

**Ecosystems Mission Area—Species Management Research Program**

**Distribution and Abundance of Southwestern  
Willow Flycatchers (*Empidonax traillii extimus*) on  
the Upper San Luis Rey River, San Diego County,  
California—2023 Data Summary**



Data Report 1194

U.S. Department of the Interior  
U.S. Geological Survey

**Cover.** Flooded Southwestern Willow Flycatcher habitat at Lake Henshaw. Photograph by Scarlett Howell, U.S. Geological Survey, May 24, 2023.

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By Scarlett L. Howell and Barbara E. Kus

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## U.S. Geological Survey, Reston, Virginia: 2024

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## Conversion Factors

International System of Units to U.S. customary units

<b>Multiply</b>	<b>By</b>	<b>To obtain</b>
	Length	
centimeter (cm)	0.3937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)

## Datum

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83) and the World Geodetic System of 1984 (WGS 84).

## Abbreviations

CNF	Cleveland National Forest
RRR	Rey River Ranch
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—2023 Data Summary

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## 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 2023. Surveys were completed at four locations: three downstream from Lake Henshaw, where surveys previously occurred from 2015 to 2022 (Rey River Ranch [RRR], Cleveland National Forest [CNF], Vista Irrigation District [VID]), and one at VID Lake Henshaw (VLH) that has been surveyed annually since 2018. There were a minimum of 74 territorial flycatchers detected at 1 location (VLH), and 12 transient flycatchers of unknown subspecies detected at 2 locations (CNF and VLH). At VLH, we detected a minimum of 31 males, 40 females, and 3 flycatchers of unknown sex. In total, 51 territories were established, containing 40 pairs and 11 flycatchers of undetermined breeding status (8 males and 3 flycatchers of unknown sex). Of the 40 pairs, 9–11 pairs were monogamous (1 male and 1 female), and 29–31 pairs were polygynous (1 male paired with more than 1 female). For the first time since annual surveys began in 2015, no territorial flycatchers were detected downstream from Lake Henshaw. Brown-headed cowbirds (*Molothrus ater*; cowbird) were detected at all four survey locations. No banded flycatchers were detected during surveys.

Flycatchers used three habitat types in the survey area: (1) mixed willow riparian, (2) willow-cottonwood, and (3) oak-sycamore. Of the flycatcher locations, 86 percent were in habitat characterized as mixed willow riparian, and 95 percent were in habitat with greater than 95-percent native plant cover. Exotic vegetation was not prevalent in the survey area.

There were five nests incidentally located during surveys: one failed, one was seen with eggs on the last visit, and the outcome of the remaining three nests was unknown. One of

these nests was parasitized by cowbirds, and a second nest was suspected to contain a cowbird nestling. Adult flycatchers in two territories were observed feeding cowbird fledglings. No juvenile flycatchers were detected during surveys.

## 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 including 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 within the past five 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; Remsen, 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 in 1995. After listing, population estimates for flycatchers in California increased to 256 territories, with the increase largely attributed to expanded survey effort rather than population growth at known sites (U.S. Fish and Wildlife Service, 2002). In the 2014 5-year status review, estimates of California flycatcher territories decreased to 172, with declines occurring statewide (Durst and others, 2008; U.S. Fish and Wildlife Service, 2014).

Flycatchers in southern California co-occur with the Least Bell's Vireo (*Vireo bellii pusillus*; vireo), another riparian obligate endangered by habitat loss and cowbird parasitism. 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. As of 2021, most flycatchers in California are concentrated at two known sites: (1) the upper San Luis Rey River at Lake Henshaw in San Diego County (Howell and Kus, 2022b) and (2) the Owens River Valley in Inyo County (M. Whitfield, Southern Sierra Research Station, written commun., 2021). Outside of these sites, flycatchers occur as small, isolated populations of five territories or less.

Male flycatchers begin arriving in southern California in early to mid-May, whereas females arrive approximately 1 week later. While on the breeding grounds, males sing repeatedly from exposed perches. Once the pair bond is established, the female builds an open cup nest that is usually 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 for their wintering grounds in Central America and northern South America.

Flycatcher breeding habitat is characterized by patches of dense riparian vegetation along rivers, streams, and reservoir inflows, interspersed with small openings, open water, or areas of sparse vegetation. Vegetation species composition varies across the range, but most breeding habitats include tree or shrub cover that is at least 3 m tall, with patches of dense vegetation within 3–4 m of the ground. In addition, flycatcher breeding habitat is almost always near or adjacent to areas of standing water or saturated soil (U.S. Fish and Wildlife Service, 2002; Sogge and others, 2010).

