



Southwestern Willow Flycatcher Breeding Site and Territory Summary – 2006

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Photo by S. Sferra

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Introduction

The Southwestern Willow Flycatcher (*Empidonax traillii extimus*) is an endangered bird that breeds only in dense riparian habitats in six southwestern states (southern California, extreme southern Nevada, southern Utah, southwestern Colorado, Arizona, and New Mexico). Since 1993, hundreds of Southwestern Willow Flycatcher surveys have been conducted each year, and many new flycatcher breeding sites located. This document synthesizes information on all known Southwestern Willow Flycatcher breeding sites.

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 2006.

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 a location where one or more Willow Flycatchers establishes a territory. 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 five different sites in one state, but only a single site in another state. This lack of standardization makes comparisons based on “site” problematic. For this report, we deferred to 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 the purposes of this report a territory is roughly equivalent to a pair of flycatchers. In general the concept of territory is more similar among states and different investigators than is the term “site”, thus it is a more robust unit to use for summaries and comparisons. However, keep in mind that the definition of a polygynous territory is not consistent among states; a male polygynously paired with two females would be considered one territory in some states and two territories in other states.

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 number of flycatcher territories.

Synthesizing the information on more than 200 breeding sites is challenging because annual survey reporting requirements are not standardized rangewide, and the nature and degree of readily available information varied widely from state to state. This is particularly true for areas such as California, where there are many flycatcher sites but surveyors are not required to submit standardized flycatcher survey forms. The lack of consistent reporting makes it difficult to determine precise survey locations, compare locations between years, standardize site names, and evaluate site-specific characteristics. It also introduces long delays in access to basic site and population information. However, California has instituted a state-wide database (coordinated by the USGS San Diego Field Station) that compiles data from an array of investigators; this database has greatly aided the compilation of data at the rangewide level. While Arizona, California, and New Mexico all compile state-wide survey summaries, Colorado, Nevada, and Utah do not have coordinated state-wide survey efforts and data for these state is compiled at the rangewide level.

This report includes all known flycatcher breeding sites reported between 1993 and 2006. 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, data from 158 sites that were not surveyed in 2006 are still included in the site and territory tallies if they had territorial flycatchers during one or more years since 1993. This report does not include data from sites where only migrant Willow Flycatchers were detected.

This report also includes sites that at some time since 1993 had territorial Southwestern Willow Flycatchers, but as of the most recent survey have zero territories. We considered these sites “extirpated” based on this definition but continue to include them in data summaries based on the most recent surveys conducted at these sites. Sites considered extirpated in one year may be recolonized by territorial flycatchers in subsequent years and we do not imply any regulatory or permanent designation in calling a site “extirpated”.

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 keeping this variation in mind. Following is a discussion of cautions to consider when using these data.

Subspecies status of each site: The 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), Sogge et al. (1997), and USFWS (2002). 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 *E.t. 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, survey intent, surveyor experience, habitat density, flycatcher behavior, and even background noise levels. The population estimates reported for a site are generally the minimum number of flycatchers that are likely present based on the overall survey results; 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.

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). Every effort was made to locate and include all survey information for every known Southwestern Willow Flycatcher breeding site; however, due to delays in reporting for some sites, some 2006-season survey information may not be available until after this report is produced (November 2007). New 2006 survey information that is not included herein will be incorporated in future rangewide reports.

