

# Southwestern Willow Flycatcher Breeding Site and Territory Summary – 2001

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## Introduction

The Southwestern Willow Flycatcher (*Empidonax traillii extimus*) is an endangered bird that is known to breed only in dense riparian habitats in six southwestern states (southern California, extreme southern Nevada, southern Utah and Colorado, Arizona, and New Mexico). Since 1993, hundreds of Willow Flycatcher surveys have been conducted each year, and many new flycatcher breeding sites located. This document arose from efforts to synthesize information on all known Southwestern Willow Flycatcher breeding sites, primarily as a tool for the U.S. Fish and Wildlife Service's (USFWS) Southwestern Willow Flycatcher Recovery Team. Established in 1998, this team depends on access to all available current information in order to effectively plan for the conservation and recovery of the flycatcher.

This rangewide data synthesis was designed to meet these objectives:

- 1 – identify all known Southwestern Willow Flycatcher breeding sites, and
- 2 – assemble data on population size, location, habitat, and other information for all breeding sites, for as many years as possible, from 1993 through 2001.

This report provides data summaries in terms of the number of flycatcher sites and the number of territories. When interpreting and using this information, the following must be kept in mind:

**A site** is defined as a location where one or more Willow Flycatchers establish a territory in which they attempt to breed. Sites with unpaired territorial males are considered breeding sites even if no nesting attempts were documented. A site is often a discrete patch of habitat; however, there is no standardized definition for site and its use varies among states. For example, five occupied habitat patches along a 10 km stretch of river might be considered as five different sites in one state, but as only a single site in another state. This makes comparison of information based on "site" problematic. For this report, we deferred to the statewide summary documents, or to local managers and researchers, when delineating a site for inclusion in the database. Due to differences in site definitions, one should not evaluate the relative importance of a geographic region (drainage, watershed, state, etc.) based simply on the number of flycatcher sites.

**A territory** is an exclusive defended area within a breeding site. Although detailed monitoring studies have identified unpaired territorial males and/or polygynous males at some flycatcher breeding sites, for purposes of this report a territory is roughly equivalent to a pair of flycatchers. The concept of territory is more similar between states and among different investigators, so this is a more “robust” unit to use for summaries and comparisons.

For each breeding site, we referred to reports or spoke directly with researchers and managers to gather information such as management entity/agency, location (state, drainage, elevation), gross habitat type (native, exotic, or mixed; dominant tree species), and flycatcher population size (number of territories).

Gathering and synthesizing the information on more than 200 breeding sites was made more difficult because annual survey reporting requirements are not standardized range-wide, and the nature and degree of readily available information varied widely from state to state. Most states and USFWS regions require standard data sheets be submitted each year, and produce detailed statewide summary reports; these resources were tremendously helpful in producing this report.

Synthesizing annual Willow Flycatcher survey data was more challenging for areas such as California. There, the USFWS does not require that surveyors submit the standardized flycatcher survey forms; this makes it difficult to determine precise survey locations, compare locations between years, standardize site names, and get important data on site characteristics. It also introduces long delays in access to even the most basic site and population information. The lack of standardized, annual state-based synthesis and reporting is the most immediate obstacle to rangewide synthesis of data. We strongly encourage the USFWS in California to adopt the same survey reporting requirements that have implemented in USFWS Region 2.

This report includes all flycatcher breeding sites reported between 1993 and 2001. The statistics included herein are based on survey data from the most recent year during which surveys were conducted, whether flycatchers were detected or not. Therefore, 65 sites that had no flycatchers in the most recent survey year (as judged by the agencies consolidating statewide survey data) are still included in the site tallies if they had resident flycatchers during one or more years since 1993. This report does not include data from sites where only migrant Willow Flycatchers were detected.

Every effort was made to locate and include all survey information for every known Southwestern Willow Flycatcher breeding site, and we sincerely thank the many people who generously provided information from the sites they were surveying and monitoring (see following sections listing data sources and contacts, and acknowledgements). However, there may be some extant sites that have not yet been reported and are therefore not included herein. Hopefully, the preparation and dissemination of this report will prompt additional and more comprehensive reporting, such that future annual rangewide summaries become more complete with each iteration.

Additional Considerations in Using and Interpreting the Data in this Report: We used data from a wide variety of sources, and the amount of information and level of detail varied greatly among sites. Because survey methodology and effort varied among sites and/or between years, these summary data should be interpreted and used in context. Following is a discussion of cautions to consider when using these data.

Subspecies status of each site: The Willow Flycatcher sites entered into this database all fall within the geographic range of the southwestern subspecies (*E.t. extimus*), as defined by Unitt (1987), Browning (1993) and Sogge et al. (1997). Recent studies of flycatcher genetics (e.g., Paxton 2000) and song patterns (e.g., Sedgwick 2001) support a more southern range boundary for *E.t. extimus* than was used for the 1999 summary (Sogge et al. 2000). Future research may provide more insight into subspecies range boundaries; therefore, additional sites may eventually be removed from management as *extimus*, and/or new geographic areas and sites could be added. This should be considered when producing updates in future years, and when making rangewide comparisons among years.