The goal of the 2023 effort was to assess the population status, banding status, breeding status, and habitat attributes of the flycatcher population along the upper San Luis Rey River, in an area downstream from Lake Henshaw, where demographic monitoring occurred from 2015 to 2019 (Howell and others, 2022; Howell and Kus, 2022b), and the habitat surrounding Lake Henshaw. This report is the annual update to surveys that have been completed since 2015 (Howell and Kus, 2021, 2022a, b, 2023). The data contained in this report can be found in the associated data release (Howell and Kus, 2022b).

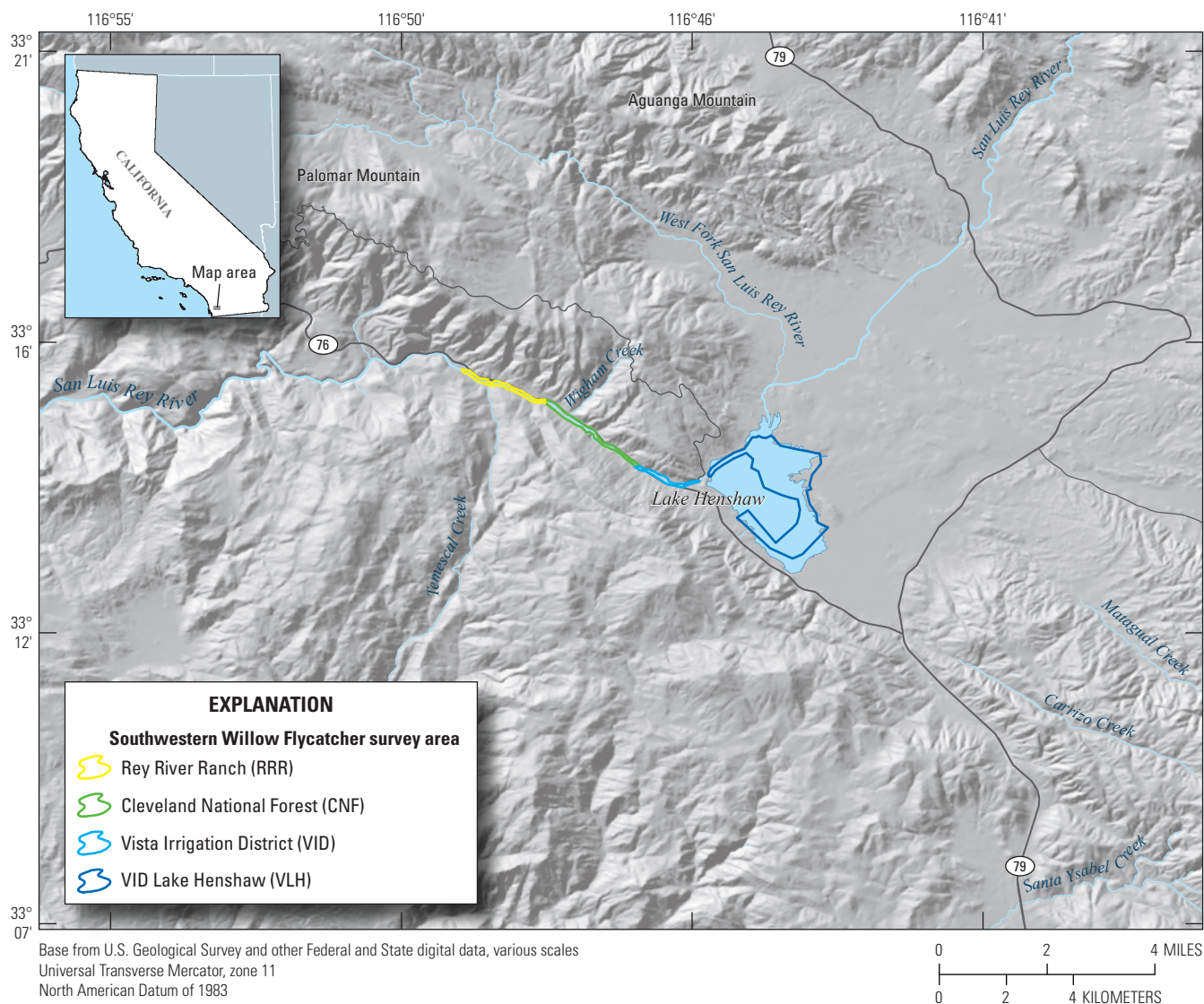
These data, when compared with data from other sites, will inform natural resource managers about the status of the flycatcher on the upper San Luis Rey River and guide modification of land-use and management practices as appropriate to ensure the species' continued existence.