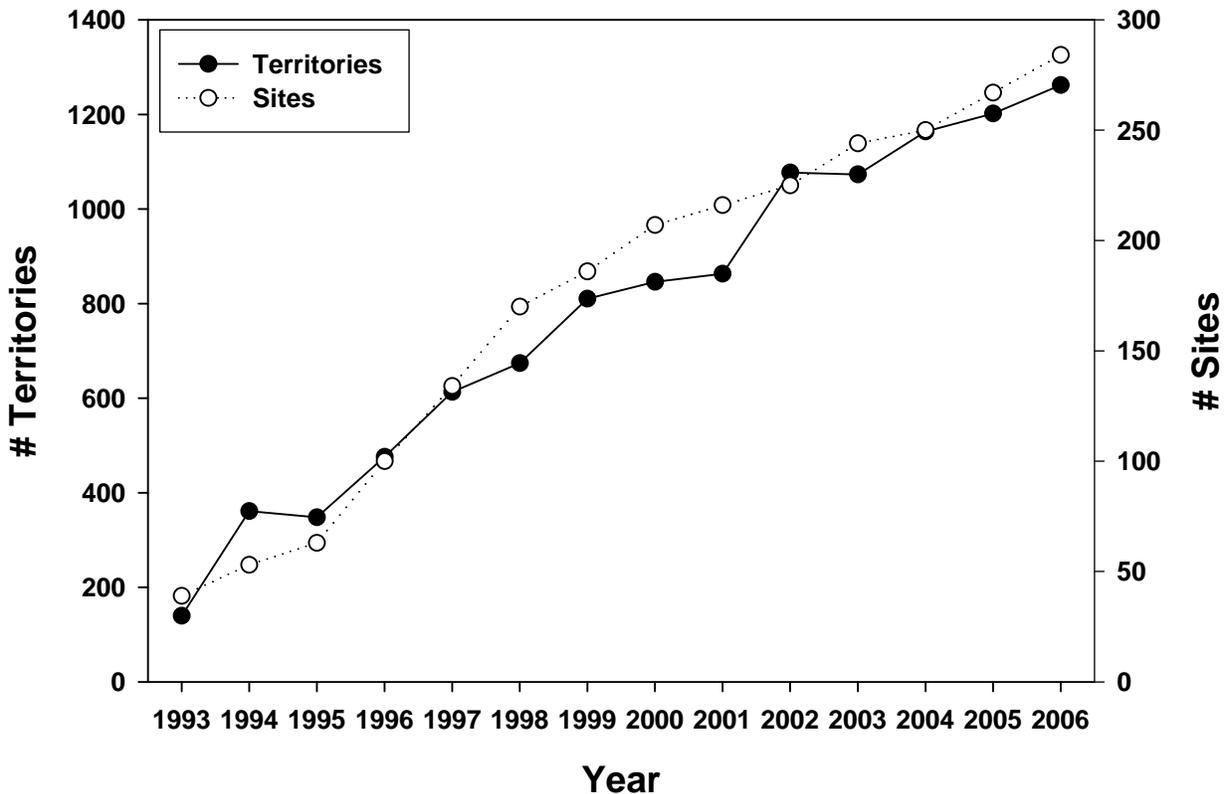
DATA SUMMARIES

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 territories. From a 1993 estimate of 40 sites and 140 territories, we now have data for 284 sites and 1262 territories (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.

Estimated number of known breeding sites and territories, as of 2006. Numbers of sites and territories prior to 2006 have been updated as new information has become available and may be different from past reports.

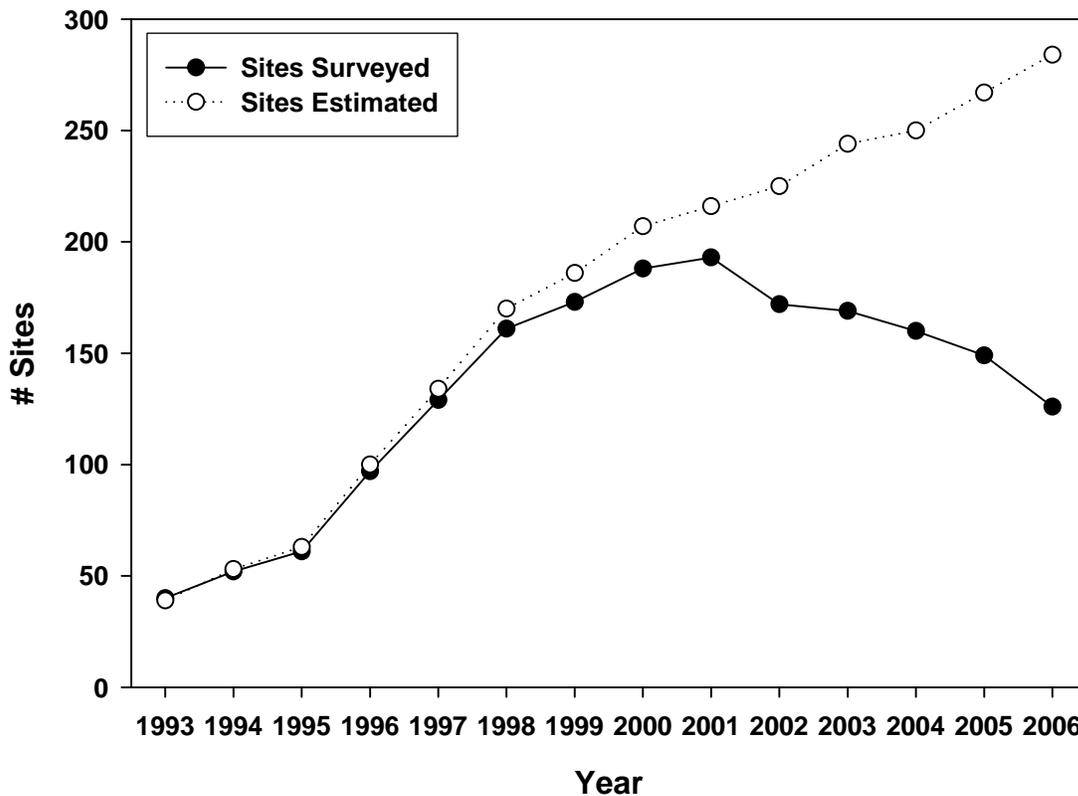


Numbers of sites over time: surveyed vs estimated

Not all of the 284 sites where Southwestern Willow Flycatcher territories have been discovered over the last 14 years are surveyed every year. However, our compilation includes all sites where flycatcher territories have been detected since 1993, including sites that were not surveyed in 2006. Therefore the total estimated number of sites (n=284) includes 126 that were surveyed in 2006, plus 158 that were last surveyed in 2005 or earlier. The number of sites actually surveyed each year increased from 1993 to 2001, but has been declining since then. This results in an increasing gap between the total number of estimated flycatcher sites and the number actually surveyed in the most recent year. See the section on Recency of Survey Data (below) and Appendix 1 for additional details.

FIGURE 2.

Number of estimated and surveyed breeding sites, as of 2006. Numbers of sites and territories prior to 2006 have been updated as new information has become available and may be different from past reports.

