natural Heritage Global Rank G5.

Recent management in Alberta

No specific management for the Willow Flycatcher has been reported in Alberta.

Synthesis

The Willow Flycatcher is present in patches of wetland habitat in the Rocky Mountains and Foothills of Alberta. Due to lack of study, population size and trends have not been determined accurately. Population size is thought to be low and BBS data indicates a decline in numbers. The possible limiting factors for the Willow Flycatcher include: loss of habitat from human disturbance and cattle grazing; productivity losses from Brown-headed Cowbird parasitism; and competition with Alder Flycatchers.

The lack of study about the Willow Flycatcher in Alberta is currently the greatest weakness in working towards a management plan. Several questions should be answered with respect to Alberta's population of Willow Flycatchers. The Willow Flycatcher is not endangered as a species but western populations of this species are at risk. The Alberta population constitutes a tiny fraction of the continental population. From a biological perspective, it is significant that the most northerly populations of this species are in Alberta and British Columbia and that no assessment of the genetic distinctness of northern populations has been made.

Volunteer help in documenting other potential breeding area for this species would be useful if supporting identification aids (primarily song recordings) are provided. Population trends, nest success and survivorship would be necessary to examine the success of the Willows breeding in Alberta. Although the Willow Flycatcher does not appear to be at risk in the province, the most probable area of concern would be that of human disturbance. The relative ease with which significant amounts of Willow Flycatcher habitat could be unknowingly destroyed is significant. Any management plans drafted would have to consider this. Based on data from British Columbia and the southwestern United States, it would be advisable to study the effects of cattle grazing and Brown-headed Cowbird parasitism on Willow Flycatchers in Alberta, because this is a topic of concern elsewhere.

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