## Methods

### Study Area

The study area consisted of an approximately 6.9-kilometer (km) 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 2023. Three locations were downstream from Lake Henshaw (Rey River Ranch [RRR], Cleveland National Forest [CNF], and Vista Irrigation District [VID]) and were previously surveyed annually from 2015 to 2022. One location was upstream from the dam, VID Lake Henshaw (VLH), and was previously surveyed annually from 2018 to 2022. The study area included property managed by 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. In most years, spring and summer flows were swift and slow-moving backwater/marshy habitats were absent. In 2023, however, there was very little water in the downstream part of the San Luis Rey River, and some sections were dry by the end of July because of a reduced release schedule coordinated among the Vista Irrigation District, the City of Escondido, and tribal representatives during treatment for a harmful algal bloom at the lake (D. Smith, Vista Irrigation District, written commun., 2023). 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 California wildrose (*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 Lake Henshaw was dominated by Goodding's black willow (*Salix gooddingii*), with some arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), Fremont cottonwood (*Populus fremontii*), and coast live oak 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*) present. In 2023, above average precipitation (114.5 centimeters [cm], 172 percent of mean from 1960 to 2022 [66.7 cm]; J. Sherwood, Vista Irrigation District, written commun., 2023) partially inundated flycatcher habitat at Lake Henshaw. All understory vegetation was submerged but the tops of mature willow, cottonwood, oak, and tamarisk trees extended above the water line in some sections.



**Figure 1.** Location of the Southwestern Willow Flycatcher (*Empidonax traillii extimus*) survey area on the upper San Luis Rey River, San Diego County, California, 2023.

## Surveys

U.S. Geological Survey biologists Lisa Allen, Scarlett Howell, Barbara Kus, Megan Logsdon, Suellen Lynn, Shannon Mendia, and Ryan Pottinger completed flycatcher surveys following a standardized call back survey protocol for Southwestern Willow Flycatchers (Sogge and others, 2010). The survey protocol is designed to increase the likelihood of detecting Willow Flycatchers and aid in determining their breeding status by performing repeated surveys during the early to mid-nesting season, with four surveys carried out at least 5 days apart during three consecutive survey periods between May 15 and July 31. One survey was carried out between May 15 and May 31, one survey between June 1 and June 24, and two surveys between June 25 and July 31. Flycatcher surveys were completed under U.S. Fish and

Wildlife Service (USFWS) 10(a)1(A) Recovery Permit ESPER0004080\_0.2. Surveys were completed between dawn and early afternoon, avoiding periods of inclement weather such as temperatures below freezing, rain, or strong winds that inhibit detection of flycatchers. Surveys were done by walking next to the river or lake, 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. In flooded habitat, surveys were done by boat, primarily by moving along the outside edge of the habitat patch and entering the interior habitat whenever possible. Because we were unable to access the interior habitat in many sections at Lake Henshaw, the number of flycatcher detections in 2023 should be considered a minimum.

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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. During boat surveys, investigators stopped the boat engine and floated quietly during the listening period. If there were no birds detected during the initial listening period, investigators broadcasted flycatcher song (fitz-bew) using an MP3 player or Android phone and an amplified speaker at the volume of typical bird songs for approximately 10–15 seconds and 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. Additional flycatcher vocalizations were broadcasted occasionally during boat-based surveys to elicit response and confirm flycatcher presence. This procedure was repeated (including a 10-second quiet pre-broadcast listening period) every 20–30 m throughout land-based survey sites or 80–100 m throughout boat-based survey sites, and more frequently 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. At most flycatcher territories, flycatchers in adjacent territories could be heard vocalizing simultaneously.

For each flycatcher encountered, observers recorded age (adult or juvenile), sex (male, female, or unknown), breeding status (paired, undetermined, or transient), and whenever possible, whether the bird was banded. Flycatchers were considered paired if a second flycatcher was present and unchallenged by the territorial male during more than one survey period, if male/female interactions were observed, if an adult flycatcher was observed carrying nesting material or food, if an active flycatcher nest was located, or if adults were observed actively feeding fledglings. To avoid overcounting male flycatchers, observers also attempted to determine pairing type (monogamous or polygynous). Monogamous pairings consisted of one male paired with one female, whereas polygynous pairings consisted of one male paired with more than one female. Behaviors used to establish polygyny included males interacting with more than one female simultaneously or sequentially. For example, during a territory visit observers often documented a male/female interaction in territory “A” while simultaneously hearing a third flycatcher vocalizing (for example, whitting) in the adjacent territory “B,” and when the territory A interaction ended, a male/female interaction was subsequently heard in territory B, and the female in territory A simultaneously began vocalizing. Although we were able to determine pairing type in most territories, occasionally we were unable to determine which adjacent male a female was paired with, especially in locations where multiple territories were clustered together.

