

# **Distribution and Abundance of Southwestern Willow Flycatchers (*Empidonax traillii extimus*) on the Upper San Luis Rey River, San Diego County, California—2020 Data Summary**



Data Series 1140



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By Scarlett L. Howell and Barbara E. Kus

Data Series 1140

**U.S. Department of the Interior  
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## Conversion Factors

International System of Units to U.S. customary units

Multiply	By	To obtain
Length		
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) / 1.8.$$

## Datum

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

## Abbreviations

CNF	Cleveland National Forest
RRR	Rey River Ranch
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VID	Vista Irrigation District
VLH	VID Lake Henshaw



# Distribution and Abundance of Southwestern Willow Flycatchers (*Empidonax traillii extimus*) on the Upper San Luis Rey River, San Diego County, California—2020 Data Summary

By Scarlett L. Howell and Barbara E. Kus

## Executive Summary

We surveyed for Southwestern Willow Flycatchers (*Empidonax traillii extimus*; flycatcher) along the upper San Luis Rey River, near Lake Henshaw, in Santa Ysabel, California, in 2020. Surveys were completed at four locations: three downstream from Lake Henshaw, where nest monitoring occurred from 2015 to 2019 (Rey River Ranch [RRR], Cleveland National Forest [CNF], Vista Irrigation District [VID]), and one at VID Lake Henshaw (VLH) that was previously surveyed in 2018 and 2019. There were 62 territorial flycatchers detected at 3 locations (RRR, CNF, VLH); no flycatchers were detected at VID. Within the former nest monitoring study area, 11 flycatchers, including 5 males and 6 females, were detected at RRR and CNF. In total, seven territories were established, consisting of six pairs (two polygynous groups consisting of two males each pairing with two different females) and one male of undetermined breeding status. Upstream from the former nest monitoring study area at VLH, we detected 51 flycatchers, including 24 males and 27 females. There were 28 territories established, containing 27 pairs (23 monogamous pairings and 4 confirmed polygynous pairings consisting of 1 male and 2 females) and 1 male of undetermined breeding status. Brown-headed cowbirds (*Molothrus ater*; cowbird) were detected at all four survey locations.

Flycatchers used four different habitat types in the survey area: (1) mixed willow riparian, (2) willow-oak, (3) willow-ash, and (4) willow-sycamore. Eighty percent of the flycatchers were detected in habitat characterized as mixed willow riparian, and 83 percent of the flycatchers were detected in habitat with greater than 50-percent native plant cover. Exotic vegetation was not prevalent in the survey area.

There were 17 flycatcher nests incidentally located during surveys: 2 were successful, 3 were seen with nestlings on the last visit, 10 failed, and the outcome of the remaining 2 nests was unknown. Five of these nests were parasitized by

cowbirds. There were 10 juveniles detected during surveys: 2 at RRR and 8 at VLH.

Of the 17 banded flycatchers detected during surveys, 8 were resighted and confirmed to be adults that held territories in previous years. Seven flycatchers with a single dark blue federal band, indicating that they were banded as nestlings in the former nest monitoring study area downstream from Lake Henshaw, were resighted during surveys; 86 percent of these “natal” flycatchers held territories at VLH.

In 2020, we documented both adult and natal flycatchers moving from the former nest monitoring study area downstream from Lake Henshaw upstream to the habitat surrounding Lake Henshaw. Six natal flycatchers that were originally banded as nestlings and two adults that previously held territories downstream dispersed to Lake Henshaw in 2020.

## Introduction

The Southwestern Willow Flycatcher (*Empidonax traillii extimus*; flycatcher) is one of four subspecies of Willow Flycatcher in the United States, with a breeding range that includes southern California, Arizona, New Mexico, extreme southern parts of Nevada and Utah, and western Texas (Hubbard, 1987; Unitt, 1987). Restricted to riparian habitat for breeding, the flycatcher has declined in recent decades in response to widespread habitat loss throughout its range and, possibly, brood-parasitism by the Brown-headed cowbird (*Molothrus ater*; cowbird (Wheelock, 1912; Willett, 1912, 1933; Grinnell and Miller, 1944; Remson, 1978; Garrett and Dunn, 1981; Unitt, 1984, 1987; Gaines, 1988; Schlorff, 1990; Whitfield and Sogge, 1999)). By 1993, the species was believed to number approximately 70 pairs in California (U.S. Fish and Wildlife Service, 1993) in small, disjunct populations. The flycatcher was listed as endangered by the State of California in 1992 and by the U.S. Fish and Wildlife Service (USFWS) in 1995.

Flycatchers in southern California co-occur with vireos. However, unlike the vireo, which has increased tenfold since the mid-1980s in response to management practices alleviating threats (U.S. Fish and Wildlife Service, 2006), the number of flycatchers has remained low. Currently, most flycatchers in California are concentrated in two sites—the Owens River Valley in Inyo County (Lacey Greene, California Department of Fish and Wildlife, written commun., 2015) and the upper San Luis Rey River, including a part of the Cleveland National Forest in San Diego County (B.E. Kus, U.S. Geological Survey, unpub. data, 2020). Outside of these sites, flycatchers occur as small, isolated populations of one to six pairs. Data on the distribution and demography of the flycatcher, as well as identification of factors limiting the species, are critical information needs during the current stage of recovery planning (Kus and others, 2003; Kus and Whitfield, 2005).