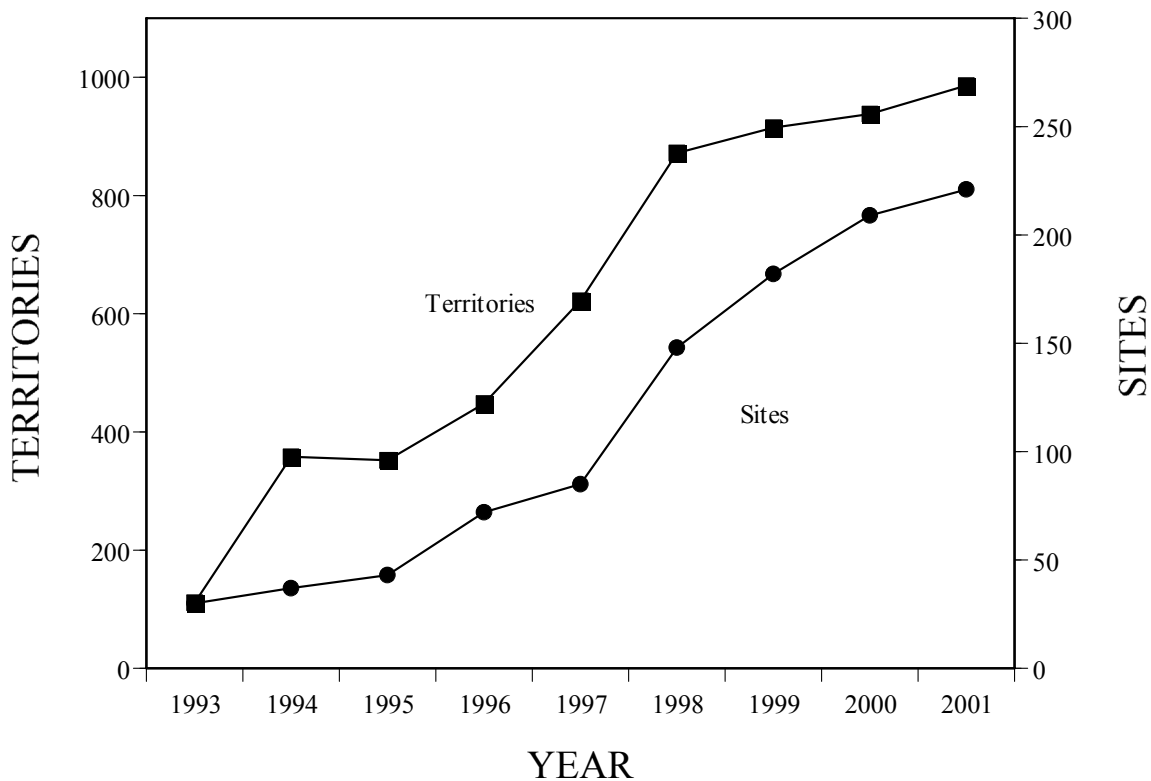
Population estimates: Population estimates are just that – **estimates**. Their accuracy and precision vary with survey effort, surveyor experience, habitat density, and even background noise levels. The population estimates often represent the minimum number of flycatchers present; i.e., if surveyors suspected 12 to 14 flycatchers, the lower (more conservative) number was used. Therefore, although estimates may be very accurate for some intensively surveyed sites, the overall statistics presented in this report should be recognized as approximate.

# DATA SUMMARIES

## Changes in the number of known territories over time

Since 1993, extensive survey effort in Arizona, California, Colorado, Nevada, New Mexico and Utah has greatly increased the number of known breeding sites and breeding territories. From a 1993 estimate of roughly 30 sites and 111 territories, we now have data for 986 territories, located among 221 sites (Figure 1). This increase should NOT be interpreted entirely as a Southwestern Willow Flycatcher population increase. Rather, it is to a great extent a function of increased survey effort over time. Although population increases and decreases undoubtedly occur at some sites, movements of birds among sites and lack of standardized survey effort/reporting make it difficult to separate population trends from variances in survey effort. Determination of trends (positive or negative) can be made in only a few cases, and original data sources (e.g., reports, survey data sheets, etc.) must be consulted when trying to elucidate population trends.

**FIGURE 1**



## **Recency of survey data**

The information used in this report is based on the most recent available survey data for each site. Although there were a few sites for which we could not find survey data more recent than 1995 or earlier, 2000 and/or 2001 data were available for 84% of sites (accounting for 93% of territories). Thus, the information used for most of the statistics reported herein is quite recent.

Table 1. Most recent year of survey data for sites and territories included in this report.

<b>Year</b>	<b># Sites</b>	<b>% Total Sites (n=209)</b>	<b># Territories</b>	<b>% Total Territories (n=933)</b>
1993	2	1	3	0.3
1994	1	0.5	0	0
1995	2	1	3	0.3
1996	2	1	4	0.4
1997	9	4	44	5
1998	11	5	11	1
1999	9	4	7	.5
2000	22	10	85	9
2001	163	74	829	84