For example, a female in territory B was known to be paired because we documented male/female interactions at her location, but she could be paired with the territory A male directly south who was initially thought to be monogamous, or with the territory “C” male directly north who was already known to be polygynous with two different females. Flooded conditions that prevented us from accessing interior habitat further complicated the determination of pairing type in 2023, because we were often unable to use banded bird resights, nest locations, or other territory observations to determine which male (A or C) was paired with female B. For this reason, we present a range for the number of monogamous and polygynous pairs. Flycatcher breeding status was considered undetermined when behaviors such as spontaneous singing or other territory defense were observed during the non-migrant period (approximately June 15 to July 20; Sogge and others, 2010) but no pair behaviors were confirmed. A flycatcher was considered transient if detected only once, or if more than once, detections were less than 2 weeks apart. Flycatcher locations were mapped using Environmental Systems Research Institute Field Maps (Environmental Systems Research Institute, 2022) on an Android phone with 1- to 15-m accuracy to determine geographic coordinates (World Geodetic System of 1984). 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, red willow, and sandbar willow (*Salix exigua*), with mule fat (*Baccharis salicifolia*) as a frequent co-dominant.

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

**Willow-cottonwood:** Willow riparian habitat in which Fremont cottonwood 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.

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

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

## Incidental Nesting Activities

We documented any evidence of nesting (for example, a female with nest material or a completed nest, adults carrying food, or dependent juveniles in the territory) observed during surveys. Incidental nest locations observed during surveys were recorded and the contents observed whenever possible.

## Brown-headed Cowbirds

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

## Banded Bird Resighting

Flycatchers were banded at three locations (RRR, CNF, and VID) as part of a separate demographic study from 2015 to 2019 (Howell and others, 2022). In that study, adults were captured at monitored territories using mist nets and song playback and were banded with a unique color-band combination. Nestlings from accessible nests 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 using the same methods described for adults and given a second leg band to yield a unique color-band combination. In 2023, we attempted to resight all flycatchers to identify individuals based on color-band combinations. Color-band resighting data were used to determine age and document movement from banding sites.

## Results

### Abundance and Distribution

In 2023, there were a minimum of 74 territorial flycatchers and 12 transient flycatchers of unknown subspecies observed along the upper San Luis Rey River (fig. 2; tables 1, 2). Of the 74 territorial flycatchers, 31 were male, 40 were female, and 3 were of unknown sex. The flycatcher population at the upper San Luis Rey River increased by 4 percent from 2022 (71 territorial flycatchers; Howell and Kus, 2022b, 2023) to 2023 (Howell and Kus, 2022b). For the first time since annual surveys began in 2015, no territorial flycatchers were detected at any of the survey locations downstream from Lake Henshaw; all territorial detections were at VLH. There were 51 territories established at VLH, containing 40 pairs (23 males and 40 females) and 11 flycatchers of undetermined breeding status (8 males and 3 flycatchers of unknown sex). Of the 40 pairs, 9–11 were monogamous pairings, and 29–31 were polygynous pairings consisting of 9–11 males each pairing with 2 different females, and 1–3 males each pairing with 3 different females. Of the 12 transient flycatchers, 11 were detected at VLH, and 1 was detected at CNF (fig. 2; tables 1, 2).

The distribution of flycatcher territories along the upper San Luis Rey River has shifted since 2018 when Lake Henshaw was first surveyed. From 2018 to 2023, the combined population of flycatchers downstream from Lake Henshaw decreased annually before falling to zero territories in 2023, whereas the population upstream from the dam at VLH increased from 2018 to 2021, declined slightly in 2022, and increased again in 2023 (fig. 3).