Male flycatchers begin arriving in southern California at the end of April, and females arrive approximately 1 week later. Males sing repeatedly from exposed perches while on the breeding grounds. Once the pair bond is established, the female builds an open cup nest that usually is placed in a branch fork of a willow (*Salix* spp.) or plant with a similar branching structure approximately 1–3 meters (m) above the ground. The typical clutch of three to four eggs is laid in May–June. Females incubate for approximately 12 days and nestlings fledge within 12–15 days, in early July. Adults usually depart from their breeding territory in mid-August and early September to their wintering grounds in Central America and northern South America.

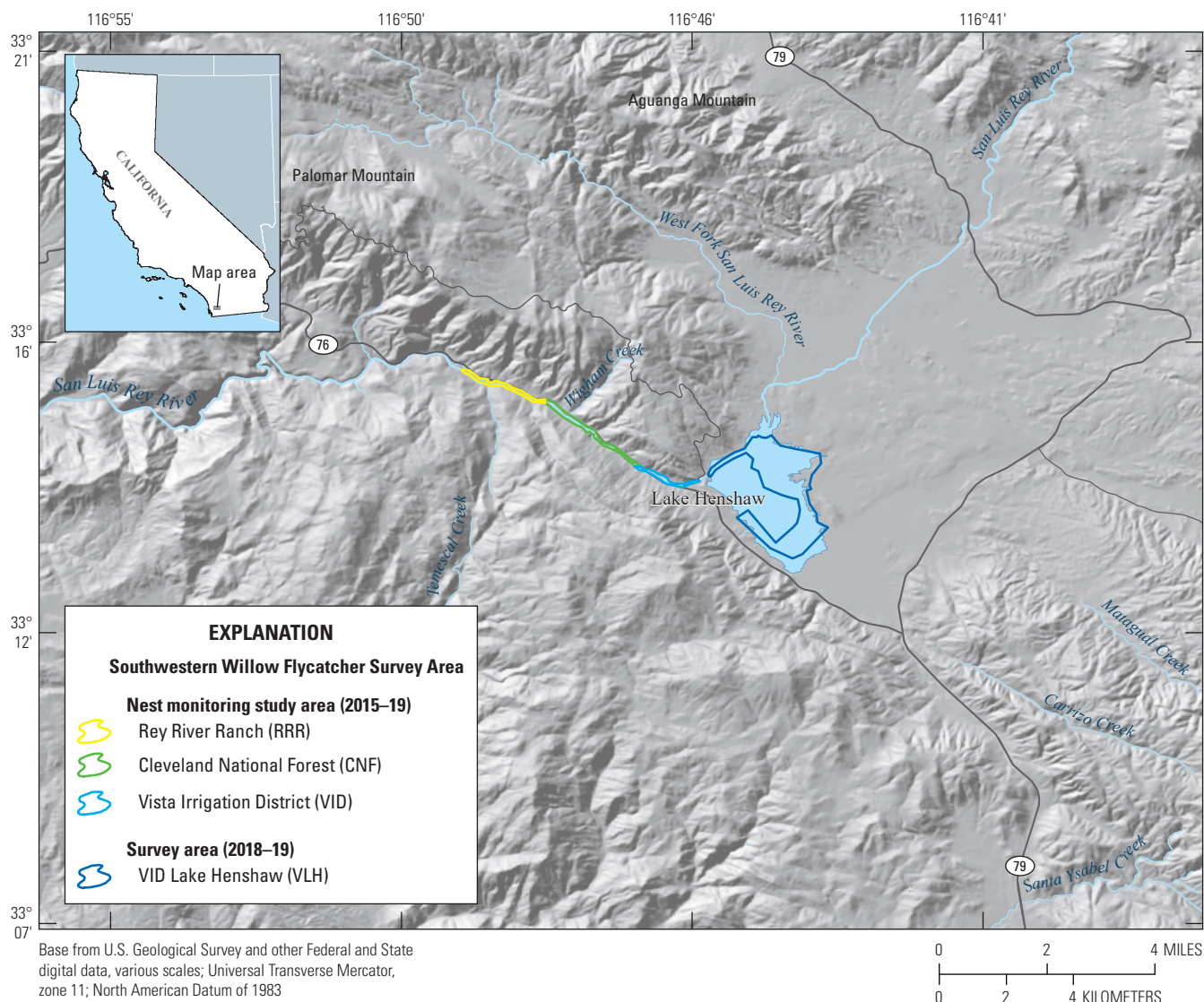
The goal of the 2020 effort was to assess the status of the flycatcher population along the upper San Luis Rey River in an area downstream from Lake Henshaw that was surveyed and monitored for nesting activity during 2015–19, as well as the habitat surrounding Lake Henshaw that was surveyed from 2018 to 19 (B.E. Kus, U.S. Geological Survey, unpub. data, 2020). This report is the annual update to surveys that have been completed since 2015 (B.E. Kus, U.S. Geological Survey, unpub. data, 2020).

