

SOUTHWESTERN WILLOW FLYCATCHER

Empidonax traillii extimus

Author: Philip Unitt, San Diego Natural History Museum, P.O. Box 1390, San Diego, California 92112

Management Status: Federal: Endangered
California: Endangered (CDFG, 1998)

General Distribution:

The Willow Flycatcher is a nearly transcontinental species breeding widely across temperate North America and migrating for the winter to Middle and northwestern South America. It consists of four subspecies (*contra* Browning, 1993).

(1) Nominate *traillii* (including *campestris*) breeds in the Great Plains region and has extended its range into the northeastern U.S.

(2) *E. t. adastus* breeds in the Great Basin and central Rocky Mountain region, south to Utah and Colorado.

(3) *E. t. brewsteri* breeds in the Pacific Northwest and south in the Sierra Nevada in central California.

(4) *E. t. extimus* breeds in southern California (north to the Santa Ynez River, Kern River, and Independence on the Owens River), southern Nevada, southern Utah, Arizona, New Mexico, and extreme western Texas. A few records suggest rare or sporadic breeding in northwestern Baja California and northeastern Sonora. *Extimus* differs from the other two western races by its paler upperparts and lack of contrast between crown and back (dark centers to the crown feathers often contrast with the paler olive tips, generating a dappled effect).

All subspecies of the Willow Flycatcher are completely migratory. The species as a whole winters from southern Mexico south through Central America to Panama and western Venezuela. Subspecies *extimus* has been collected in winter in Guatemala, El Salvador, Honduras, and Costa Rica (Unitt, 1997). Otherwise, the winter distribution and ecology of the subspecies remain unknown.

Because the species is strongly migratory, migrants of the more northern subspecies occur commonly in the breeding range of *extimus*. Southern California lies across the main migration route of *brewsteri*, and specimens of *brewsteri* outnumber specimens of *extimus* in collections from the range of the latter. With the population crash of *extimus*, almost all Willow Flycatchers seen in southern California are *brewsteri*. *Extimus* is encountered only at the few sites where it breeds.

Subspecies *extimus* arrives in spring usually in early May, rarely as early as the last two or three days of April. In occasional years they are delayed until the third week of May. In fall, the adults depart mainly during the last half of August, remaining rarely as late as 4 September. Juveniles remain later in September but all have departed by 1 October.

Distribution in the West Mojave Planning Area:

The Southwest Willow Flycatcher (*E.t. extimus*) is confirmed to occur in the WMPA on the basis of a single specimen, a male with "testes large" collected at Oro Grande on 26 May 1920 (Museum of Vertebrate Zoology 40543). However, the occurrence of this subspecies just to the west at Weldon on the South Fork Kern River, to the north at Independence, and to the east along the Colorado River imply that any population of Willow Flycatchers nesting in the western Mojave Desert would be *extimus*. Subspecies *brewsteri* occurs as a regular migrant throughout the area.

Summering Willow Flycatchers in the area thus interpreted as *extimus*, the subspecies appears to be known from only two sites in the WMPA:

(1) At Big Morongo Wildlife Preserve, Cardiff et al. (1982) found one nesting pair in 1981. Subsequent years' regular study, however, failed to reveal any further resident Willow Flycatchers (E. A. Cardiff pers. comm.). The birds' use of the site is evidently only ephemeral.

(2) Along the Mojave River, since the specimen from Oro Grande in 1920, the only subsequent reports of summering Willow Flycatchers are Stephen J. Myers' (pers. comm.) observation of a territorial male from 16 June to 8 July 1990 at Mojave Narrows Regional Park and Robert McKernan's (pers. comm.) observations in 1994 and 1995 about one-quarter mile downstream (north-northwest) of the Interstate 15 crossing. From 10 to 21 June 1994 McKernan observed a single pair, saw it copulating on the first date, and heard another singing bird on the last date. He observed two pairs at the site on 13, 16, and 19 June 1995. Nesting was never confirmed.

The California Natural Diversity Data Base has a record of a supposedly nesting Willow Flycatcher just south of the WMPA at Whitewater on 17 May 1987, too early for the species' nesting and therefore evidently in error.

Natural History:

The Southwestern Willow Flycatcher has grayish olive upperparts, a whitish throat, a pale gray tinge on the breast, and a pale yellow-tinged belly. The dark gray wing feathers are edged paler, olive on the coverts (forming wing bars) and pale grayish on the secondaries, especially the tertials. The bird weighs about 12-13 grams, has a wingspread of around 8.1-8.7 in. (??-?? cm), and is around 5.5-5.9 in. (??-?? cm) long.

