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Distribution and Abundance of Least Bell's Vireos (*Vireo bellii pusillus*) and Southwestern Willow Flycatchers (*Empidonax traillii extimus*) at the San Antonio Dam, Los Angeles and San Bernardino Counties, California—2021 Data Summary

Data Report 1148

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

Cover. Photograph showing a Least Bell's Vireo. Photograph by Alexandra Houston, U.S. Geological Survey, May 2010.

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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)
meter (m)	1.094	yard (yd)
Area		
hectare (ha)	2.471	acre

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

$$°C = (°F - 32) / 1.8.$$

Datum

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

Abbreviations

ESRI	Environmental Systems Research Institute
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Distribution and Abundance of Least Bell's Vireos (*Vireo bellii pusillus*) and Southwestern Willow Flycatchers (*Empidonax traillii extimus*) at the San Antonio Dam, Los Angeles and San Bernardino Counties, California—2021 Data Summary

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Executive Summary

We surveyed for Least Bell's Vireos (*Vireo bellii pusillus*; vireo) and Southwestern Willow Flycatchers (*Empidonax traillii extimus*; flycatcher) at the San Antonio Dam near Upland, California, in 2021. Four vireo surveys were conducted between April 16 and July 15, 2021, and three flycatcher surveys were conducted between May 27 and July 15, 2021.

We detected one transient vireo and one transient flycatcher. No territorial vireos or flycatchers were observed. The vireo was found in riparian scrub habitat dominated by native mule fat (*Baccharis salicifolia*), whereas the flycatcher was using habitat dominated by non-native tamarisk (*Tamarix ramosissima*).

Introduction

The Least Bell's Vireo (*Vireo bellii pusillus*; vireo) is a small, migratory songbird that breeds in southern California and northwestern Baja California, Mexico, from April through July. Historically abundant in lowland riparian ecosystems, vireo populations began declining in the late 1900s as a result of multiple anthropogenic factors, including habitat loss and alteration associated with urbanization and agricultural conversion of land adjacent to rivers, the expansion in range of the brood-parasitic Brown-headed Cowbird (*Molothrus ater*; cowbird), and the introduction of invasive exotic plant species, such as giant reed (*Arundo donax*), into riparian systems (U.S. Fish and Wildlife Service 1986, 1998; Franzreb, 1989; Kus, 1998, 1999; Riparian Habitat Joint Venture, 2004; Kus and others, 2020). By 1986, the vireo population in California numbered just 300 territorial males (U.S. Fish and Wildlife Service, 1986).

In response to the dramatic numeric decline of vireos in California, the California Fish and Game Commission listed the species as endangered in 1980, and the U.S. Fish and Wildlife Service (USFWS) followed suit in 1986. Since listing, the vireo population in southern California has rebounded, largely in response to cowbird control and habitat restoration and preservation (Kus and Whitfield, 2005). As of 2006, the statewide vireo population was estimated to be approximately 2,500–3,000 territories (U.S. Fish and Wildlife Service, 2006).

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 in recent decades in response to widespread habitat loss throughout its range and, possibly, brood-parasitism by cowbirds (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 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 at one site, the upper San Luis Rey River near Lake Henshaw in San Diego County (Howell and Kus, 2021). Outside of this site, 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 vireos arrive on breeding grounds in southern California in mid-March. Male vireos are vocally conspicuous and frequently sing their diagnostic primary song from exposed perches throughout the breeding season. Females arrive approximately 1–2 weeks after males and are more secretive but are often seen early in the season traveling through habitat with the males. The female, with the male's help, builds an open cup nest in dense vegetation approximately 1 meter (m) above the ground. Nesting occurs from early April through July, but adults and juvenile birds remain on the breeding grounds into late September and early October before migrating to their wintering grounds in southern Baja California, Mexico.

Male flycatchers begin arriving in southern California at the end of April, 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 m above the ground. Adults usually depart from their breeding territory in mid-August and early September to their wintering grounds in central America and northern South America.