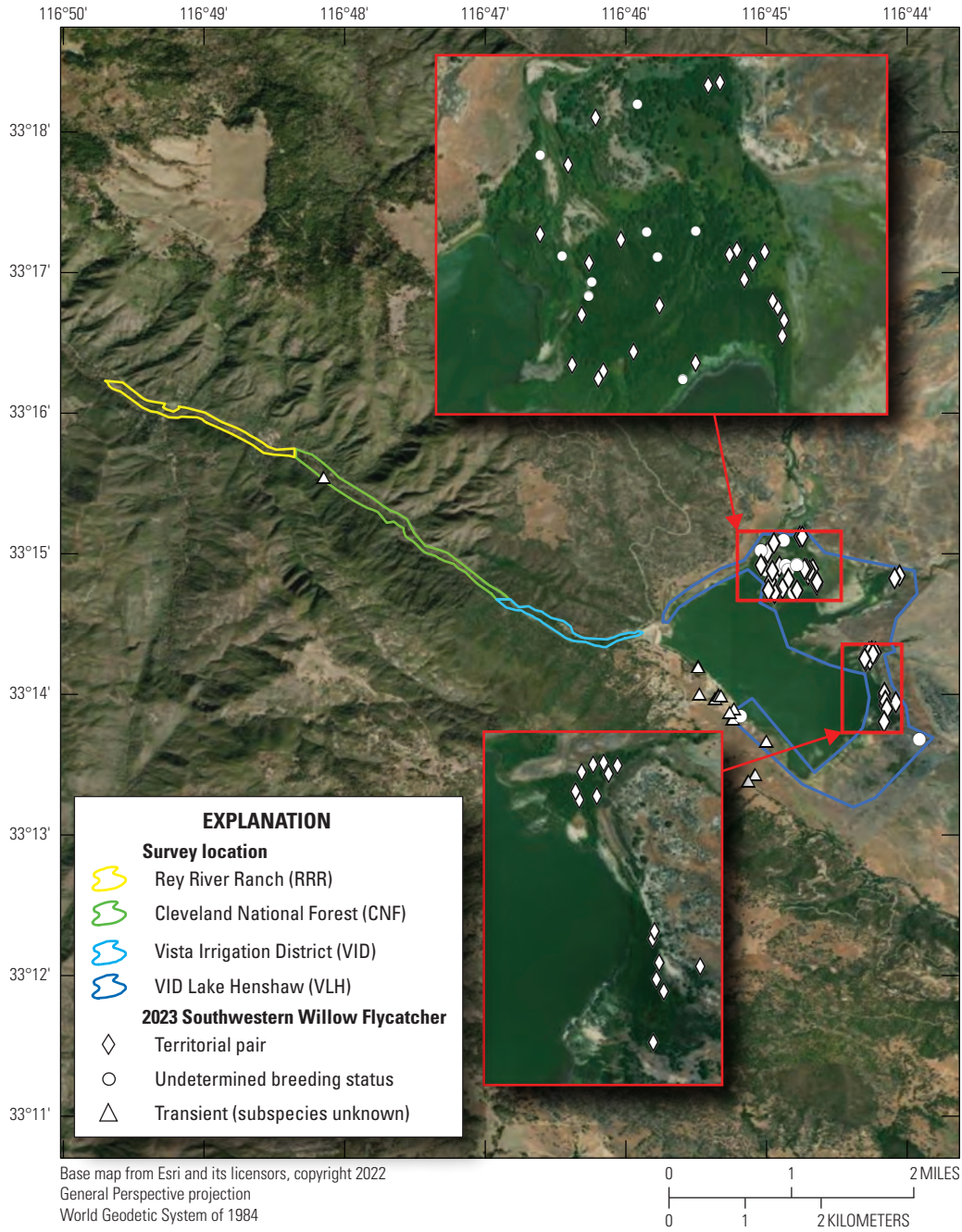
**Table 1.** Total number and breeding status of Willow Flycatchers (*Empidonax traillii*) detected in the study area on the upper San Luis Rey River, San Diego County, California, 2023.

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

Abbreviations: Unk., unknown; Juv., juveniles]

Survey location	Number of							Breeding status	
	Transient flycatchers	Territorial flycatchers	Males	Females	Unk. sex	Juv.	Territories	Paired	Undetermined
CNF	1	0	0	0	0	0	0	0	0
RRR	0	0	0	0	0	0	0	0	0
VID	0	0	0	0	0	0	0	0	0
VLH	11	74	31	40	3	0	51	40	11
Total	12	74	31	40	3	0	51	40	11

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**Figure 2.** Southwestern Willow Flycatcher (*Empidonax traillii extimus*) detections and breeding status on the upper San Luis Rey River, San Diego County, California, 2023.

Flycatchers used three habitat types in the survey area. Of the flycatcher locations, 86 percent (54/63) occurred in habitat characterized as mixed willow riparian, 10 percent (6/63) in willow riparian habitat co-dominated by cottonwood and the remainder occurred in oak-sycamore (table 3). The most frequently recorded dominant vegetation species at flycatcher locations was Goodding's black willow. Exotic vegetation was not prevalent in the survey area; 95 percent (60/63) of flycatcher locations occurred in habitat with greater than 95-percent native plant cover (table 3).