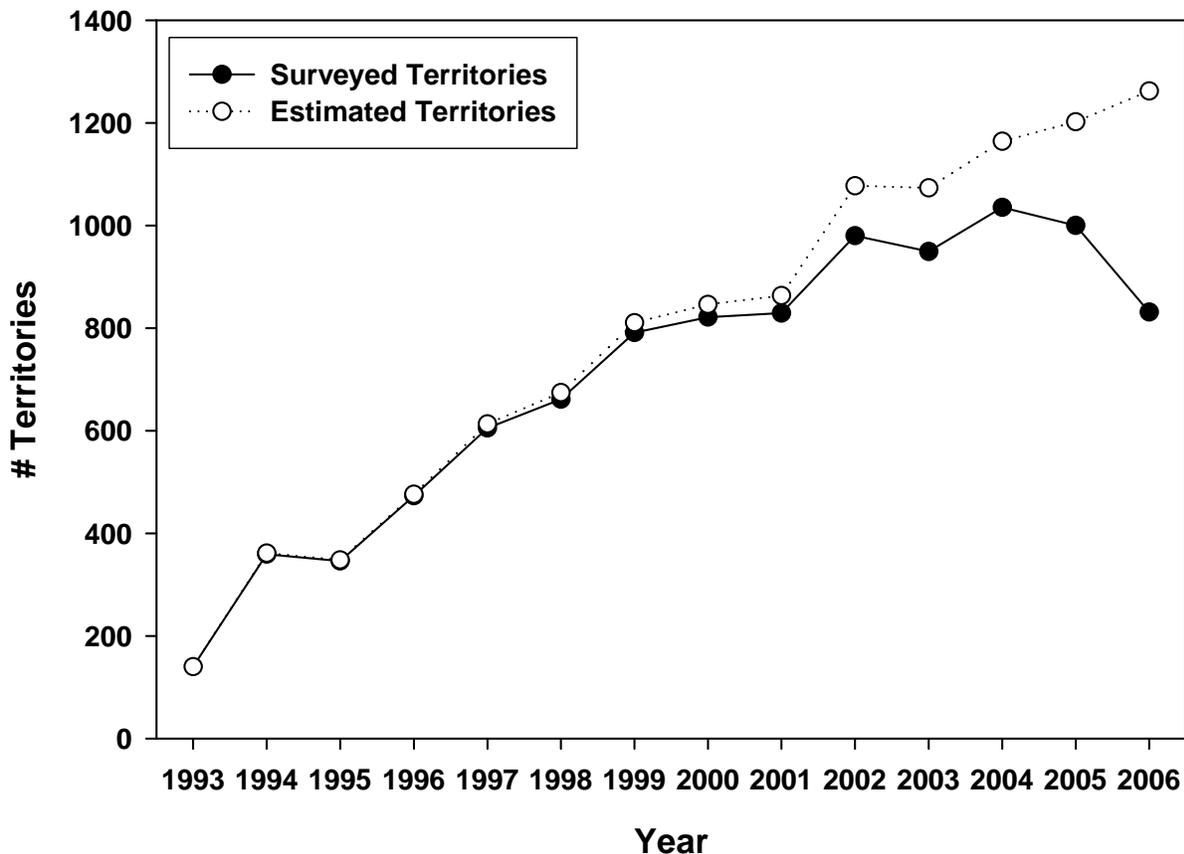


Numbers of territories over time: surveyed vs estimated

As previously noted, not all known Southwestern Willow Flycatcher breeding sites are surveyed every year. For sites that were not surveyed in 2006, we used the numbers reported in the most recent pre-2006 survey as an estimate of the number of territories currently at that site. Thus, for sites that were not surveyed in 2006, we continue to report the number of territories from the most recent survey year. In 2006, our estimated total number of territories (1262) includes 831 detected in 2006-season surveys, plus 431 territories from sites that were last surveyed in 2005 or before (Figure 3). As with site estimates, the trend over the last several years is for an increasing gap between the number of territories known via recent surveys and the total number estimated. See the section on Recency of Survey Data (below) and Appendix 1 for additional details.

FIGURE 3.

Number of estimated and surveyed territories, as of 2006. Numbers of sites and territories prior to 2006 have been updated as new information has become available and may be different from past reports.



Recency of survey data

As previously indicated, the information used in this report is based on the most recent available survey data for each site. However, not all sites are surveyed every year. Of the 284 sites where Southwestern Willow Flycatchers have occurred since 1993, only 126 sites were surveyed in 2006. Although our estimates for some sites are based on older survey data, over 68% of known sites have been surveyed since 2004, and sites surveyed since 2004 account for almost 90% of the rangewide estimated number of flycatcher territories. Thus, the information used for most of the statistics reported herein is quite recent. All data presented in this report are based on the most recent survey available for a given site. For 126 sites, the data are from surveys conducted in 2006; however, for 158 sites the most recent data were collected prior to 2006.

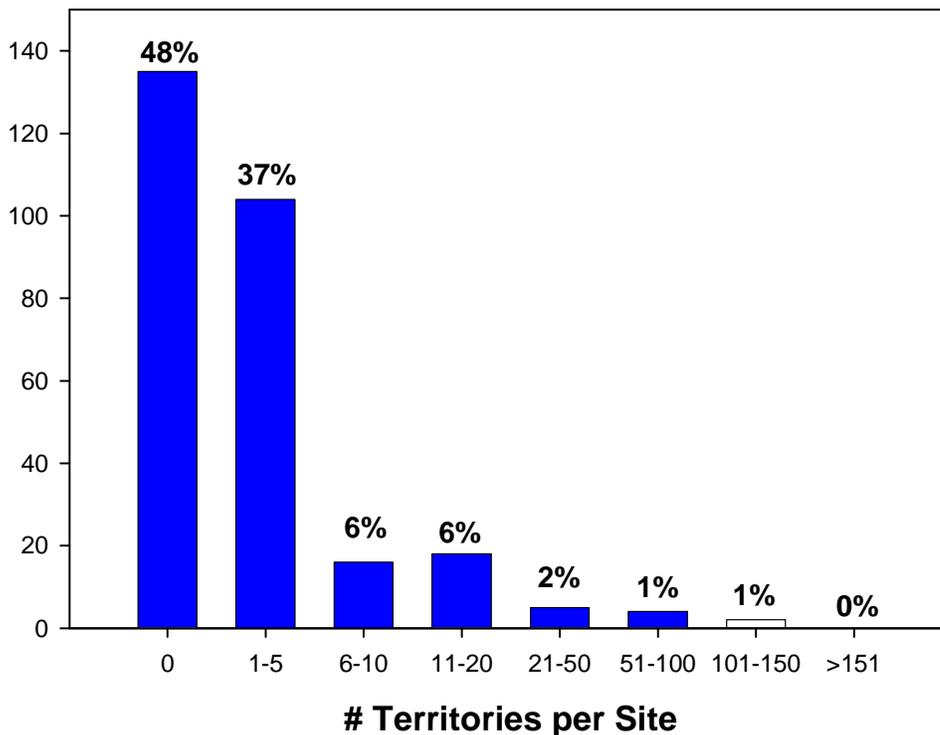
Table 1. Most recent year of survey data for sites and territories included in this report, as of 2006.