Although it is outside of the published breeding range as of 2015 for the species (U.S. Fish and Wildlife Service, 2021), vireos are known to occur at the San Antonio Dam near Upland, California. The San Antonio Dam also falls just outside of the documented breeding range for the flycatcher, but the species may still be detected at the San Antonio Dam. Managed by the U.S. Army Corps of Engineers for flood control, the San Antonio Dam requires regular operational maintenance, including debris, sediment, and vegetation removal and management. As mandated by the USFWS, the U.S. Army Corps of Engineers must conduct surveys and assess activities that might have adverse effects on these federally endangered bird species. The purpose of this report is to summarize the results of vireo and flycatcher surveys conducted by the U.S. Geological Survey (USGS) at the San Antonio Dam in 2021. These data will inform natural resource managers about the status of these endangered species at the San Antonio Dam and guide modification of land use and management practices as appropriate to ensure the species' continued existence.

Methods

Study Area

The study area is along San Antonio Creek, both upstream and downstream from the San Antonio Dam (fig. 1). The San Antonio Dam is located outside the city of Upland between Mount Baldy Road and North Mountain Avenue north of Interstate 210, at the San Bernardino and Los Angeles County border in California. The dam was completed in 1956 with the primary purpose of flood risk management and the secondary purpose of recreation. The reservoir behind the dam is usually dry but can fill after large flooding events. Water was not present in the study area during the time of the surveys.

The area surveyed includes approximately 1.5 kilometers of San Antonio Creek upstream from the dam. The riparian habitat in the study area is patchy and highly disturbed. The northernmost part of the study area consists of an open, dry, sandy wash, with evidence of past mining operations and little riparian vegetation. The habitat within the footprint of the reservoir consists mostly of non-native annuals, such as poison hemlock (*Conium maculatum*) and black mustard (*Brassica nigra*), non-native tamarisk, patches of Goodding's black willow (*Salix gooddingii*), and mule fat. Downstream from the dam, San Antonio Creek flows through a concrete flood control channel. The habitat downstream from the dam is dominated by chaparral and coastal sage scrub species, with no riparian vegetation present; therefore, the area downstream from the dam was not surveyed for vireo or flycatcher.

Surveys

Surveys were conducted during the breeding season (April–July) and followed standard survey techniques for vireos (U.S. Fish and Wildlife Service, 2001) and flycatchers (Sogge and others, 2010). Four surveys for vireos were conducted throughout the study area between April 16 and July 15, 2021, and three surveys for flycatchers were conducted between May 27 and July 15, 2021. Observers walked slowly through or adjacent to suitable riparian habitat, listening and searching for vireos and flycatchers, occasionally playing a recording of a vireo or flycatcher song to elicit a territorial response. Surveys typically began at sunrise and were completed by early afternoon, avoiding conditions of high winds and extreme heat that can reduce bird activity and detectability. Vireo and flycatcher surveys were conducted by USGS biologist Scarlett Howell under USFWS permit ESPER0004080_0.