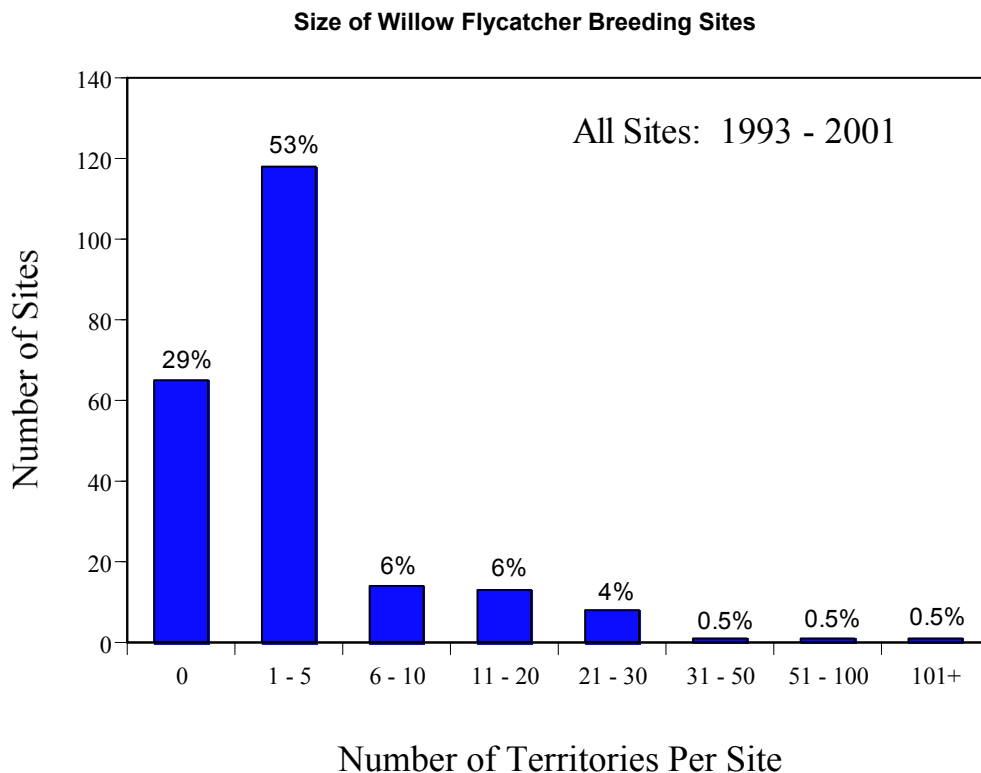
## Population sizes of breeding sites

Most southwestern willow flycatcher breeding sites are small, both in terms of population size (hosting five or fewer territories: Figure 2) and habitat patch size. Such small sites are theoretically more susceptible to extirpation, and there is evidence to support this is the case. Willow flycatchers have disappeared from 65 of the 221 sites tracked since 1993. All but two of these extirpated sites were composed of five or fewer territories. The two exceptions – Colorado River inflow to Lake Mead, and PZ Ranch on the San Pedro River – were larger sites where habitat was destroyed by flooding and fire, respectively.

Not all birds at these extirpated sites necessarily died – some may have moved elsewhere. We know this is the case for banded flycatchers which moved from the Verde River Tuzigoot Bridge and PZ Ranch to other sites (Paxton and Sogge 1996, Paxton et al. 1997, Netter et al. 1998).

If we look again at the size distribution of breeding sites and exclude the extirpated sites, the picture remains much the same - the vast majority of sites (76%) have five or fewer territories. Because most of the 65 extirpated sites had very small populations (usually only one or two territories), their loss does not greatly affect the overall rangewide territory estimates, nor many of the territory statistics that we report herein.

### Figure 2





## **Distribution of territories by state**

Arizona, New Mexico, and California account for the greatest number of known Southwestern Willow Flycatcher sites and territories (Table 2). Nevada, Colorado, and Utah account for only about 11% of territories, primarily because they have few known Willow Flycatcher breeding sites occurring far enough south to fall within the range of *E.t. extimus*. Texas is absent from this table because there were no recent survey data or other records to shed light on current status and distribution within the state. We believe this is an unfortunate data gap and hope that coordinated survey work is soon initiated within southwestern Texas.

Table 2. The number of Southwestern Willow Flycatcher breeding sites and territories by state.

<b>State</b>	<b># Sites</b>	<b>% of Total Sites (n=209)</b>	<b># Territories</b>	<b>% of Total Territories (n=933)</b>
AZ	95	43	359	36
CA	77	35	256	26
CO	5	2	37	4
NM	32	15	258	26
NV	10	4	73	7
UT	2	1	3	0.3
TOTAL	221		986	

## **Distribution of territories by drainage**

More flycatcher territories are found along the Gila River than any other major drainage (Table 3); one of the largest known populations (in the Cliff-Gila Valley, NM) contributes many of the territories within this drainage. Elsewhere in New Mexico, and in southwest Colorado, most territories are along the Rio Grande. The primary flycatcher drainages in California are the Kern, Owen's, San Luis Rey, Santa Ana, and Santa Margarita rivers. In Arizona, most flycatchers are found along the Gila, San Pedro, and Salt River drainages. The Virgin River drainage supports the majority of flycatchers in Utah, and along with the Pahranaagat River, most of the flycatchers in Nevada.

Table 3. The number of Southwestern Willow Flycatcher breeding sites and territories by major river drainage.

<b>DRAINAGE</b>	<b># Sites</b>	<b>% of Total Sites (n=209)</b>	<b># Territories</b>	<b>% of Total Territories (n=933)</b>
Colorado River	37	17	34	4
Gila River	35	16	227	23
Kern River	2	1	23	2
Owen's River	5	2	28	3
Pahranaagat River	2	1	22	2
Rio Grande	18	8	112	11
Salt River	5	2	113	12
San Luis Rey River	9	4	61	6
San Pedro River	14	6	80	8
Santa Ana River	21	9	38	4
Santa Margarita River	2	1	23	2
Santa Ynez	3	1	33	3
Virgin River	7	3	42	4
All others	61	28	150	15

## Distribution of territories by Recovery Unit

We tallied the number of breeding sites and territories by Recovery Unit and Management Unit (Table 4), as defined in the Southwestern Willow Flycatcher Recovery Plan (USFWS 2002). Note that in some Management Units, the number of territories is **less than** the number of sites; this occurs where Management Units include primarily small sites, one or more of which no longer contain territorial flycatchers as of the most recent survey (e.g., “extirpated” sites).