The Willow Flycatcher closely resembles several other small flycatchers of the genus *Empidonax* as well as the Western Wood Pewee (*Contopus sordidulus*). It differs from the other species of *Empidonax* by its near lack of a pale eye ring and from the Western Wood Pewee by its smaller size, paler, more olive upperparts, and habit of wagging the tail. The song of the Willow Flycatcher is characteristic: "witcha-pew," commonly rendered "fitz-bew" in the literature. The species is not easily identified by the inexperienced; intensive study both in the field and museum is essential to reliable identifications, in the field or in the hand. Studies of nonsinging birds that are not supported by such experience (e.g., Yong and Finch, 1997) lead to inaccurate data. The subspecies can be identified reliably only through comparison of museum specimens.

Like most other flycatchers, the Willow is a diurnal insectivore, catching its prey on the wing usually in the middle story of riparian woodland. Males maintain and advertise a territory by singing. Territorial defense begins essentially immediately after spring arrival. Females occasionally sing, apparently when stimulated by territorial disputes (Seutin, 1987; Sogge et al., 1997). Most birds are monogamous within one breeding season, but 10-20% of males have two

mates, and one instance of trigyny is known from the South Fork Kern River. Not all territorial males are mated.

Territory sizes of *extimus* along the San Luis Rey River range from 0.097-0.18 acres (W.E. Haas pers. comm.), in the Grand Canyon from 0.036-0.2 acres (Sogge et al., 1997). A study in Wisconsin found that territory size is apparently independent of population density. Population density in suitable habitat can range up to 6 females and 5 males in 1.78 acres (0.75 females per acre), as observed along the South Fork Kern River (M. Whitfield pers. comm.). The birds use a home range larger than the defended territory.

Nests are initiated usually within one week of pair formation, 10-14 days after spring arrival. Building them takes three to eight days. The nests are open cups, attached by the sides to slender stems and twigs, which may be vertical, horizontal, or slanting. They may be in an upright crotch or without support from below. Nest material often trails from the bottom of the cup. Only the female builds the nest. The nest substrate varies greatly by site. In historic egg collections from southern California, 86% of nests were in willows (*Salix* spp.), 4% in stinging nettles (*Urtica dioica*), and 10% in other plants (Unitt 1987). On the South Fork Kern River 70% were in willows, 10% in stinging nettles, and 15% in both (M. Whitfield pers. comm.). On the San Luis Rey River, however, a canyon rather than floodplain site, 92% of nests have been in coast live oak (*Quercus agrifolia*). Materials used in the nest include bark, plant fibers, stems, and grass in the cup, grass, animal hair, plant down, feathers, and spider cocoons in the lining. The height of the nest above the ground is highly variable. In historic egg collections from southern California, the range is 2-18 ft (?-? m), mean 7.5 ft (? m; Unitt 1987). More recent data also show much variability: range 2-33 ft (?-?? m) on the South Fork Kern River (M. Whitfield pers. comm.), 2-28 ft (?-?? m) on the San Luis Rey River (W. E. Haas pers. comm.).

Egg-laying may begin as early as 24 May (historic egg collections); recent studies found the earliest clutches initiated on 25 May on the South Fork Kern River (M. Whitfield pers. comm.) or 5 June on the San Luis Rey River (W. E. Haas pers. comm.). The median date of 92 first nest attempts on the South Fork Kern River from 1989 to 1995 was 12 June (M. Whitfield pers. comm.). The clutch consists normally of 3 or 4 eggs; 2-egg clutches are rare, 5-egg clutches very rare. In historic egg collections, the average clutch size in coastal southern California is 3.4 eggs, along the Colorado River, 2.8 eggs. Along the South Fork Kern River, Mary Whitfield has found a mean size of 3.78 eggs in first nest attempts, 2.78 in second nest attempts, and 2.29 in third or fourth nest attempts. The incubation period is 12 or 13 days from the laying of the last egg. Only the female incubates. The young fledge at an age of 12-15 days. They may disperse from their natal territory 14 or 15 days after fledging, but they remain longer when, as usual, no second clutch follows.

Viable clutches may be laid as late in the summer as 16 July. The latest recorded dates for eggs are 30 July (historic southern California egg collections) and 31 July (South Fork Kern River, M. Whitfield pers. comm.). Singing decreases through July, ending in the last week of July or first week of August.