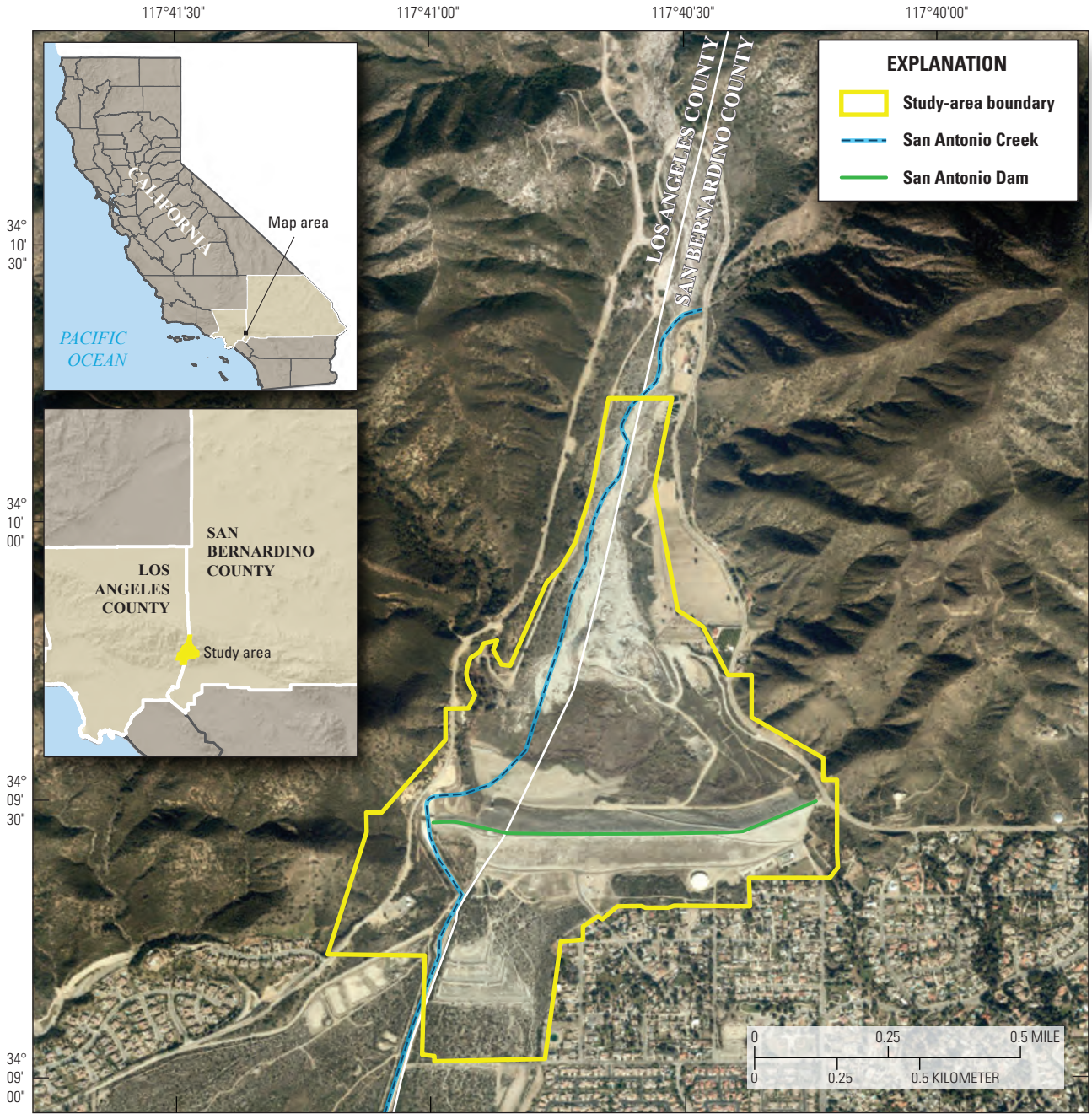

Figure 1. Location of the Least Bell's Vireo (*Vireo bellii pusillus*) and Southwestern Willow Flycatcher (*Empidonax traillii extimus*) study area at the San Antonio Dam, Los Angeles and San Bernardino Counties, California, 2021.

For each vireo or flycatcher encountered, we recorded age (adult or juvenile), sex, breeding status (paired, undetermined, or transient), and whether the bird was banded. A male was considered paired if a female also was visually detected, by hearing vocalizations unique to mated birds, or by observing breeding behavior (for example, food carry, a nest, or dependent juveniles in the territory). A vireo or flycatcher was considered transient if detected only once or, if more than once, detections were less than 2 weeks apart. To determine geographic coordinates, the vireo and flycatcher locations were mapped using the ESRI Collector application (Environmental Systems Research Institute, 2020) on an Android phone with 1- to 15-m accuracy (World Geodetic System of 1984, WGS 84). Dominant native and exotic plants were recorded at each territory 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 (*Salix lasiolepis*), and red willow (*Salix laevigata*), with mule fat as a frequent co-dominant.

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

Willow-sycamore: Willow riparian habitat in which California sycamore (*Platanus racemosa*) is a co-dominant.

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

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

Upland scrub: Coastal sage scrub adjacent to riparian habitat.