Table 4. The currently known number of flycatcher breeding sites and territories (as of 2001 data), by Recovery Unit and Management Unit.

<b>Recovery Unit</b>	<b>Management Unit</b>	<b># of Sites</b>	<b># of Territories</b>
<b>Basin and Mojave</b>	Owens	5	28
	Kern	2	23
	Amargosa	2	3
	Mojave	5	13
	Salton	1	2
	<b>TOTAL</b>	<b>15</b>	<b>69</b>
<b>Coastal California</b>	Santa Ynez	3	33
	Santa Clara	7	13
	Santa Ana	23	39
	San Diego	23	101
	<b>TOTAL</b>	<b>56</b>	<b>186</b>
<b>Gila</b>	Verde	4	3
	Hassayampa - Agua Fria	1	0
	Salt – Tonto	6	140
	San Francisco	2	3
	Upper Gila	16	187
	Gila – San Pedro	32	120
	Santa Cruz	1	1
	<b>TOTAL</b>	<b>62</b>	<b>454</b>
<b>Lower Colorado</b>	Pahranagat	5	34
	Virgin	6	40
	Little Colorado	4	6
	Middle Colorado	18	16
	Hoover - Parker	6	15
	Bill Williams	8	32
	Parker – Southern International Boundary	14	3
	<b>TOTAL</b>	<b>61</b>	<b>146</b>
<b>Rio Grande</b>	San Luis Valley	2	34
	Upper Rio Grande	13	37
	Middle Rio Grande	6	51
	Lower Rio Grande	2	6
	<b>TOTAL</b>	<b>23</b>	<b>128</b>
<b>Upper Colorado River</b>	San Juan	4	3
	Powell	0	0
	<b>TOTAL</b>	<b>4</b>	<b>3</b>
<b>GRAND TOTAL</b>		<b>221</b>	<b>986</b>

## Elevational range of breeding territories

As might be expected of a species that ranges over such a wide geographic area, the Southwestern Willow Flycatcher is distributed over a wide elevational range. The majority of sites occur between 0 and 1000 m elevation (Figure 3a). Most territories are found between 0 and 1600 m (Figure 3b), with “spikes” at 601-800 m (the Gila/San Pedro River confluence area in AZ) and 1401-1600 m (the Cliff-Gila Valley in NM). Although relatively few territories are known to occur above 2000 m elevation, Willow Flycatchers breed at three sites that are above 2500 m.

**Figure 3.**

Figure 3a. The percentage of flycatcher breeding sites located at different elevations (200 = 0 - 200 m, 400 = 201 – 400 m, etc.).

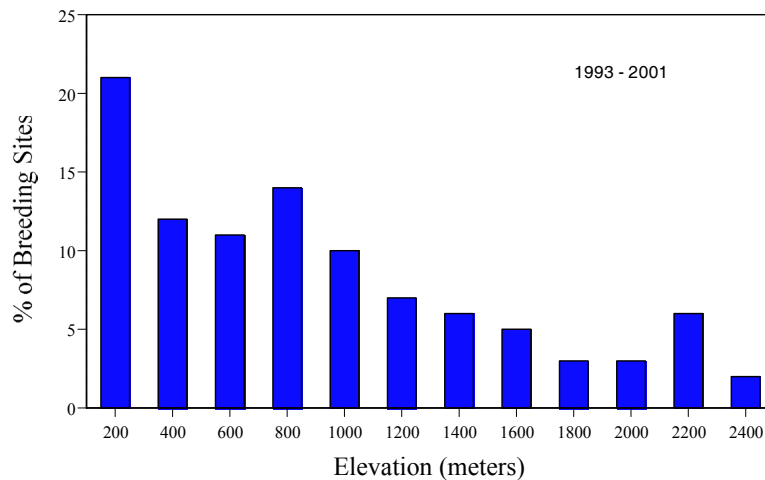
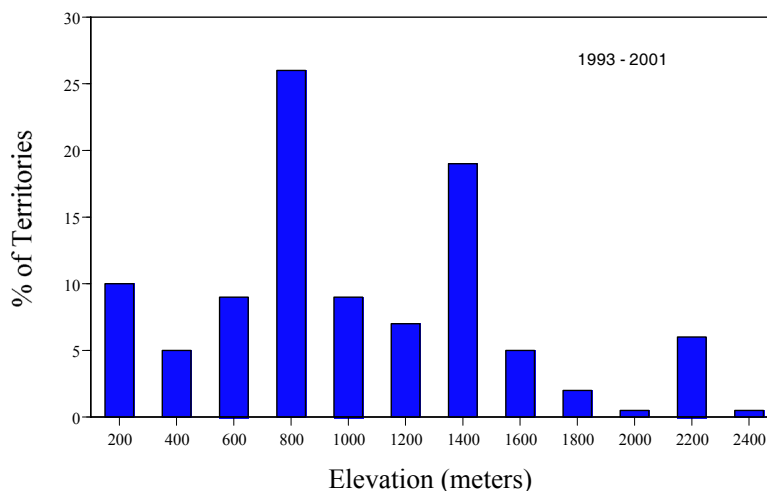


Figure 3b. The percentage of flycatcher territories occurring at differing elevations (200 = 0 - 200 m, 400 = 201 – 400 m, etc.).



## Use of native and exotic habitats

Many (perhaps most) flycatcher breeding sites are comprised of spatially complex habitat mosaics, often including both exotic and native vegetation. Within a site, flycatchers often use only a part of the patch, with territories frequently clumped and/or distributed near the patch edge. Therefore, the vegetative composition of individual territories may differ from the overall composition of the patch.