Year	# Sites	% Total Sites (n = 284)	# Territories	% Total Territories (n = 1262)
1993	1	0.4	2	0.2
1994	1	0.4	0	0.0
1995	1	0.4	1	0.1
1996	2	0.7	5	0.4
1997	4	1.4	5	0.4
1998	4	1.4	6	0.5
1999	6	2.1	6	0.5
2000	4	1.4	9	0.7
2001	30	10.6	63	5.0
2002	22	7.7	27	2.1
2003	15	5.3	5	0.4
2004	28	9.9	73	5.8
2005	40	14.1	229	18.1
2006	126	44.4	831	65.8

Distribution of breeding sites by number of territories

Most Southwestern Willow Flycatcher breeding sites are small, both in terms of the number of territories (hosting five or fewer territories: Figure 4) and habitat patch size. Willow Flycatcher territories have disappeared from 135 of the 284 sites tracked since 1993 and as of the most recent survey do not have any territories (See Appendix 2 for a list of extirpated sites). All but two of these sites where flycatcher territories are no longer detected 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. Additionally there have been incidences of fire and flooding that did not result in the total loss of flycatcher breeding habitats. There were fires during the 2004 and 2005 breeding seasons in Arizona at the Gila River Kearney Sewage Ponds and San Pedro River Dudleyville Crossing sites, respectively, that may have reduced the amount of suitable breeding habitat for flycatchers at these sites. The inundation of Roosevelt Lake and Horseshoe Reservoir in Arizona prior to the 2005 breeding season dramatically reduced the available riparian habitat at some sites. The long-term impact of fire and flooding at these breeding sites is unknown and should be examined through continued survey efforts.

Figure 4.
Number of territories at Willow Flycatcher Breeding Sites, as of 2006.



Not all birds at the sites where flycatcher territories are no longer detected necessarily died – some of these birds moved to other sites where they attempted to establish breeding territories. We know this is the case for banded flycatchers that 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), plus numerous movements following the inundation of Roosevelt Lake (Causey et al. 2005). Some of these sites may eventually cycle back into occupancy by breeding flycatchers due to a change in habitat quality, an increase in number of nearby territories, or other unknown or undetected factors. There have been 45 sites that have been recolonized after at least one year of zero territorial flycatchers detections indicating that currently extirpated sites may develop suitable habitat in the future. Some of these sites have repeatedly cycled between occupied and unoccupied status and some currently have territories while others do not.

If we look again at the size distribution of breeding sites and exclude the sites where territories are no longer detected, the picture remains much the same - the vast majority of sites (104 of 149; 70%) have five or fewer territories. Because most of the 135 sites where birds are no longer detected 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 have reported herein.

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 about 12% of territories, primarily because these states 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 survey data or other records to shed light on current status and distribution within the state. For a revised version of Table 2 that includes updated estimated and surveyed numbers of sites and territories by year and state see Appendix 1.

Table 2. Number of Southwestern Willow Flycatcher breeding sites and territories by state, as of 2006.

State	# Sites	% of Total Sites	# Territories	% of Total Territories
AZ	123	43.3	482	38.2
CA	96	33.8	190	15.1
CO	11	3.9	58	4.6
NM	38	13.4	443	35.1
NV	13	4.6	82	6.5
UT	3	1.1	7	0.6
TOTAL	284		1262	

Distribution of territories by drainage

In general we have designated a drainage name to serve as a functional unit, rather than a defined hydrological unit, as a means to summarize site and territory information. 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. The Virgin River and the Pahrnagat River support most of the flycatchers in Nevada. Sites along the Colorado River are in Arizona, California, and Utah. The scale of all drainages in the rangewide summary is not equivalent and the drainage naming convention is specific to a particular watershed.

Table 3. The number of Southwestern Willow Flycatcher breeding sites and territories by major river drainage (drainages with >1% of total flycatcher territories), as of the 2006 breeding season.

Drainage	# Sites	% of Total Sites	# Territories	% of Total Territories
Big Sandy River	2	0.7	27	2.1
Bill Williams River	6	2.1	14	1.1
Canadian River	6	2.1	15	1.2
Colorado River	41	14.4	27	2.1
Gila River	49	17.3	326	25.8
Kern River	2	0.7	16	1.3
Owen's River	5	1.8	28	2.2
Pahrnagat River	4	1.4	36	2.9
Rio Grande	25	8.8	263	20.8
Salt River	6	2.1	56	4.4
San Luis Rey River	9	3.2	59	4.7
San Pedro River	19	6.7	157	12.4
Santa Ana River	30	10.6	33	2.6
Santa Margarita River	3	1.1	22	1.7
Tonto Creek	1	0.4	61	4.8
Verde River	6	2.1	18	1.4
Virgin River	8	2.8	51	4.0
All others*	62	21.8	53	4.2
Total	284		1262	

*All others includes drainages that had <1% of total territories: Agua Fria River, Agua Hedionda, Amargosa River, Chama River, Hassayampa River, Las Flores Creek, Little Colorado River, Meadow Valley Wash, Mimbres River, Mojave River, San Diego Creek, San Diego River, San Dieguito River, San Felipe Creek, San Francisco River, San Gabriel River, San Juan Creek, San Juan River, San Mateo Creek, Santa Clara River, Santa Cruz River, Santa Maria River, Santa Ynez River, Sulphur Creek, Sweetwater River, Temecula Creek

Distribution of territories by Recovery and Management 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 contains territorial flycatchers as of the most recent survey (i.e., “extirpated” sites; see Appendix 2).