Non-native: Areas vegetated primarily with non-native species, such as giant reed and tamarisk.

Because multiple subspecies of flycatchers may be encountered during surveys, we refer to flycatchers in tables and figures as Willow Flycatchers (*Empidonax traillii*) to include all subspecies.

Results

No territorial vireos were detected, although we did detect one singing male on the final survey in July (table 1; fig. 2). Because no vireos were detected during the first three survey periods, this individual was considered to be a transient (table 2). The vireo was not banded.

No territorial flycatchers were detected; however, we detected one individual on May 27, 2021 (table 1; fig. 2). This individual was not observed on subsequent surveys and was considered to be a transient (table 2). We were unable to get a visual of the flycatcher's legs; therefore, it is unknown if it was banded.

The vireo and flycatcher were found in different habitat types within the San Antonio Dam basin. The vireo was observed in mule fat-dominated riparian scrub that included more than 50-percent native plant cover, whereas the flycatcher was found in habitat almost exclusively dominated by non-native tamarisk (table 3).

Table 1. Survey dates and results of Least Bell's Vireo (*Vireo bellii pusillus*) and Willow Flycatcher (*Empidonax traillii*) surveys at the San Antonio Dam, Los Angeles and San Bernardino Counties, California, 2021.

[M, male; F, female; J, juvenile; —, no data. The number of birds detected on individual survey dates does not sum to the total number of territorial birds]

Survey date	Number of					
	Least Bell's Vireo			Willow Flycatcher		
	M	F	J	M	F	J
April 16, 2021	0	0	0	—	—	—
May 27, 2021	0	0	0	1	0	0
June 9, 2021	0	0	0	0	0	0
July 15, 2021	1	0	0	0	0	0
Total number of territorial birds	0	0	—	0	0	—