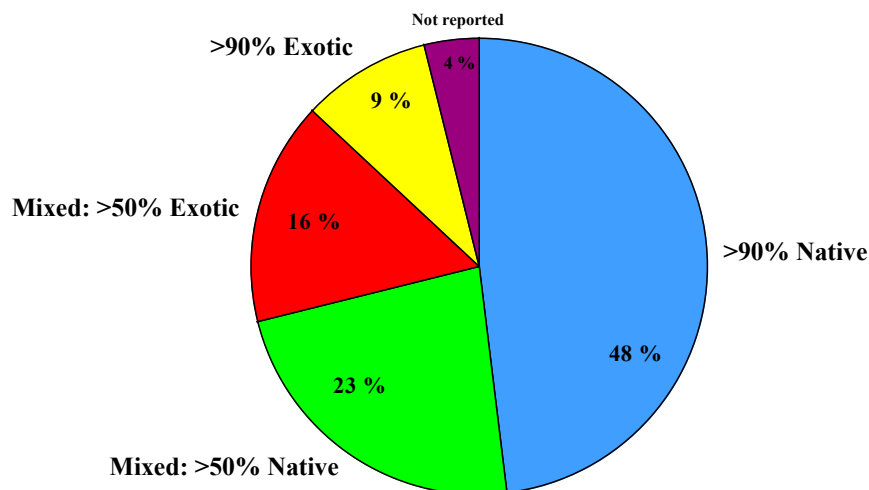
Although detailed territory-based habitat measurements are lacking for the majority of Southwestern Willow Flycatcher breeding sites, it is important to characterize the use of native and exotic habitats. To do so, we classified the habitat at each site into one of four broad categories, based on the overall species composition of the tree/shrub layer(s) of the site. The categories were:

<b>Native</b>	(>90% native vegetation)
<b>Mixed – &gt;50% Native</b>	(50-90% native vegetation)
<b>Mixed – &gt;50% Exotic</b>	(50-90% exotic vegetation)
<b>Exotic</b>	(>90% exotic vegetation)

Habitat patches comprised of Native vegetation account for approximately half (48%) of the known flycatcher territories (Figure 4). Although only 9% of territories occur at Exotic sites, another 39% are located within sites where the habitat includes native/exotic mixtures. In many of these cases, exotics are contributing significantly to the habitat structure by providing the dense lower-strata vegetation that flycatchers prefer.

**Figure 4.**

**Percentage of flycatcher territories occurring within breeding sites of differing compositions of native and exotic vegetation.**



## Dominant tree species at breeding sites

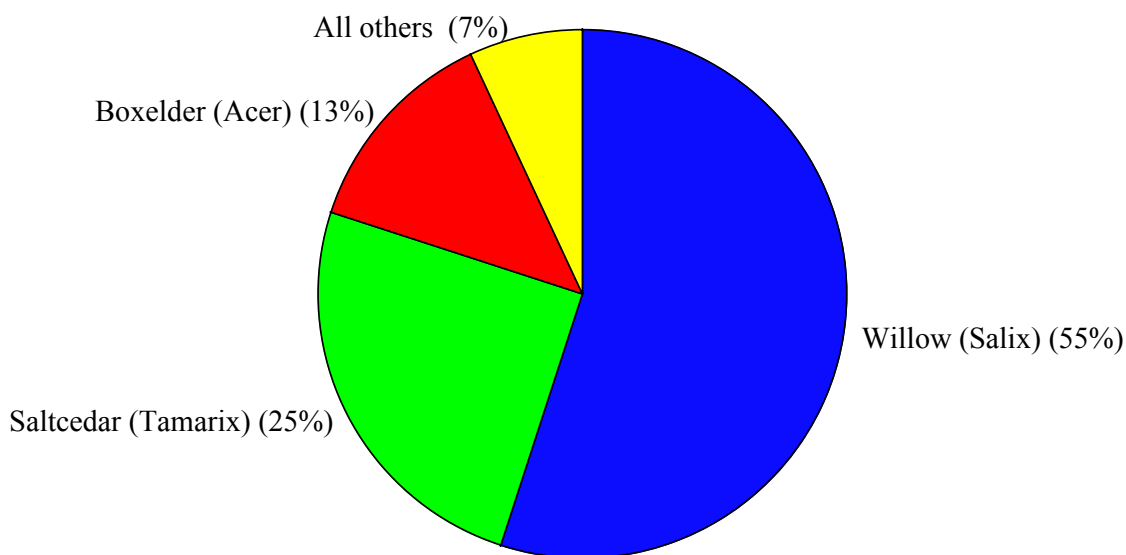
Most flycatcher breeding sites are comprised of spatially complex mosaics of different tree species. Within a site, flycatchers often use only a part of the patch, with territories frequently clumped and/or distributed near the patch edge. Therefore, the dominant tree species may differ between a patch and an individual territory within that patch. Generally, detailed territory-based habitat measurements are lacking for the majority of Southwestern Willow Flycatcher breeding sites. Despite this limitation, it is useful to characterize the dominant tree species within known flycatcher breeding sites.

To characterize the degree to which flycatchers breed in habitats dominated by particular tree species, we tallied the number of territories occurring in breeding sites dominated by particular tree species. Over half (55%) of territories are found at sites where willow (*Salix spp*) is the dominant tree species (Figure 5). One-fourth are located at sites where saltcedar (*Tamarix spp*) predominates, and 13% are in patches where boxelder (*Acer spp*) is the most common habitat component. Taken together, sites dominated by all other tree species account for only about 7% of territories.