Habitat Requirements:

The Southwestern Willow Flycatcher breeds only in riparian woodland, typically adjacent to or even over water. Surface water or saturated soil is usually present in or adjacent to nesting sites during at least the initial portion of the nesting period (Muiznieks et al., 1994; Tibbits et al., 1994). Riparian woodland used by Willow Flycatchers typically has a canopy and an understory

of shrubs or saplings. The vegetative composition of the habitat varies greatly from site to site. The habitat commonly represented in historical records, and still occupied on the South Fork Kern, Santa Margarita, and Santa Ynez rivers, is dominated by native willows. Along the San Luis Rey River the plant species are more varied, with ash, alder, and coast live oak being major components. In Arizona, as at Roosevelt Lake and in the Grand Canyon, the Willow Flycatcher occupies nearly pure stands of mature nonnative tamarisk (e.g., Spencer et al., 1996; Sogge et al., 1997). In very low deserts, however, as along the Colorado River south of Lake Havasu, the flycatcher makes little if any use of tamarisk woodland. Young tamarisk thickets are not occupied anywhere. Near the Gila River in New Mexico, *extimus* occupies floodplain forest dominated by cottonwoods and boxelders and narrow strips of riparian vegetation, including the nonnative Russian olive, along networks of water-diversion ditches (D. Zimmerman in litt.). Because the flycatchers frequently nest adjacent to water, aquatic plants such as cattail, bulrush, or (along the San Luis Rey River) *Sparganium eurycarpum* are a conspicuous element of the habitat. Clearly, water and vegetation structure are important to the Willow Flycatcher; plant-species composition is not. Studies in Arizona find the birds selecting the densest riparian vegetation available (e.g., Spencer et al., 1996).

Population Status:

In southern California, *extimus* was once widespread in riparian woodland. Through the 20th century, however, the subspecies declined precipitously, becoming restricted to a few small scattered populations. The principal sites are along the South Fork Kern River near Weldon, along the Santa Ynez River from Vandenberg Air Force Base to Buellton, Prado Basin in the Santa Ana River, near Corona, Santa Margarita River, Camp Pendleton to Fallbrook, and San Luis Rey River, La Jolla Indian Reservation to Lake Henshaw. Other sites are used only ephemerally or their regularity of use has yet to be ascertained. In any case, use of other sites is likely of only a few scattered pairs. It seems improbable that other significant populations remain to be discovered.

Threats Analysis:

Synergy between loss and degradation of riparian habitat and brood-parasitism by the invading Brown-headed Cowbird seems responsible for the Southwestern Willow Flycatcher's decline (Unitt, 1987). Loss of riparian wetlands has been especially severe in California, estimated at 91%. In coastal southern California, these losses have been due largely to conversion of floodplains to agriculture (and then commonly to cities) and flood-control projects. In Arizona and New Mexico, overgrazing by cattle has been an important factor. Overgrazing can degrade Willow Flycatcher habitat both directly and indirectly. Cattle eat and trample the vegetation on which the flycatcher depends, removing the understory. On a broader scale, overgrazing removes vegetative cover that assists rain in permeating the ground; water tables decline and wetlands dry out, eliminating Willow Flycatcher habitat. Other processes that disrupt water tables, such as overpumping for agriculture or urban use or compaction of the soil, accelerating runoff, also adversely affect the Willow Flycatcher's habitat.

Brood-parasitism by the Brown-headed Cowbird is also a major negative factor on the Willow Flycatcher. For example, Harris (1991) found that at least 68% of Willow Flycatcher nests on the South Fork Kern River had been parasitized and that cowbird parasitism was the leading cause of nest failure. The flycatchers may accept the cowbird eggs, in which case they

invariably raise cowbird young if the cowbird lays shortly after the flycatcher. Even if the cowbird lays too late in the flycatcher's incubation period to be assured sufficient incubation, it typically removes one of the host's eggs, reducing the number of young the flycatcher can raise. More frequently, the flycatchers abandon the parasitized nest and start their nesting cycle over. Repeated cases of parasitism may lead to repeated nesting attempts, reducing the birds' efficiency—often to zero. Because the birds arrive so late in the spring, the Willow Flycatcher's breeding season is among the shortest of North American songbirds, heightening the species' sensitivity to disruptions to its breeding cycle of any sort.

Biological Standards:

The minimum requirements necessary for a self-sustaining population of the Willow Flycatcher can only be guessed at under the current state of knowledge. Nesting birds defend only a small territory, commonly under 0.2 acre (Sogge et al., 1997; W.E. Haas pers. comm.). Several pairs may pack themselves into suitable habitat at close to this density. Along the San Luis Rey River, where the birds are arranged in a narrow linear strip, the population consists of about 35 pairs in 3 mi. (W. E. Haas pers. comm.). In Arizona, sites of stands of riparian woodland occupied by Willow Flycatchers ranged from 0.12 (in montane willows) to 20 (in low-elevation tamarisk) acres (Spencer et al., 1996).