## Incidental Nesting Activities

Observers incidentally located five flycatcher nests during surveys at VLH. Of the five nests, one nest failed, one nest was seen with eggs on the last survey, and the outcome of the remaining three nests was unknown. No flycatcher juveniles were observed at any of the survey locations in 2023.

## Brown-headed Cowbirds

Cowbirds were detected at all four survey locations. One of the five incidentally located flycatcher nests contained one cowbird egg. We also suspected that one nest contained a cowbird nestling but could not confirm. Flycatchers in two additional territories at VLH were each observed feeding a cowbird fledgling.

## Banded Birds

None of the five banded flycatchers at VLH in 2022, or any banded flycatchers present in previous years were observed in 2023. However, flooded conditions made entering the interior habitat difficult, and we were unable to access the exact territory locations where banded birds were observed in 2022.

**Table 2.** Locations, breeding status, and band status of Willow Flycatchers (*Empidonax traillii*) detected in the study area on the upper San Luis Rey River, San Diego County, California, 2023.

[Survey location: CNF, Cleveland National Forest; VLH, VID Lake Henshaw. Breeding status: T, transient (subspecies unknown); U, undetermined; P, pair. Sex: U, unknown; M, male; F, female. Banded bird(s) present: N, no; U, unknown. Other abbreviations: ID, identification; —, no additional comment; &, and]

Survey location	Bird ID	Number of adults	Breeding status	Sex	Banded bird(s) present	Comments
CNF	CNF01F	1	T	U	N	Detected July 5 only.
VLH	LHW01F	1	U	M	N	—
VLH	LHW02F	1	U	U	U	Possible female paired with LHW01F.
VLH	LHW03F	1	U	U	N	Possible second female of LHW26F.
VLH	LHW04F	2	P	M & F	U	Suspected polygyny with LHW28F.
VLH	LHW05F	1	U	M	U	—
VLH	LHW06F	2	P	M & F	U	Polygynous male (LHW06/32F).
VLH	LHW07F	1	U	M	U	—
VLH	LHW08F	1	U	M	U	—
VLH	LHW09F	2	P	M & F	U	—
VLH	LHW10F	2	P	M & F	U	—
VLH	LHW11F	2	P	M & F	U	Polygynous male (LHW11/12F).
VLH	LHW12F	1	P	F	U	Second female of LHW11F.
VLH	LHW13F	1	U	U	U	Possible second female of LHW14F.
VLH	LHW14F	2	P	M & F	U	—
VLH	LHW15F	2	P	M & F	U	Polygynous male (LHW15/31F).
VLH	LHW16F	2	P	M & F	U	Polygynous male (LHW16/17F).
VLH	LHW17F	1	P	F	N	Second female of LHW16F.
VLH	LHW18F	2	P	M & F	N	Polygynous male (LHW18/19/20F).
VLH	LHW19F	1	P	F	U	Second female of LHW18F.

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**Table 2.** Locations, breeding status, and band status of Willow Flycatchers (*Empidonax traillii*) detected in the study area on the upper San Luis Rey River, San Diego County, California, 2023.—Continued

[Survey location: CNF, Cleveland National Forest; VLH, VID Lake Henshaw. Breeding status: T, transient (subspecies unknown); U, undetermined; P, pair. Sex: U, unknown; M, male; F, female. Banded bird(s) present: N, no; U, unknown. Other abbreviations: ID, identification; —, no additional comment; &, and]