The large percentage of territories located in boxelder dominated habitats might suggest that boxelder sites are widely used across the Southwestern Willow Flycatcher's range. However, boxelder dominated breeding habitats occur only in the Cliff-Gila Valley, New Mexico. Removing that site from the analysis, no territories are found in boxelder dominated habitats, and the proportions of rangewide territories at willow and saltcedar sites increase to 63% and 28%, respectively.

**Figure 5.**

**Percentage of flycatcher territories occurring within breeding sites dominated by particular tree species.**



## Administration/management of sites and territories

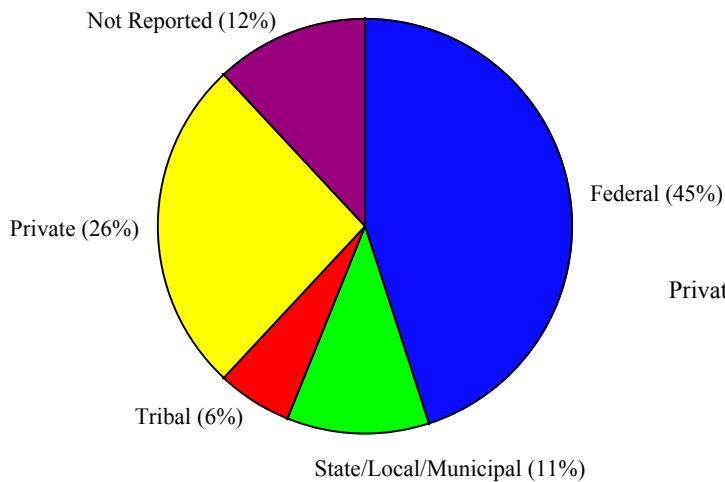
One factor important in conservation and recovery planning is the nature of ownership or “administration” of a site – e.g., whether management of the site is the responsibility of private landowners, the government, or some other entity. We examined this in two ways – first by site, then by territory.

By Site (Figure 6a): Forty-five percent of known breeding sites are under federal government administration, and 26% are on privately owned lands. State/local/municipal governments account for another 11% of sites, and 6% are administered by Native American tribes.

By Territory (Figure 6b): Federal lands account for 48% of flycatcher territories, and private for 37%. This underscores the importance of working with private landowners as flycatcher conservation and recovery efforts proceed. Roughly a third (35%) of the flycatcher territories found on privately owned lands are in the Cliff-Gila Valley, New Mexico.

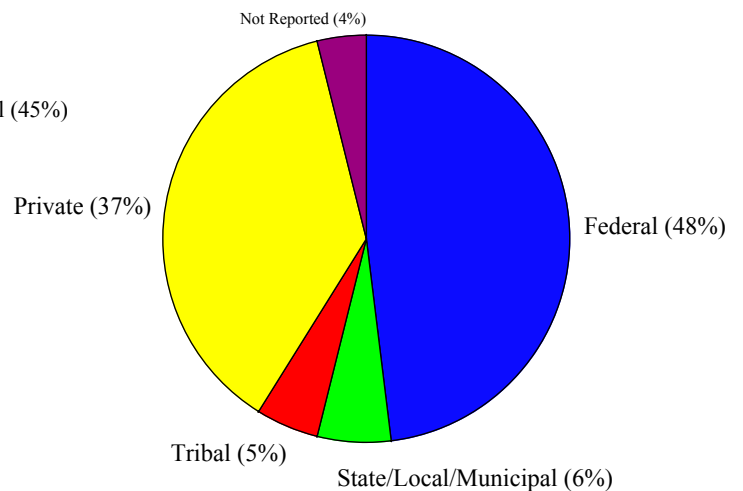
**Figure 6a**

Administration by Sites



**Figure 6b**

Administration by Territories



## SUMMARY

- We have learned of many new breeding sites and territories in the last nine years, thanks to extensive survey efforts throughout the southwest. In 1993, there were only 111 known territories distributed among 30 breeding sites. The current count (as of 2001) is 986 territories located among 221 sites (but remember the earlier caution about lack of standard definition for “site”).
- Most territories are found within small breeding sites (those sites with five or fewer territories). There are fewer than a half-dozen sites with 50 or more territories.
- We know of 65 sites that have been “extirpated” since 1993 - almost all were very small sites (five or fewer territories). Because these were primarily small sites, these extirpations account for only a small percentage of known territories; however, they underscore the vulnerability of small sites to extirpation.
- The states of California, Arizona, and New Mexico account for 89% of known territories. Nevada, Colorado, and Utah collectively have 11% of the known territories. We know virtually nothing about the current status of the Southwestern Willow Flycatcher in Texas.
- Southwestern Willow Flycatchers are distributed over a wide elevation range, with most from sea level to 1600 m, but a few territories are located as high as 2500 m in elevation.
- Just under half of territories are in native habitat, while 25% are in habitats having a 50% or greater exotic component. A large percentage of the native habitat territories occur at one site –the Cliff-Gila Valley in New Mexico. Over 90% of territories are in habitats where willow, saltcedar, or boxelder are the dominant tree species; flycatchers breed in boxelder dominated habitats only in the Cliff-Gila Valley, New Mexico.
- Slightly less than half (45%) of sites are on federally-controlled lands, while 26% are on private lands; these privately owned sites account for 37% of known territories. Approximately one-third (35%) of territories on privately owned sites are found in the Cliff-Gila Valley, New Mexico.



## List of literature cited and data sources: Journal Articles and Reports

BonTerra. 2001. Findings of Bird Surveys at Selected Soft-Bottom Channel Reaches in Los Angeles County in June 2001. Letter report to Los Angeles Department of Public Works.