These data, when compared with data from other sites, will inform natural resource managers about the status of the flycatcher on the upper San Luis Rey River and guide modification of land-use and management practices as appropriate to ensure the species' continued existence.

## Methods

### Study Area

The study area consisted of an approximately 6.9-kilometers (km; 4.3-miles [mi]) reach of the upper San Luis Rey River downstream from Lake Henshaw and the habitat surrounding Lake Henshaw (fig. 1). Four locations along the upper San Luis Rey River were surveyed for flycatchers in 2020: three locations downstream from Lake Henshaw (former nest monitoring study area 2015–19: Rey River Ranch; RRR, Cleveland National Forest; CNF, and Vista Irrigation District; VID) and one location upstream from the dam (VID Lake Henshaw; VLN), previously surveyed in 2018–19. The study area included property managed by the Vista Irrigation District, Cleveland National Forest, and private property downstream from the Forest Service property. Surface flows downstream were regulated by a dam at Lake Henshaw operated by the Vista Irrigation District and water was present year-round. Spring and summer flows were swift and slow-moving backwater/marshy habitats were absent. Parts of the riparian zone around Lake Henshaw were flooded at the beginning of the season and some territories could not be accessed on foot. The flood plain in the downstream part of the study area was narrow and bordered by steep slopes that supported chaparral vegetation. Riparian habitat downstream included a diverse mix of mature willow (*Salix* spp.) woodland and coast live oak (*Quercus agrifolia*) woodland dominated by coast live oak, willow, velvet ash (*Fraxinus velutina*), California sycamore (*Platanus racemosa*), and white alder (*Alnus rhombifolia*). Thick understory vegetation was present, including wild rose (*Rosa californica*), poison oak (*Toxicodendron diversilobum*), stinging nettle (*Urtica dioica*), and California blackberry (*Rubus ursinus*) interspersed with patches of open habitat dominated by annual grasses and bracken fern (*Pteridium* sp.). The habitat surrounding the lake was dominated by Gooding's black willow (*Salix goodingii*), with some arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), and coast live oak present where the west fork of the San Luis Rey River and several other minor creeks flowed into the lake. There were several patches of non-native tamarisk (*Tamarix ramosissima*) further from the outside edge of the lake as well.



**Figure 1.** Location of Southwestern Willow Flycatcher (*Empidonax traillii extimus*) survey area on the upper San Luis Rey River, San Diego County, California, 2020.

## Surveys

U.S. Geological Survey (USGS) biologists Scarlett Howell and Suellen Lynn completed flycatcher surveys by following standard survey techniques for flycatchers (Sogge and others, 2010). Flycatcher surveys were done under USFWS permit TE-829554. Four surveys were done at least 5 days apart during three consecutive survey periods between May 15 and July 31, 2020 (except for the VID and VLH locations, which were only surveyed three times because of

access restrictions). Surveys were done between dawn and early afternoon, depending on wind and weather conditions. Surveys were not done during inclement weather such as temperatures below freezing, rain, or strong winds that inhibit detection of vocalizations. Surveys were done by walking next to the river, using caution to avoid disturbing the habitat or damaging nests. In wider stands, observers traversed the habitat, choosing routes that permitted detection of all birds throughout its extent, such as multiple straight transects, serpentine, zig-zag, or criss-cross routes.



Upon initiation of the survey, investigators stood quietly for 1–2 minutes, listening for spontaneously singing flycatchers and acclimating to surrounding conditions such as road and river noise. If no birds were detected during the initial listening period, investigators broadcasted the flycatcher song (fitz-bew) using an MP3 player and an amplified speaker, at the volume of normal bird songs, for approximately 10–15 seconds, then looked and listened for approximately 1 minute for a response. Song playback was ceased immediately upon detection of a flycatcher. Flycatchers typically responded by moving silently toward the song, singing in response to the song or producing some other call or vocalization. This procedure was repeated (including 10-second quiet pre-broadcast listening period) every 20–30 m throughout the survey site and more often if background noise was loud. If a flycatcher was detected, the investigator moved approximately 50–80 m beyond the detection before additional playback occurred to avoid double counting birds.

For each flycatcher encountered, observers recorded age (adult or juvenile), sex (male, female, or unknown), breeding status (paired, single, undetermined, or transient), and whether the bird was banded. A flycatcher was considered transient if detected only once, or if more than once, detections were less than 2 weeks apart. The flycatcher locations were mapped using the ESRI Collector (Environmental Systems Research Institute, 2020) on an Android phone with 1- to 15-m accuracy to determine geographic coordinates (World Geodetic System of 1984, WGS 84). Dominant native and exotic plants were recorded at each location, and percent cover of native vegetation was estimated using cover categories of less than 5 percent, 5–50 percent, 51–95 percent, and greater than 95 percent. Overall habitat type was specified according to the following categories:

**Mixed willow riparian:** Habitat dominated by one or more willow species, including Goodding's black willow, arroyo willow and red willow, with mule fat (*Baccharis salicifolia*) as a frequent co-dominant.