Table 4. The currently known number of flycatcher breeding sites, territories (as of 2006 data) and number of territories necessary for recovery criteria, by Recovery Unit and Management Unit.

Recovery Unit	Management Unit	# of Sites	# of Territories	Recovery Criteria
Basin and Mojave	Owens	5	28	50
	Kern	2	16	75
	Amargosa	2	2	25
	Mojave	7	4	25
	Salton	1	4	25
	TOTAL	17	54	200
Coastal California	Santa Ynez	4	7	75
	Santa Clara	12	8	25
	Santa Ana	33	33	50
	San Diego	24	88	125
	TOTAL	73	136	275
Gila	Verde	6	18	50
	Hassayampa - Agua Fria	2	3	25
	Roosevelt	7	117	50
	San Francisco	2	3	25
	Upper Gila	21	287	325
	Gila – San Pedro	46	196	150
	Santa Cruz	1	0	25
TOTAL	85	624	625	
Lower Colorado	Pahrnagat	6	44	50
	Virgin	7	43	100
	Little Colorado	5	9	50
	Middle Colorado	20	9	25
	Hoover - Parker	6	14	50
	Bill Williams	9	41	100
	Parker – Southern. Intl Boundary	16	4	150
TOTAL	70	164	525	
Rio Grande	San Luis Valley	7	54	50
	Upper Rio Grande	16	34	75
	Middle Rio Grande	8	185	100
	Lower Rio Grande	3	7	25
TOTAL	34	280	250	
Upper Colorado River	San Juan	5	4	25
	Powell	0	0	25
	TOTAL	5	4	50
GRAND TOTAL		284	1262	1950

Elevation range of breeding territories

The Southwestern Willow Flycatcher is distributed over a wide elevation range. The majority of sites occur between 0 and 1000 m elevation (Figure 5a). Most territories are found between 0 and 1600 m (Figure 5b), with “spikes” at 601-800 m (the Gila/San Pedro River confluence and Roosevelt Lake 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 5.

Figure 5a. The percentage of flycatcher breeding sites located at different elevations, as of 2006 (200 = 0 - 200 m, 400 = 201 - 400 m, etc.).

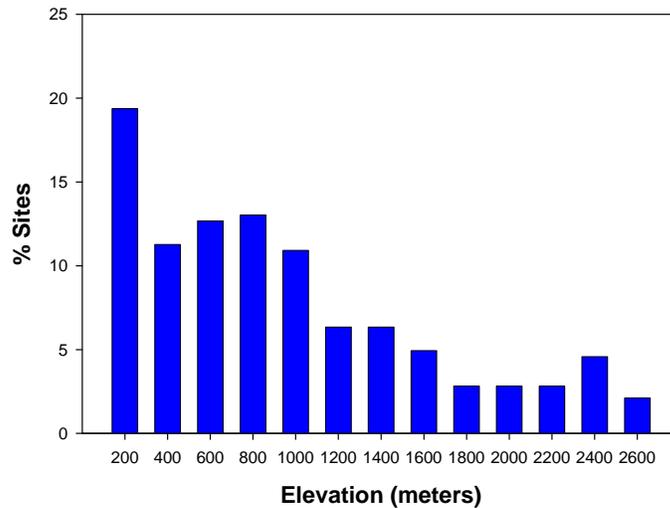
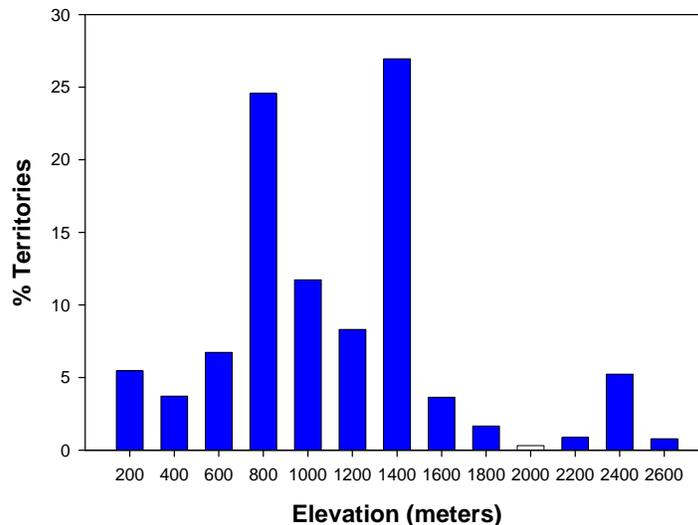


Figure 5b. The percentage of flycatcher territories occurring at differing elevations, as of 2006 (200 = 0 - 200 m, 400 = 201 - 400 m, etc.).