Day, K.S. 2001. Summary of Southwestern Willow Flycatcher investigations in Utah Division of Wildlife Resources' Southern Region in 2001. Utah Division of Wildlife Resources, Cedar City, UT.

Dudek and Associates 2001. 45-day report for the Irvine Company willow flycatcher and least Bell's vireo focused surveys at Rattlesnake Reservoir, Orange County. Prepared for the Irvine Company.

Farmer, C., M.A. Holmgren, and S.I. Rothstein. 2001. DRAFT REPORT: Distribution and abundance of southwestern willow flycatchers on Vandenberg Air Force Base and the Lower Santa Ynez River. Dept. Ecology, Evolution, and Marine Biology, University of California, Santa Barbara, California.

Furtek, R., C.R. Tomlinson, and F.R. Griego. 2002. Breeding status of the Southwestern Willow Flycatcher and Yellow-billed Cuckoo at various sites in southern Nevada. Nevada Division of Wildlife, Southern Region Nongame Branch. Las Vegas, NV.

Furtek, R, T. Gallagher, and C. Tomlinson. 2000. Southern Region Bird Projects Federal Fiscal year 1999, State Fiscal Year 2000. Nevada Division of Wildlife. September 2000

Gallagher, T., C. R. Tomlinson, and B. Furtek. 2001. Breeding status of the Southwestern Willow Flycatcher and initial surveys for the Yuma Clapper Rail and Yellow-billed Cuckoo at various sites in southern Nevada. Nevada Division of Wildlife Nongame Program, Las Vegas, NV.

GWB 2001. CA gnatcatcher, Least Bell's vireo, and SWFL protocol surveys at Loma Linda. Letter report prepared for VHBC, inc., Riverside, CA, by GWB, Calumet, MI.

GWB 2001. The Status of the least Bell's vireo and SW willow flycatcher at Strawberry Farms Golf Course in 2001. Unpublished report prepared for DeCinces Properties And the Planning Association by GWB, Calumet, MI.

GWB 2001. INS Border Project least Bell's vireo, SW Willow Flycatcher and CA Gnatcatcher protocol surveys. Letter report prepared for AMEC, San Diego, CA, By GWB, Calumet, MI.

Harmsworth Associates. 2001. Least Bell's vireo and southwestern willow flycatcher surveys in the North Ranch Policy Plan Area, Orange County, California. Draft report prepared for USFWS, CDFG, County of Orange, Metropolitan Water Dist. of Southern California, Irvine Ranch District, Transportation Corridor Agencies, and the Irvine Company. February.

Hoffman, S. M. 2000 Status and management of the least Bell's vireo and southwestern willow flycatcher on the Santa Ana River in Riverside county above Prado Basin including Hidden Valley 2000. Prepared for the Santa Ana Watershed Association, Orange County Water District, U.S.F.W.S. and California Department of Fish and Game.

Konecny Biological Services. 2000. Annual report to the U.S. Fish and Wildlife Service, Carlsbad Field Office, CA.

Kus, B.E. 2001. Distribution, abundance, and breeding activities of the southwestern willow flycatcher at Marine Corps Base Camp Pendleton, California, in 2000. Final Report prepared for Assistant Chief of Staff, Environmental Security, Marine Corps Base Camp Pendleton.

Kus, B.E. and B.L. Peterson. (2002). Pilgrim Creek restoration project: bird community and vegetation structure. Prepared for the California Department of Transportation, District 11.

Kus, B.E. (in prep.). Distribution, abundance, and breeding activities of the least Bell's vireo and southwestern willow flycatcher along the San Luis Rey River, California, 1999-2001. Prepared for the California Department of Transportation, District 11.

Kus, B. E. (in prep.). Distribution, abundance, and breeding activities of the southwestern willow flycatcher at Marine Corps Base Camp Pendleton, California, in 2001. Prepared for AC/S Environmental Security, Marine Corps Base Camp Pendleton, California.

Langridge, S.M. and M.K. Sogge. 1998. Banding and genetic sampling of Willow Flycatchers in Utah: 1997 and 1998. USGS Colorado Plateau Field Stn Report to the U.S. Bureau of Reclamation, Salt Lake City, UT.

McKernan, R.L. and G. Braden. 2001. Status, distribution, and habitat affinities of the Southwestern Willow Flycatcher along the Lower Colorado River, Year 5 – 2000. Report by the San Bernardino County Museum, Redlands, CA.

McKernan, R. L. and G. Braden. 2001. Status, distribution, and habitat affinities of the Southwestern Willow Flycatcher along the lower Colorado River, Year 5 - 2000. San Bernardino County Museum, Redlands, CA.

Netter, M.R., E.H. Paxton and M.K. Sogge. 1998. Banding and movements of the Southwestern Willow Flycatcher at Roosevelt Lake and San Pedro River/Gila River confluence, Arizona – 1998. USGS Colorado Plateau Field Station Report. 48 pp

Owen, J. C. and M. K. Sogge. 1997. Banding and Genetic Sampling of Willow Flycatchers in Colorado - 1996 & 1997 Summary Report. USGS Colorado Plateau Field Station: Flagstaff, Arizona.

Pacific Southwest Biological Services, Inc. 2001a. Peppertree Park, Fallbrook, San Diego County, California, Surveys for Least Bell's Vireo and Southwestern Willow Flycatcher. 30 July 2001.

Paxton, E.H. 2000. Molecular genetic structuring and demographic history of the Willow Flycatcher. Masters Thesis. Northern Arizona University, Flagstaff, AZ.