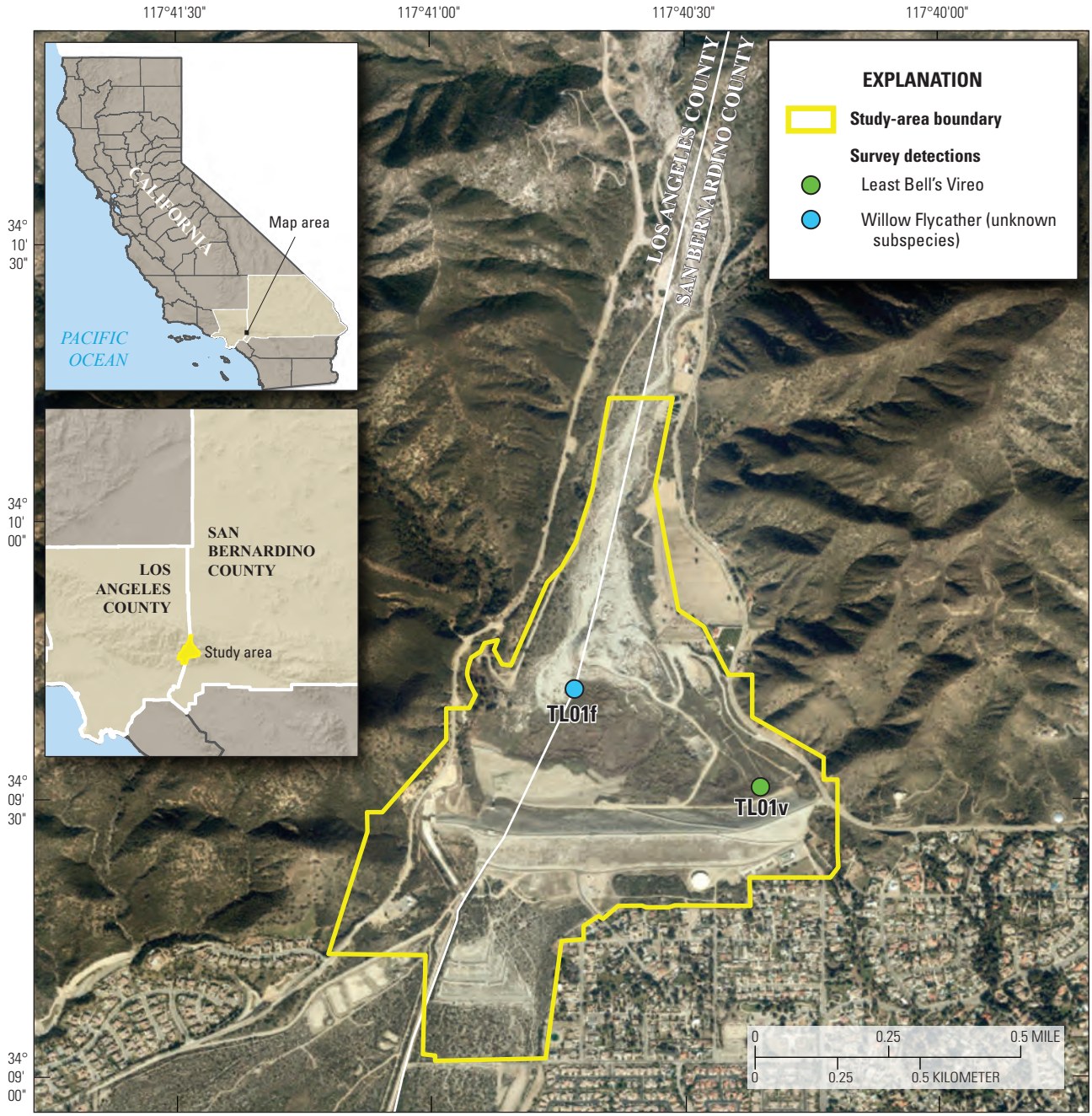

Figure 2. Least Bell's Vireo (*Vireo bellii pusillus*) and Willow Flycatcher (*Empidonax traillii*) locations at the San Antonio Dam, Los Angeles and San Bernardino Counties, California, 2021.

Table 2. Locations, breeding status, and band status of Least Bell's Vireos (*Vireo bellii pusillus*) and Willow Flycatchers (*Empidonax traillii*) detected at the San Antonio Dam, Los Angeles and San Bernardino Counties, California, 2021.

[ID, identification; LBVI, Least Bell's Vireo; WIFL, Willow Flycatcher]

Species	Bird ID	Latitude	Longitude	Breeding status	Banded
LBVI	TI01v	33.24706	–116.78449	Transient	No
WIFL	TI01f	33.24606	–116.78314	Transient	Unknown

Table 3. Habitat characteristics of Least Bell's Vireo (*Vireo bellii pusillus*) and Willow Flycatcher (*Empidonax traillii*) locations at the San Antonio Dam, Los Angeles and San Bernardino Counties, California, 2021.

[*Non-native*: Areas vegetated exclusively with non-native species such as giant reed and tamarisk. *Riparian scrub*: Dry or sandy habitat dominated by sandbar willow or mule fat, with few other woody species. **Abbreviations**: ID, identification; <, less than]

Bird ID	Habitat type	Dominant plant species	Percent native cover	Dominant exotic species
TI01v	Riparian scrub	Mule fat	51–95	Black mustard
TI01f	Non-native	Tamarisk	<5	Tamarisk

Summary

In 2021, we documented one vireo using the habitat at the San Antonio Dam late in the breeding season. It is possible that this individual held a territory elsewhere in the region and was using the habitat at the dam during a southbound migration. The habitat at San Antonio Dam was last occupied by breeding vireos in 2018, when one territorial pair was reported (M. Madden, U.S. Geological Survey, unpub. data, 2018). The 2018 male was color-banded and was observed again, in 2020, 45 kilometers away at the Mojave River Dam (M. Madden, U.S. Geological Survey, unpub. data, 2020). Though the San Antonio Dam may not be occupied by breeding vireos every year, it is likely an important component in the regional patchwork of riparian habitat within an urban landscape.

Although no breeding flycatchers were detected in 2021, the vegetation at the San Antonio Dam appears to provide important stopover habitat for migrating flycatchers.

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