Use of native and exotic habitats

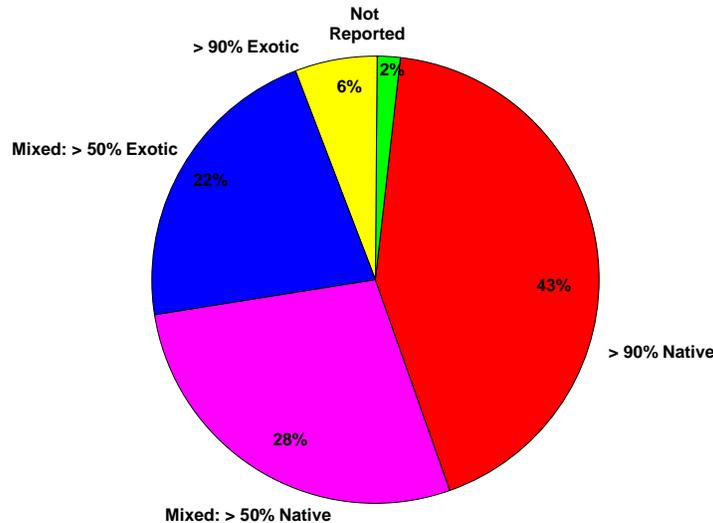
Most flycatcher breeding sites are comprised of spatially complex habitat mosaics, often including both exotic and native vegetation. Within a site territories are frequently clumped and/or distributed near the patch edge. Thus, the vegetative composition of individual territories may differ from the overall composition of the patch. However, depending on the time in the breeding season and the breeding status of an individual, flycatchers may move extensively within a patch, travel between patches, or exploit resources outside of a breeding patch (Cardinal et al. 2005, 2006). Therefore an area much larger than a territory and possibly much larger than a patch may be important to flycatcher breeding success and persistence at a particular site. This concept is supported by recent habitat modeling (Hatten and Paradick 2003, Paxton et al. 2007).

Detailed territory-based habitat measurements are lacking for the majority of Southwestern Willow Flycatcher breeding sites, yet we attempted to broadly 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:

Native	(>90% native vegetation)
Mixed – >50% Native	(50-90% native vegetation)
Mixed – >50% Exotic	(50-90% exotic vegetation)
Exotic	(>90% exotic vegetation)

Habitat patches comprised of native vegetation account for less than half (43%) of the known flycatcher territories (Figure 6). Although only 6% of territories occur at exotic sites, another 50% 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 6.
Percentage of flycatcher territories occurring within breeding sites of differing compositions of native and exotic vegetation, as of the 2006 breeding season.



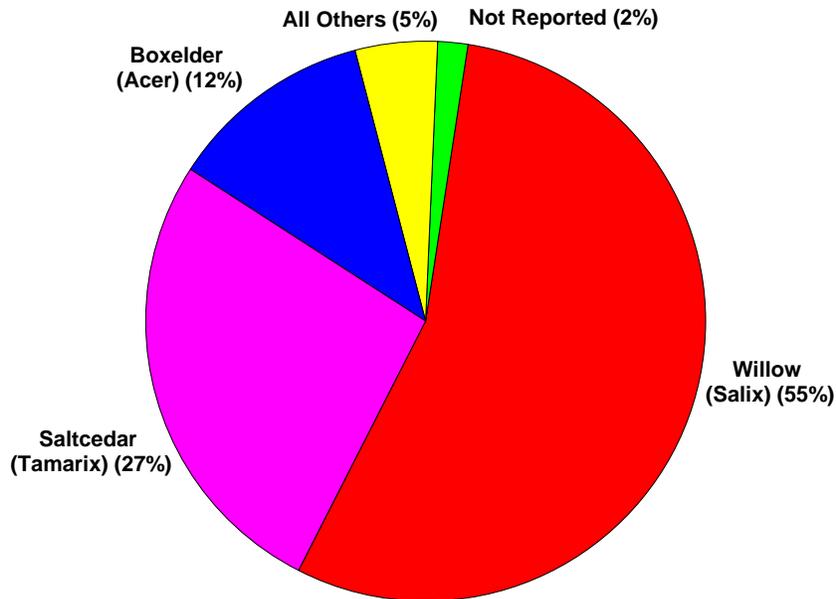
Dominant tree species at breeding sites

Similar to classifying breeding territory habitat based on patch-level characteristics, 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 7). Saltcedar (*Tamarix spp.*) predominates at sites that account for 27% of territories and 12% are in patches where boxelder (*Acer negundo*) is the most common habitat component. Taken together, sites dominated by all other tree species account for only about 5% 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 (Stoleson and Finch 2003).

Figure 7.
Percentage of flycatcher territories occurring within breeding sites dominated by particular tree species, as of the 2006 breeding season.



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 8a): Forty-four percent of known breeding sites are under federal government administration, 28% are on privately owned lands, state/local/municipal governments account for another 13% of sites, and 5% are administered by Native American tribes.

By Territory (Figure 8b): Federal lands account for 53% of flycatcher territories, and private for 36%. This underscores the importance of working with private landowners as flycatcher conservation and recovery efforts proceed. Roughly a third (32%) of the flycatcher territories found on privately owned lands are in the Cliff-Gila Valley, New Mexico.

Figure 8

Figure 8a. Percentage of flycatcher breeding sites found under different land ownership, as of the 2006 breeding season.