Paxton, E. and M.K. Sogge. 1996. Banding and population genetics of Southwestern Willow Flycatchers in Arizona – 1996 Summary Report. USGS Colorado Plateau Field Station Report. 25 pp.

Pike, J., D. Pelligrini, L. Hays, and R. Zembal. 2002. Least Bell's Vireos and Southwestern Willow Flycatchers in Prado Basin of the Santa Ana River watershed, CA. Prepared for the Orange County Water District and the U.S. Fish and Wildlife Service.

Pike, J., D. Pelligrini, S. Reynolds, and L.H. Hays. 2000. The status and management of the least Bell's vireo and southwestern willow flycatcher within the Prado Basin, California, 1986- 2000. Prepared for the Orange County Water District, U.S. Army Corps of Engineers, Los Angeles District, U.S. Fish and Wildlife Service, and California Department of Fish and Game.

Porter, A. and K.S. Day. 2000. Summary of Southwestern Willow Flycatcher (*Empidonax traillii extimus*) Surveys Conducted in the Virgin River Drainage, Washington County, Utah in 2000. Utah Division of Wildlife Resources Publication No. 00-32, Cedar City, UT.

Recon. 2000. Post-survey notification- focused survey results for the least Bell's vireo and southwestern willow flycatcher on the Windmill Creek Channel Improvements in Oceanside, California. August 14. Report to U.S. Fish and Wildlife Service.

Recon. 2000b. Post-survey notification- focused survey results for the least Bell's vireo and southwestern willow flycatcher on the proposed bridge and thoroughfare District No. 4 in Carlsbad, California. August 14. Report to the U.S. Fish and Wildlife Service.

Santa Ana Watershed Association (SAWA). 2001. Status and Management of the Least Bell's Vireo and Southwestern Willow Flycatcher in Selected Sites in the Santa Ana Watershed: San Timoteo Canyon, Hidden Valley and Portions of the Santa Ana River, Temescal Canyon, and the Santa Ana Canyon.

Sedgwick, J.A. 2001. Geographic variation in the song of Willow Flycatchers: differentiation between

*Empidonax traillii adastus* and *E.t. extimus*. Auk 118:366-379.

Smith, A. B., C. E. Paradzick, A. A. Woodward, P. E. T. Dockens, and T. D. McCarthey. 2002. Southwestern Willow Flycatcher 2001 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report 191, Arizona Game and Fish Department, Phoenix, AZ.

Sogge, M.K., R.M. Marshall, S.J. Sferra and T.J. Tibbitts. 1997. A Southwestern Willow Flycatcher natural history summary and survey protocol. National Park Service Technical Report NPS/NAUCPRS/NRTR-97/12. 37 pp.

Sogge, M. K., S. J. Sferra, T. D. McCarthey, S. O. Williams, and B. E. Kus. 2001. Southwestern Willow Flycatcher breeding site and territory summary - 2000. U.S. Geological Survey, Flagstaff, AZ.

Sugnet and Associates. 1998. Presence or absence survey for Southwestern Willow Flycatcher (*Empidonax traillii extimus*) for Colorado Department of Transportation Project #FC-NH (CX) 160-2(048) (SH160 Farmington Hill to Bayfield). Report to US Fish and Wildlife Service, Grand Junction, CO.

Sugnet and Associates. 2000. Presence or absence survey for Southwestern Willow Flycatcher (*Empidonax traillii extimus*) at Piano Creek Ranch. Report to US Fish & Wildlife Serv., Grand Junction, CO.

Sweetwater Authority. 2001. Endangered species monitoring report for the Sweetwater Reservoir Habitat Management Program and Urban Runoff Diversion System, Phase II. Prepared by P. Famolaro and L. Tikkanen Reising for the U.S. Fish and Wildlife Service and Calif. Dept. of Fish and Game.

Turnbull, Jennifer L. 2001. Tonner Canyon southwestern willow flycatcher surveys, 2000. Report of findings to Planning Consultants Research, Irvine, CA.

U.S. Fish and Wildlife Service. 2002. Final Southwestern Willow Flycatcher Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, NM.

Varanus Biological Services, Inc. 2000. Report of baseline surveys of existing species, San Felipe Creek and adjoining CDFG acquisition properties, San Diego County, California. Report prepared under contract to California Department of Fish and Game.

Varanus Biological Services, Inc. 2000. Report: Results of general surveys for arroyo toad and protocol surveys for least Bell's vireo, southwestern willow flycatcher, California gnatcatcher, Salesian Mission property, California 76, Pala, San Diego County, California. Report prepared for URS Geiner Corporation.

Varanus Biological Services, Inc. 2000. Least Bell's vireo and willow flycatcher surveys and monitoring, Cannon Road Extension Wetlands Mitigation Project, Macario Canyon, Carlsbad, San Diego County, California. City Project No. 3184. Report prepared for the City of Carlsbad.

Wells, J., and J. Turnbull. 2000. Year 2000 western San Luis Rey River least Bell's vireo and southwestern willow flycatcher survey and nest monitoring program. Unpublished report prepared for the U.S. Army Corps of Engineers, Los Angeles District.

Whitfield, M.J. 2002. Southwestern Willow Flycatcher monitoring and removal of Brown-headed Cowbirds on the South Fork Kern River, California in 2001. Southern Sierra Research Station, Weldon, CA.

Williams, S.O. III. 2002. Summary of Willow Flycatcher surveys in New Mexico during 2001. Unpublished summary provided by New Mexico Department of Game and Fish, Santa Fe, NM.

## List of data sources: Personal communications and unpublished data

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