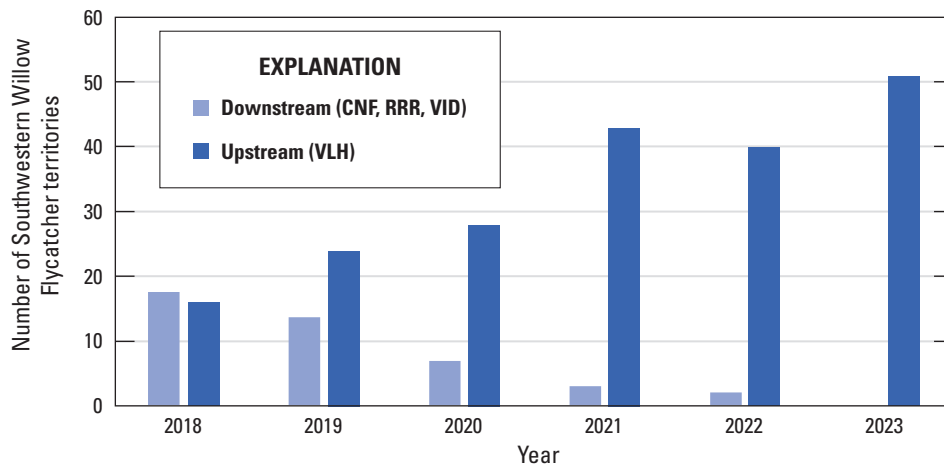
Survey location	Bird ID	Number of adults	Breeding status	Sex	Banded bird(s) present	Comments
VLH	LHW20F	1	P	F	U	Third female of LHW18F.
VLH	LHW21F	2	P	M & F	U	Polygynous male (LHW21/22F).
VLH	LHW22F	1	P	F	N	Second female of LHW21F.
VLH	LHW23F	1	U	M	N	—
VLH	LHW24F	2	P	M & F	U	—
VLH	LHW25F	2	P	M & F	U	—
VLH	LHW26F	2	P	M & F	U	—
VLH	LHW27F	1	U	M	N	—
VLH	LHW28F	1	P	F	U	Likely second female of LHW04F.
VLH	LHW29F	2	P	M & F	U	Polygynous male (LHW29/30F).
VLH	LHW30F	1	P	F	N	Second female of LHW29F.
VLH	LHW31F	1	P	F	U	Second female of LHW15F.
VLH	LHW32F	1	P	F	U	Second female of LHW06F.
VLH	MLH01F	2	P	M & F	N	Polygynous male (MLH01/02F).
VLH	MLH02F	1	P	F	N	Second female of MLH01F.
VLH	VLH01F	2	P	M & F	N	Polygynous male (VLH01/14F).
VLH	VLH02F	2	P	M & F	U	Suspected polygyny with VLH15F and also VLH06F.
VLH	VLH03F	2	P	M & F	U	—
VLH	VLH04F	2	P	M & F	N	Polygynous male (VLH04/17F).
VLH	VLH05F	2	P	M & F	N	Polygynous male (VLH05/10F).
VLH	VLH06F	1	P	F	U	Likely third female of either VLH02F or VLH04F.
VLH	VLH07F	1	U	M	N	—
VLH	VLH08F	2	P	M & F	U	—
VLH	VLH09F	2	P	M & F	N	Polygynous male (VLH09/12F).
VLH	VLH10F	1	P	F	N	Second female of VLH05F.
VLH	VLH11F	1	P	F	N	Likely third female of VLH05F.
VLH	VLH12F	1	P	F	N	Second female of VLH09F.
VLH	VLH13F	2	P	M & F	N	—
VLH	VLH14F	1	P	F	N	Second female of VLH01F.
VLH	VLH15F	1	P	F	N	Likely second female of VLH02F.
VLH	VLH17F	1	P	F	U	Second female of VLH04F.
VLH	VLH51F	1	T	U	U	—
VLH	VLH52F	1	U	M	N	—
VLH	VLH53F	1	T	U	U	—
VLH	VLH54F	1	T	U	U	—
VLH	VLH55F	1	T	U	U	—
VLH	VLH56F	1	T	U	N	—
VLH	VLH57F	1	T	U	N	—
VLH	VLH58F	1	T	U	U	—



**Table 2.** Locations, breeding status, and band status of Willow Flycatchers (*Empidonax traillii*) detected in the study area on the upper San Luis Rey River, San Diego County, California, 2023.—Continued

[Survey location: CNF, Cleveland National Forest; VLH, VID Lake Henshaw. Breeding status: T, transient (subspecies unknown); U, undetermined; P, pair. Sex: U, unknown; M, male; F, female. Banded bird(s) present: N, no; U, unknown. Other abbreviations: ID, identification; —, no additional comment; &, and]

Survey location	Bird ID	Number of adults	Breeding status	Sex	Banded bird(s) present	Comments
VLH	VLH59F	1	T	U	U	—
VLH	VLH60F	1	T	U	U	—
VLH	VLH61F	1	T	U	U	—
VLH	VLH62F	1	T	U	U	—



**Figure 3.** Distribution of Southwestern Willow Flycatcher (*Empidonax traillii extimus*) territories on the upper San Luis Rey River, San Diego County, California, 2018–23. Abbreviations: CNF, Cleveland National Forest; RRR, Rey River Ranch; VID, Vista Irrigation District; VLH, VID Lake Henshaw.

## 10 Distribution and Abundance of Southwestern Willow Flycatchers on the Upper San Luis Rey River

**Table 3.** Habitat characteristics of Willow Flycatcher (*Empidonax traillii*) locations on the upper San Luis Rey River, San Diego County, California, 2023.