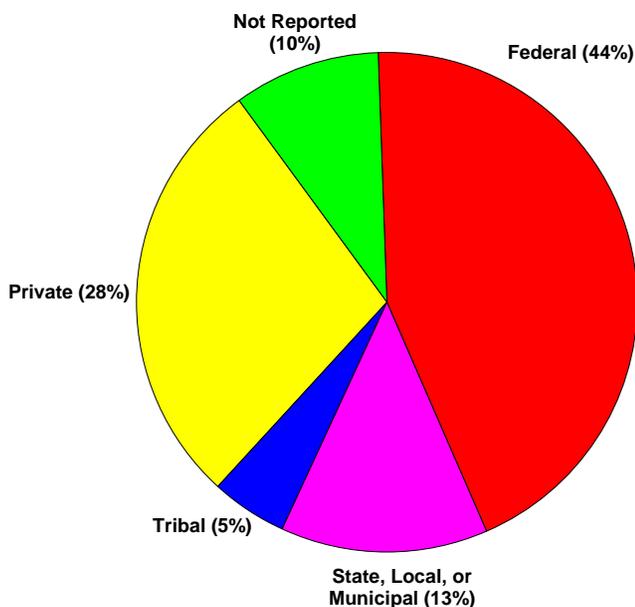
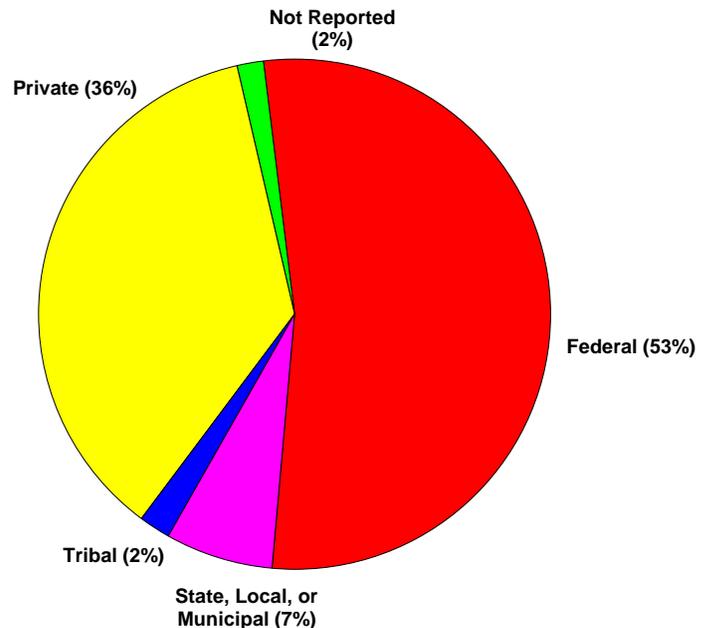


Figure 8b. Percentage of flycatcher territories found under different land ownership, as of the 2006 breeding season.



SUMMARY: 2006

- We have learned of many new breeding sites and territories since the early 1990s as a result of extensive survey efforts throughout the Southwest. In 1993, there were only 140 known territories distributed among 40 breeding sites. The current estimate (as of 2006) is 1262 territories located among 284 sites (but remember the earlier caution about lack of standard definition for “site”).
- Not all of the 284 known sites are surveyed every year. The total estimated number of known territories (1262) is based on the most recent survey at all sites and does not reflect sites that were actually surveyed in a given year. At 126 sites surveyed in 2006, there were 831 territories detected.
- Most territories are found within small breeding sites (those sites with five or fewer territories). There are only six sites with 50 or more territories, though this comparison is confounded by lack of a standard definition of site.
- We know of 135 sites that at one time had flycatcher since 1993, but as of 2006 do not contain flycatcher territories - almost all were small sites (five or fewer territories). Because these were primarily small sites, these territory losses account for only a small percentage of known territories; however, they underscore the vulnerability of small sites.
- The states of California, Arizona, and New Mexico account for 88% of known flycatcher territories. Nevada, Colorado, and Utah collectively have 12% of the known territories. We have received no reporting from standardized Southwestern Willow Flycatcher surveys in Texas, and hence know nothing of the current status of the flycatcher there.
- Southwestern Willow Flycatchers are distributed over a wide elevation range, with most from sea level to 1600 m, but a few sites (n=3) are located as high as 2500 m in elevation.
- Fewer than half (43%) of territories are in native habitat and 28% are in habitats having a 50% or greater exotic component. A large percentage of the territories in native habitat 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.
- Fewer than half (44%) of sites are on federally-controlled lands and 28% are on private lands; these privately owned sites account for 36% of known territories. Approximately one-third (32%) of territories on privately owned sites are found in the Cliff-Gila Valley, New Mexico.

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Appendix 1. Distribution of sites and territories by year and state based on both estimated and surveyed values. Data for years prior to 2006 reflect the actual surveys conducted in the year and estimates based on the most recent surveys prior to that year. These updated numbers may differ from past reports.

Year	Estimated Sites and Territories					Surveyed Sites and Territories			
	State	# Sites	% of Total Sites by Year	# Terr.	% of Total Terr. by Year	# Sites	% of Total Sites by Year	# Terr.	% of Total Terr. by Year
2006	AZ	123	43.3	482	38.2	78	61.9	349	42.0
	CA	96	33.8	190	15.1	14	11.1	44	5.3
	CO	11	3.9	58	4.6	1	0.8	0	0.0
	NM	38	13.4	443	35.1	21	16.7	361	43.4
	NV	13	4.6	82	6.5	10	7.9	70	8.4
	UT	3	1.1	7	0.6	2	1.6	7	0.8
	TOTAL	284		1262		126		831	
2005	AZ	113	42.3	492	40.9	88	59.1	481	48.1
	CA	93	34.8	192	16.0	21	14.1	47	4.7
	CO	10	3.7	58	4.8	3	2.0	48	4.8
	NM	37	13.9	389	32.4	25	16.8	365	36.5
	NV	11	4.1	67	5.6	9	6.0	55	5.5
	UT	3	1.1	4	0.3	3	2.0	4	0.4
	TOTAL	267		1202		149		1000	
2004	AZ	105	42.0	516	44.3	86	53.8	508	49.1
	CA	90	36.0	197	16.9	33	20.6	109	10.5
	CO	10	4.0	51	4.4	7	4.4	47	4.5
	NM	31	12.4	325	27.9	22	13.8	308	29.8
	NV	11	4.4	68	5.8	9	5.6	56	5.4
	UT	3	1.2	7	0.6	3	1.9	7	0.7
	TOTAL	250		1164		160		1035	
2003	AZ	104	42.6	420	39.1	91	53.8	412	43.4
	CA	86	35.2	196	18.3	38	22.5	113	11.9
	CO	9	3.7	79	7.4	6	3.6	75	7.9
	NM	31	12.7	306	28.5	22	13.0	289	30.5
	NV	11	4.5	64	6.0	9	5.3	52	5.5
	UT	3	1.2	8	0.7	3	1.8	8	0.8
	TOTAL	244		1073		169		949	