**Willow-alder:** Willow riparian habitat in which white alder is a co-dominant.

**Willow-ash:** Willow riparian habitat in which velvet ash is a co-dominant.

**Willow-cottonwood:** Willow riparian habitat in which Fremont cottonwood (*Populus fremontii*) is a co-dominant.

**Willow-oak:** Willow-riparian habitat in which coast live oak is a co-dominant.

**Willow-sycamore:** Willow riparian habitat in which California sycamore is a co-dominant.

**Riparian scrub:** Dry or sandy habitat dominated by sandbar willow (*Salix exigua*) or mule fat, with few other woody species.

**Sycamore-oak:** Woodlands in which California sycamore and coast live oak occur as co-dominants.

**Upland scrub:** Coastal sage scrub adjacent to riparian habitat.

**Non-native:** Areas vegetated exclusively with non-native species, such as giant reed (*Arundo donax*) and tamarisk.

## Breeding Activities

We documented any breeding activities observed during surveys. Incidental nest locations observed during surveys were recorded and the contents observed whenever possible.

## Brown-headed Cowbirds

We documented the presence of cowbirds during surveys. Whenever possible, the contents of incidentally located nests were observed for the presence of cowbird eggs; if present, cowbird eggs were removed from the nest and destroyed because parasitized nests are rarely successful in fledging host young (Rothstein and others, 2003).

## Banding

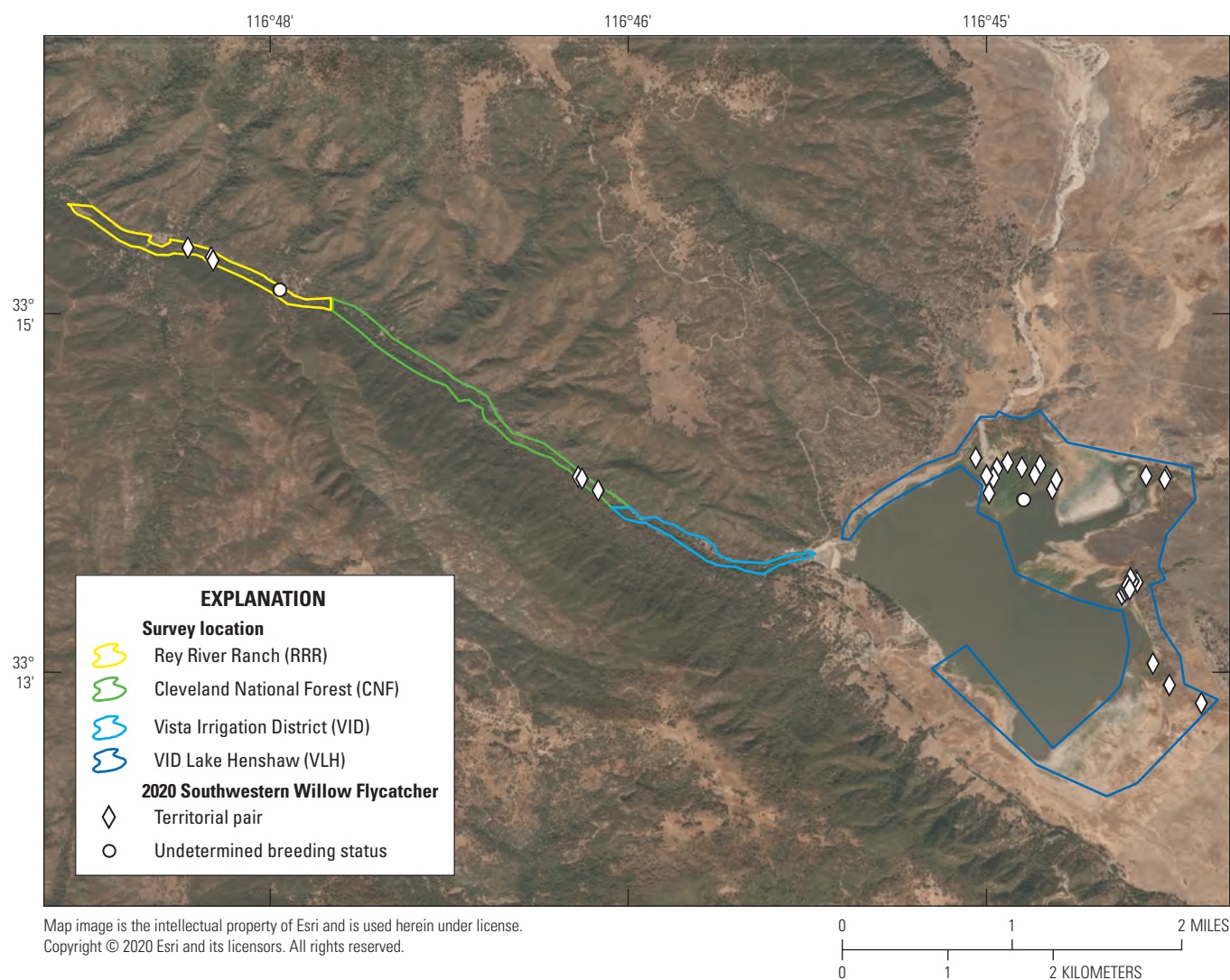
We banded adult flycatchers at three locations (RRR, CNF, and VID) as part of a separate nest monitoring and banding project. This banding was done from 2015 to 2019 (B.E. Kus, U.S. Geological Survey, unpub. data, 2020). In that study, adults were captured at monitored territories by using mist nets and song playback and were banded with a unique color-band combination. All nestlings from accessible nests, in monitored territories, were banded with a single metal dark blue band on the left or right leg. In subsequent years, flycatchers that were resighted with a single dark blue band (natal) were recaptured by using the same methods described for adults and given a second leg band to yield a unique band combination. In 2020, we attempted to re-sight all flycatchers to identify individuals based on color-band combinations. Color-band re-sighting data were used to determine age and document movement from banding sites.