Though the Willow Flycatcher maintains some degree of fidelity to its nesting sites, this fidelity is not absolute; birds shift from site to site from year to year, complicating the question of the size of a viable population. Good information on how this vagility affects the bird's population dynamics is possible only with multiple populations intensively banded over several years. Such a banding effort only began in 1996; because the effort so far depends heavily on volunteers and the vagaries of the U.S. Fish and Wildlife Service's permitting procedures, its future remains cloudy.

The Southwestern Willow Flycatcher's remaining population is distributed among both larger populations or colonies and isolated scattered pairs and individuals. Do the scattered pairs contribute positively or negatively to the subspecies' population dynamics? Data on population dynamics sufficient to answer this question do not exist. Fluctuations of Willow Flycatchers in the Grand Canyon show that the isolated pairs are *not* self-sustaining (Sogge et al., 1997). Data currently available are not sufficient to reveal whether any population or colony is self-sustaining. Alleviation of parasitism pressure through cowbird trapping has not resulted in immediate population increases at least on the Kern River (M. Whitfield pers. comm); evidently all the negative factors on the species have not been identified.

Because the viability of the current population is open to question, the species cannot be considered recovered until its numbers are substantially greater than today's. Because of the questionable contribution of isolated pairs, the estimate should take into account substantial colonies only. A few years' experience along the San Luis Rey River suggests that a population of 35-38 pairs may be self-sustaining, at least in the short term, if high nesting success can be maintained by eliminating cowbirds. Twenty-five colonies of 40 pairs each, in combination with intensive cowbird trapping at each, yields a total population of 1000 pairs, which may have a chance of sustaining itself.

The Mojave Desert has never been reported as an important region for the Willow Flycatcher. Currently, the birds use the area only sporadically. Apparently, at present, the habitat is only marginally suitable. However, it is quite possible that the Mojave River once supported a significant population that was extirpated before it was reported by biologists. The Kern River

offers an intriguing parallel. On both the Kern and Mojave rivers, the *Empidonax traillii extimus* is known from a single historic specimen. The birds of neither area were thoroughly inventoried and reported on in the earlier literature. Yet now the Kern River is the site of one of the subspecies' key populations, presumably as a relict. The Mojave may once have had an equally important role, suggesting it as a site for an attempt at restoration.

Literature Cited:

- Browning, M.R. 1993. Comments on the taxonomy of *Empidonax traillii* (Willow Flycatcher). West. Birds 24:241-257.
- California Department of Fish and Game, Natural Diversity Data Base. 1998. Special Animals. Biannual publication, Mimeo., 44 pp.
- Cardiff, E.A., Kniffen, J., and Kniffen, R. 1982. Breeding birds survey 197. Desert riparian-freshwater marsh and ponds. Amer. Birds 36:102-103.
- Harris, J.H. 1991. Effects of brood parasitism by brown-headed cowbirds on willow flycatcher nesting success along the Kern River, California. West. Birds 22:13-26.
- Muiznieks, B.M., T.E. Corman, S.J. Sferra, M.K. Sogge, and T J. Tibbits. 1994. Arizona partners in flight 1993 southwestern willow flycatcher survey. Nongame and Endangered Wildlife Program Technical Report 52. Arizona Game and Fish Dept., Phoenix, Arizona.
- Seutin, G. 1987. Female song in willow flycatchers (*Empidonax traillii*). Auk 104:329-330.
- Sogge, M.K., T.J. Tibbits, and J.R. Peterson. 1997. Status and breeding ecology of the southwestern willow flycatcher in the Grand Canyon. West. Birds 28:142-157.
- Spencer, J.A., S.J. Sferra, T.E. Corman, J.W. Rourke, and M.W. Sumner. 1996. Arizona partners in flight 1995 southwestern willow flycatcher survey. Nongame and Endangered Wildlife Program Technical Report 97. Arizona Game and Fish Dept., Phoenix, Arizona.
- Tibbits, T.J., M.K. Sogge, and S.J. Sferra. 1994. A survey protocol for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). Technical Report NPS/NAUCPRS/NRTR-94/04. Colorado Plateau Research Station, Northern Arizona Univ., Flagstaff, Arizona.
- Unitt, P. 1987. *Empidonax traillii extimus*: An endangered subspecies. West. Birds 18:137-162.
- Unitt, P. 1997. Winter range of the southwestern willow flycatcher (*Empidonax traillii extimus*). Report to Bureau of Reclamation, P.O. Box 9980, Phoenix, Arizona 85068-0980.
- USDI, Bureau of Land Management, 1997. California Desert District Resource Area files.
- Yong, W., and Finch, D.M. 1997. Migration of the willow flycatcher along the middle Rio Grande. Wilson Bull. 109:253-268.