[Survey location: CNF, Cleveland National Forest; VLH, VID Lake Henshaw. **Oak-sycamore:** Woodlands in which coast live oak and California sycamore occur as co-dominants. **Mixed willow riparian:** Habitat dominated by one or more willow species, including Goodding's black willow, arroyo willow, red willow, and sandbar willow, with mule fat as frequent co-dominant. **Willow-cottonwood:** Willow riparian habitat in which Fremont cottonwood is a co-dominant. **Other abbreviations:** ID, identification; >, greater than; —, no data]

Survey location	Bird ID	Habitat type	Dominant species	Percent native cover	Dominant exotic species
CNF	CNF01F	Oak-sycamore	Coast live oak	>95	—
VLH	LHW01F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW02F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW03F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW04F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW05F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW06F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW07F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW08F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW09F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW10F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW11F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW12F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW13F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW14F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW15F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW16F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW17F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW18F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW19F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW20F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW21F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW22F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW23F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW24F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW25F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW26F	Willow-cottonwood	Goodding's black willow	>95	—
VLH	LHW27F	Mixed Willow	Goodding's black willow	>95	—
VLH	LHW28F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW29F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW30F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW31F	Mixed willow	Goodding's black willow	>95	—
VLH	LHW32F	Mixed willow	Goodding's black willow	>95	—
VLH	MLH01F	Mixed willow	Goodding's black willow	50–95	Tamarisk
VLH	MLH02F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH01F	Willow-cottonwood	Goodding's black willow	>95	—
VLH	VLH02F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH03F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH04F	Mixed willow	Goodding's black willow	>95	—

**Table 3.** Habitat characteristics of Willow Flycatcher (*Empidonax traillii*) locations on the upper San Luis Rey River, San Diego County, California, 2023.—Continued

[Survey location: CNF, Cleveland National Forest; VLH, VID Lake Henshaw. **Oak-sycamore:** Woodlands in which coast live oak and California sycamore occur as co-dominants. **Mixed willow riparian:** Habitat dominated by one or more willow species, including Goodding's black willow, arroyo willow, red willow, and sandbar willow, with mule fat as frequent co-dominant. **Willow-cottonwood:** Willow riparian habitat in which Fremont cottonwood is a co-dominant. **Other abbreviations:** ID, identification; >, greater than; —, no data]

Survey location	Bird ID	Habitat type	Dominant species	Percent native cover	Dominant exotic species
VLH	VLH05F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH06F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH07F	Mixed willow	Goodding's black willow	5–50	Tamarisk
VLH	VLH08F	Willow-cottonwood	Goodding's black willow	50–95	Tamarisk
VLH	VLH09F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH10F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH11F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH12F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH13F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH14F	Willow-cottonwood	Fremont cottonwood	>95	—
VLH	VLH15F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH17F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH51F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH52F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH53F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH54F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH55F	Oak-sycamore	Coast live oak	>95	—
VLH	VLH56F	Willow-cottonwood	Goodding's black willow	>95	—
VLH	VLH57F	Willow-cottonwood	Goodding's black willow	>95	—
VLH	VLH58F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH59F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH60F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH61F	Mixed willow	Goodding's black willow	>95	—
VLH	VLH62F	Oak-sycamore	Coast live oak	>95	—

## Summary

In 2023, the overall population of Southwestern Willow Flycatchers on the upper San Luis Rey River near Lake Henshaw increased slightly compared to 2022 (4 percent; from 71 territorial flycatchers to 74 territorial flycatchers). For the first time since annual surveys began in 2015, no flycatcher territories were observed downstream from the dam. A complete shift in distribution was documented from 2018 to 2023, with all flycatchers in the upper San Luis Rey River study area moving to Lake Henshaw (Howell and Kus, 2021, 2022a, b, 2023; Howell and others, 2022). Flooded conditions at the Lake complicated survey efforts in 2023, and set up potential distribution shifts in future years, depending on the duration of flooding. Some trees, primarily cottonwoods and younger willows, were already beginning to show the effects of flooding (for example, yellow or brown foliage) by July, and may not survive prolonged inundation.

Except for Lake Henshaw, the Southwestern Willow Flycatcher population in California appears to be experiencing a statewide decline. Populations on the lower San Luis Rey River (Houston and others, 2023), the Santa Margarita River on Marine Corps Base Camp Pendleton (B.E. Kus, U.S. Geological Survey, unpub. data, 2022), and the Kern River (M.J. Whitfield, Southern Sierra Research Station, written commun., 2020) have steeply declined or have been extirpated in recent years. As of 2023, the population along the upper San Luis Rey River near Lake Henshaw is 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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