## Results

### Distribution and Abundance

There were 62 flycatchers detected at 3 locations (RRR, CNF, VLH); no flycatchers were detected at VID (fig. 2; tables 1, 2). Of the 62 flycatchers, all were determined to be territorial.

A total of 11 flycatchers (5 males and 6 females) were detected at RRR and CNF (fig. 2; tables 1, 2). Four of the males were paired, whereas the breeding status of the remaining male was undetermined. Two of the paired males were polygynous with two females each (CNF01F/02F and RRR02F/04F; table 2), and the remaining two pairings were monogamous. In total, seven territories were established, consisting of six pairs (two polygynous groups consisting of two males each pairing with two different females) and one male of undetermined breeding status. Two juveniles were detected at RRR during surveys (table 1).



**Figure 2.** Southwestern Willow Flycatcher (*Empidonax traillii extimus*) detections and breeding status on the upper San Luis Rey River, San Diego County, California, 2020.

**Table 1.** Total number and breeding status of Willow Flycatchers (*Empidonax traillii*) detected in the study area on the upper San Luis Rey River, San Diego County, California, 2020.

[Survey location: RRR, Rey River Ranch; CNF, Cleveland National Forest; VID, Vista Irrigation District; VLH, VID Lake Henshaw]

Survey location	Number of						Breeding status	
	Transient flycatchers	Territorial flycatchers	Males	Females	Juveniles	Territories	Paired	Undetermined
RRR	0	6	3	3	2	4	3	1
CNF	0	5	2	3	0	3	3	0
VID	0	0	0	0	0	0	0	0
VLH	0	51	24	27	8	28	27	1
Total	0	62	29	33	10	35	33	2

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**Table 2.** Locations, breeding status, and band status of Southwestern Willow Flycatchers (*Empidonax traillii extimus*) detected in the study area on the upper San Luis Rey River, San Diego County, California, 2020.

[Survey location: CNF, Cleveland National Forest; RRR, Rey River Ranch; VLH, VID Lake Henshaw. Breeding status: P, pair; U, undetermined. Sex: F, female; M, male. Banded bird (s) present: N, no; U, unknown; Y, yes; —, no additional comment; WGS 84, World Geodetic System of 1984]

Survey location	Territory	Number of adults	Breeding status	Sex	Banded bird(s) present	Latitude	Longitude	Comments
CNF	CNF01F	2	P	M, F	Y	33.24706	–116.78449	Male banded. Polygynous male (CNF02F).
CNF	CNF02F	1	P	F	N	33.24606	–116.78314	Second female of CNF01F.
CNF	CNF03F	2	P	M, F	Y	33.24722	–116.78484	Male and female banded.
RRR	RRR01F	2	P	M, F	Y	33.26675	–116.81814	Male banded.
RRR	RRR02F	2	P	M, F	Y	33.26592	–116.81615	Male and female banded. Polygynous male (RRR04F).
RRR	RRR03F	1	U	M	N	33.26316	–116.81028	—
RRR	RRR04F	1	P	F	N	33.26567	–116.81600	Second female of RRR02F.
VLH	LHW01F	2	P	M, F	N	33.24883	–116.75090	—
VLH	LHW02F	2	P	M, F	U	33.24791	–116.74911	—
VLH	LHW03F	2	P	M, F	N	33.24712	–116.74941	—
VLH	LHW04F	2	P	M, F	N	33.24817	–116.74542	—
VLH	LHW05F	2	P	M, F	N	33.24680	–116.74411	Polygynous male (LHW10F).
VLH	LHW06F	2	P	M, F	Y	33.24616	–116.74439	Male banded.
VLH	LHW07F	2	P	M, F	Y	33.24579	–116.74979	Female banded.
VLH	LHW08F	2	P	M, F	N	33.24729	–116.74999	—
VLH	LHW09F	1	U	M	N	33.24525	–116.74683	—
VLH	LHW10F	1	P	F	Y	33.24695	–116.74401	Female banded. Second female of LHW05F.
VLH	LHW11F	2	P	M, F	N	33.24726	–116.73637	—
VLH	LHW12F	2	P	M, F	Y	33.24720	–116.73468	Female banded. Polygynous male (LHW13F).
VLH	LHW13F	1	P	F	N	33.24699	–116.73480	Second female of LHW12F.
VLH	LHW14F	2	P	M, F	U	33.24842	–116.74820	—
VLH	LHW15F	2	P	M, F	Y	33.24801	–116.74698	Male banded.
VLH	LHW17F	2	P	M, F	N	33.24739	–116.74589	—
VLH	VLH01F	2	P	M, F	N	33.22946	–116.73439	—
VLH	VLH02F	2	P	M, F	N	33.23127	–116.73579	—
VLH	VLH03F	2	P	M, F	N	33.23716	–116.73846	—
VLH	VLH04F	2	P	M, F	Y	33.23746	–116.73818	Male banded. Polygynous male (VLH05F).
VLH	VLH05F	1	P	F	N	33.23764	–116.73801	Second female of VLH04F.
VLH	VLH06F	2	P	M, F	Y	33.23837	–116.73724	Male and female banded.
VLH	VLH07F	2	P	M, F	N	33.23821	–116.73715	Polygynous male (VLH08F).
VLH	VLH08F	1	P	F	N	33.23830	–116.73752	Second female of VLH07F.
VLH	VLH09F	2	P	M, F	Y	33.23857	–116.73773	Female banded.
VLH	VLH10F	2	P	M, F	N	33.23791	–116.73797	—
VLH	VLH11F	2	P	M, F	N	33.22791	–116.73167	—
VLH	VLH12F	2	P	M, F	Y	33.23761	–116.73778	Male banded.

A total of 51 flycatchers were detected at VLH (fig. 2; tables 1, 2), including 24 males and 27 females. There were 28 territories established, containing 27 pairs (23 monogamous pairings and 4 confirmed polygynous pairings consisting of 1 male and 2 females) and 1 male of undetermined breeding status. Eight juveniles were detected during surveys (table 1).

Flycatchers used four different habitat types in the survey area. Eighty percent (28/35) of the flycatchers were detected in habitat characterized as mixed willow riparian, 11 percent (4/35) were detected in willow-oak, 6 percent (2/35) were detected in willow-ash, and 3 percent (1/35) were detected in willow-sycamore. Eighty-three percent (29/35) of flycatcher territories were detected in habitat with greater than 50-percent native plant cover (table 3).

The most commonly recorded dominant species at flycatcher territories included Gooding's black willow, red or arroyo willow, coast live oak, and velvet ash. The most prevalent exotic species were tamarisk, ox-tongue (*Picris echioides*), and black mustard (*Brassica nigra*).

## Breeding Activities

Seventeen flycatcher nests were located incidentally during surveys. Nest building was observed during the first survey period. Of the 17 nests, 2 successfully fledged at least 1 flycatcher young, 3 nests were seen with nestlings on the last survey, 10 nests failed, and the outcome of the remaining 2 nests was unknown. A minimum of 10 flycatcher juveniles were seen during the study period (table 1), including 4 from incidentally found nests, and 4 detected during surveys.

## Brown-headed Cowbirds

Cowbirds were detected at all four survey locations. Four active flycatcher nests and one failed nest were each observed to contain one cowbird egg. The cowbird eggs were removed from the four active nests: three nests failed despite removal, and one of these "rescued" nests was re-parasitized and contained a second cowbird egg on the next survey visit. The outcome of the fourth nest was unknown because the cowbird egg was removed on the last survey.

## Banded Birds

Seventeen banded flycatchers were detected on the upper San Luis Rey River in 2020 (tables 4, 5). Nine banded flycatchers (seven males and two females) that were banded

before 2020, with a unique color-band combination, were resighted in 2020, eight of which were previously detected on the upper San Luis Rey River in 2019 (table 4). Of the nine color-banded flycatchers, six were detected in the former nest monitoring study area (four males and two females). Two males and one female were originally banded as adults in 2016, and one male was originally banded as an adult in 2018. One male was resighted as banded, but only a partial combination was observed, and the identity of the male could not be confirmed (CNF01/02F). One female was originally banded as a nestling in 2017 and color banded in 2019 (CNF03F). The CNF03F female was also resighted wintering in Nicaragua in February 2020 (M.J. Whitfield, Southern Sierra Research Station, written commun., 2020). The remaining three full color-band combination adults (all males) were detected at VLH. One male (VLH12F) was originally banded as an adult at CNF in 2016. Two males were originally banded as nestlings but had been captured in 2019 and given unique color-band combinations: one was originally banded as a nestling in 2017 and color banded at VLH (VLH06F) and one was originally banded as a nestling in 2018 and color banded at CNF (VLH04/05F). Most of the adult flycatchers returned to the same location they occupied in 2019; however, two males moved from 4.0 to 4.7 km from CNF to VLH (table 4).

One additional male (LHW06F) was resighted with a single dark blue band on the right leg and is most likely a nestling that was originally banded in 2017; however, it is possible that he is an adult that was originally banded in 2015, with only a single band (table 4).

Seven natal flycatchers (one male and six females) were detected on the upper San Luis Rey River in 2020 (table 5). Only one natal flycatcher was detected in the former nest monitoring study area, which was the female at RRR02F that was originally banded as a nestling in 2017 (table 5). The remaining six natal birds (one male and five females) were detected at VLH. Of the six natal birds, one male and two females were originally banded in either 2016 or 2018, and the remaining three females were originally banded in 2017 (table 5). The dispersal distances moved by natal flycatchers from the former nest monitoring study area to VLH were estimated to range from 2.2 km (minimum) to 8.2 km (maximum).

Banded flycatcher ages ranged from 2 to 5 years old (tables 4, 5).



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**Table 3.** Habitat characteristics of Southwestern Willow Flycatchers (*Empidonax traillii extimus*) on the upper San Luis Rey River, San Diego County, California, 2020.

[Survey location: RRR, Rey River Ranch; CNF, Cleveland National Forest; VLH, VID Lake Henshaw. **Mixed willow riparian:** Habitat dominated by one or more willow species, including Gooding's black willow, arroyo willow, and red willow, with mule fat as frequent co-dominant. **Willow-ash:** Willow riparian habitat in which velvet ash is a co-dominant. **Willow-oak:** Willow riparian habitat in which coast live oak is a co-dominant. **Willow-sycamore:** Willow riparian habitat in which California sycamore is a co-dominant. **Percent native cover:** 1, greater than 95-percent native plant cover; 2, 50-95 percent native plant cover; —, no data]

Survey location	Territory	Habitat type	Dominant species	Percent native cover	Dominant exotic species
RRR	RRR04F	Willow-oak	Coast live oak, red or arroyo willow	1	—
RRR	RRR01F	Willow-oak	Coast live oak, red or arroyo willow	1	Black mustard
RRR	RRR02F	Willow-oak	Coast live oak, red or arroyo willow	1	—
RRR	RRR03F	Willow-sycamore	Gooding's black willow, California sycamore	1	—
CNF	CNF01F	Willow-ash	Velvet ash, red or arroyo willow	1	—
CNF	CNF02F	Willow-ash	Velvet ash, red or arroyo willow	1	—
CNF	CNF03F	Willow-oak	Coast live oak, red or arroyo willow	1	—
VLH	VLH01F	Mixed willow	Gooding's black willow	2	Ox-tongue
VLH	VLH02F	Mixed willow	Gooding's black willow	1	—
VLH	VLH03F	Mixed willow	Gooding's black willow	1	—
VLH	VLH04F	Mixed willow	Gooding's black willow	1	—
VLH	VLH05F	Mixed willow	Gooding's black willow	1	—
VLH	VLH06F	Mixed willow	Gooding's black willow	2	Ox-tongue
VLH	VLH07F	Mixed willow	Gooding's black willow	1	—
VLH	VLH08F	Mixed willow	Gooding's black willow	1	—
VLH	VLH09F	Mixed willow	Gooding's black willow	1	—
VLH	VLH10F	Mixed willow	Gooding's black willow	2	Ox-tongue
VLH	VLH12F	Mixed willow	Gooding's black willow	1	—
VLH	LHW09F	Mixed willow	Gooding's black willow	1	—
VLH	LHW03F	Mixed willow	Gooding's black willow	1	—
VLH	LHW07F	Mixed willow	Gooding's black willow	1	—
VLH	LHW17F	Mixed willow	Gooding's black willow	1	—
VLH	LHW01F	Mixed willow	Gooding's black willow	1	—
VLH	LHW02F	Mixed willow	Gooding's black willow	1	—
VLH	LHW08F	Mixed willow	Gooding's black willow	1	—
VLH	LHW14F	Mixed willow	Gooding's black willow	1	—
VLH	LHW15F	Mixed willow	Gooding's black willow	1	—
VLH	LHW04F	Mixed willow	Gooding's black willow	1	—
VLH	LHW10F	Mixed willow	Gooding's black willow	1	—
VLH	LHW05F	Mixed willow	Gooding's black willow	1	—
VLH	LHW06F	Mixed willow	Gooding's black willow	1	—
VLH	LHW11F	Mixed willow	Gooding's black willow	1	—
VLH	LHW12F	Mixed willow	Gooding's black willow	2	Tamarisk
VLH	LHW13F	Mixed willow	Gooding's black willow	2	Tamarisk
VLH	VLH11F	Mixed willow	Gooding's black willow	2	Tamarisk



**Table 4.** Band status and movement of adult Southwestern Willow Flycatchers (*Empidonax traillii extimus*) detected on the upper San Luis Rey River, San Diego County, California, 2020.

[Age originally banded: A, adult; N, nestling; U, unknown. Color-band combination: Left Leg: Right Leg (colors read top to bottom). Metal band acronyms: Mdb, numbered dark blue band. Pin-striped metal band acronyms: dbwh, dark blue-white split; dgor, dark green-orange split; dgye, dark green-yellow split; ordb, orange-dark blue split; puye, purple-yellow split; redg, red-dark green split; whwh, white; yepu, yellow-purple split. Sex: F, female; M, male. Year/location originally banded/previously seen: CNF, Cleveland National Forest; MON, former nest monitoring area; RRR, Rey River Ranch; UNK, unknown year; VID, Vista Irrigation District. 2020 Location/territory: CNF, Cleveland National Forest; RRR, Rey River Ranch; VLH, VID Lake Henshaw; — no data]

2020 Location/territory	Sex	Minimum age in 2020 (years)	Color-band combination	Age originally banded	Year/location originally banded	Year/location previously seen	Distance moved (kilometers)
CNF/CNF01F and CNF02F	M	3	Undetermined	U	UNK/MON	—	—
CNF/CNF02F	F	5	Mdb: yepu	A	2016/CNF	2019/VID	0.5
CNF/CNF03F	F	3	dgor: Mdb	N	2017/RRR	2019/CNF	0.0
CNF/CNF03F	M	3	Mdb: whwh	A	2018/CNF	2019/CNF	0.0
RRR/RRR01F	M	5	redg: Mdb	A	2016/RRR	2019/RRR	0.0
RRR/RRR02F and RRR04F	M	5	ordb: Mdb	A	2016/RRR	2019/RRR	0.0
VLH/LHW06F	M	3	none: Mdb	U	2015 or 2017/MON	—	—
VLH/VLH04F and VLH05F	M	2	Mdb: dgye	N	2018/RRR	2019/CNF	4.7
VLH/VLH06F	M	3	puye: Mdb	N	2017/CNF	2019/VLH	0.0
VLH/VLH12F	M	5	Mdb: dbwh	A	2016/CNF	2019/CNF	4.0

**Table 5.** Band status and movement of natal Southwestern Willow Flycatchers (*Empidonax traillii extimus*) detected on the upper San Luis Rey River, San Diego County, California, 2020.

[Color-band combination: Left Leg: Right Leg (colors read top to bottom). Metal band acronyms: Mdb, numbered dark blue band. Sex: F, female; M, male. 2020 Location/territory: RRR, Rey River Ranch; VLH, VID Lake Henshaw. Year/location originally banded: CNF, Cleveland National Forest; MON, former nest monitoring area; RRR, Rey River Ranch. Distance moved (kilometers): Confirmed includes only flycatchers whose natal location was confirmed by recapture and values represent the distance between the flycatchers natal location and their first adult location; minimum and maximum values represent natal flycatchers who were unable to be captured to confirm their exact natal location, but they originated at MON; maximum, maximum distance calculated between the farthest successful nest from the birds natal year to their first adult location; minimum, minimum distance calculated between the closest successful nest from the birds natal year to the first adult location. Abbreviations: km, kilometer; —, no data]

2020 Location/territory	Sex	Minimum age in 2020 (years)	Color-band combination	Year/location originally banded	Distance moved (km)		
					Confirmed	Minimum distance moved	Maximum distance moved
RRR/RRR02F	F	3	none: Mdb	2017/MON	—	0.3	4.9
VLH/LHW07F	F	2	Mdb: none	2016 or 2018/MON	—	2.2	6.8
VLH/LHW10F	F	2	Mdb: none	2016 or 2018/MON	—	2.8	7.3
VLH/LHW12F	F	3	none: Mdb	2017/MON	—	3.6	8.2
VLH/LHW15F	M	2	Mdb: none	2016 or 2018/MON	—	2.6	7.0
VLH/VLH06F	F	3	none: Mdb	2017/RRR	8.2	—	—
VLH/VLH09F	F	3	none: Mdb	2017/CNF	4.7	—	—

## Summary

The population of Southwestern Willow Flycatchers on the upper San Luis Rey River (near Lake Henshaw) changed little from 2019 (38 territories) to 2020 (35 territories). The distribution of birds in the study area differed compared to 2019, however. The number of territories downstream from Lake Henshaw, in the former nest monitoring study area, decreased 50 percent from 2019 (14) to 2020 (7). In contrast, the number of territories observed at VLH increased by 17 percent, from 24 (2019) to 28 (2020). Our banding studies provided supporting evidence of this shift in distribution because most of the natal flycatchers located during surveys held territories at VID Lake Henshaw (VLH). Additionally, adult flycatchers that previously held territories downstream, dispersed to VLH in 2020. It remains unclear what is driving this shift in distribution; however, anecdotal observations of

dead and dying oaks (possibly from goldspotted oak borer; *Agrilus auroguttatus*) downstream, in recent years, could offer a plausible reason for the shift.

The Southwestern Willow Flycatcher population in California appears to be experiencing a statewide decline that is not isolated to the upper San Luis Rey River near Lake Henshaw. Populations on the lower San Luis Rey River (B.E. Kus, U.S. Geological Survey, unpub. data, 2020), Santa Margarita River on Marine Corps Base Camp Pendleton (B.E. Kus, U.S. Geological Survey, unpub. data, 2020), and the Kern River (M.J. Whitfield, Southern Sierra Research Station, written commun., 2020) have experienced steep declines or have been extirpated in recent years. The population along the upper San Luis Rey River near Lake Henshaw is currently the largest recorded Southwestern Willow Flycatcher population in California, making it central to understanding the conditions that favor and promote flycatchers and their habitat.

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