2006 Southwestern Willow Flycatcher Rangewide Summary

Year	Estimated Sites and Territories					Surveyed Sites and Territories			
	State	# Sites	% of Total Sites by Year	# Terr.	% of Total Terr. by Year	# Sites	% of Total Sites by Year	# Terr.	% of Total Terr. by Year
2002	AZ	95	42.2	456	42.3	86	50.0	450	45.9
	CA	74	32.9	195	18.1	38	22.1	130	13.3
	CO	10	4.4	60	5.6	9	5.2	59	6.0
	NM	32	14.2	312	29.0	27	15.7	299	30.5
	NV	11	4.9	49	4.5	9	5.2	37	3.8
	UT	3	1.3	5	0.5	3	1.7	5	0.5
	TOTAL	225		1077		172		980	
2001	AZ	92	42.6	351	40.7	84	43.5	345	41.6
	CA	83	38.4	220	25.5	73	37.8	206	24.8
	CO	1	0.5	1	0.1	0	0.0	0	0.0
	NM	25	11.6	215	24.9	21	10.9	202	24.4
	NV	12	5.6	73	8.5	12	6.2	73	8.8
	UT	3	1.4	3	0.3	3	1.6	3	0.4
	TOTAL	216		863		193		829	
2000	AZ	87	42.0	337	39.8	80	42.6	331	40.3
	CA	74	35.7	185	21.9	65	34.6	171	20.8
	CO	1	0.5	1	0.1	1	0.5	1	0.1
	NM	31	15.0	257	30.4	28	14.9	252	30.7
	NV	11	5.3	56	6.6	11	5.9	56	6.8
	UT	3	1.4	10	1.2	3	1.6	10	1.2
	TOTAL	207		846		188		821	
1999	AZ	92	49.5	295	36.4	87	50.3	290	36.7
	CA	66	35.5	193	23.8	60	34.7	184	23.3
	CO	0	0.0	0	0.0	0	0.0	0	0.0
	NM	22	11.8	300	37.0	20	11.6	295	37.3
	NV	5	2.7	17	2.1	5	2.9	17	2.1
	UT	1	0.5	5	0.6	1	0.6	5	0.6
	TOTAL	186		810		173		791	
1998	AZ	97	57.1	223	33.1	94	58.4	221	33.4
	CA	41	24.1	137	20.3	37	23.0	131	19.8
	CO	1	0.6	1	0.1	1	0.6	1	0.2
	NM	21	12.4	262	38.9	19	11.8	257	38.9
	NV	8	4.7	30	4.5	8	5.0	30	4.5
	UT	2	1.2	21	3.1	2	1.2	21	3.2
	TOTAL	170		674		161		661	

2006 Southwestern Willow Flycatcher Rangewide Summary

Year	Estimated Sites and Territories					Surveyed Sites and Territories			
	State	# Sites	% of Total Sites by Year	# Terr.	% of Total Terr. by Year	# Sites	% of Total Sites by Year	# Terr.	% of Total Terr. by Year
1997	AZ	67	50.0	188	30.7	66	51.2	188	31.1
	CA	38	28.4	118	19.2	36	27.9	115	19.0
	CO	3	2.2	35	5.7	3	2.3	35	5.8
	NM	20	14.9	243	39.6	18	14.0	238	39.3
	NV	5	3.7	18	2.9	5	3.9	18	3.0
	UT	1	0.7	11	1.8	1	0.8	11	1.8
	TOTAL	134		613		129		605	
1996	AZ	45	45.0	145	30.5	44	45.4	145	30.7
	CA	27	27.0	118	24.8	26	26.8	117	24.7
	CO	0	0.0	0	0.0	0	0.0	0	0.0
	NM	25	25.0	208	43.7	24	24.7	206	43.6
	NV	2	2.0	3	0.6	2	2.1	3	0.6
	UT	1	1.0	2	0.4	1	1.0	2	0.4
	TOTAL	100		476		97		473	
1995	AZ	25	39.7	84	24.1	24	39.3	84	24.3
	CA	18	28.6	89	25.6	18	29.5	89	25.7
	CO	0	0.0	0	0.0	0	0.0	0	0.0
	NM	18	28.6	172	49.4	17	27.9	170	49.1
	NV	1	1.6	1	0.3	1	1.6	1	0.3
	UT	1	1.6	2	0.6	1	1.6	2	0.6
	TOTAL	63		348		61		346	
1994	AZ	25	47.2	111	30.7	25	48.1	111	30.9
	CA	10	18.9	84	23.3	10	19.2	84	23.4
	CO	0	0.0	0	0.0	0	0.0	0	0.0
	NM	18	34.0	166	46.0	17	32.7	164	45.7
	NV	0	0.0	0	0.0	0	0.0	0	0.0
	UT	0	0.0	0	0.0	0	0.0	0	0.0
	TOTAL	53		361		52		359	
1993	AZ	17	42.5	33	23.6	17	42.5	33	23.6
	CA	7	17.5	75	53.6	7	17.5	75	53.6
	CO	0	0.0	0	0.0	0	0.0	0	0.0
	NM	16	40.0	32	22.9	16	40.0	32	22.9
	NV	0	0.0	0	0.0	0	0.0	0	0.0
	UT	0	0.0	0	0.0	0	0.0	0	0.0
	TOTAL	40		140		40		140	

Appendix 2. List of the 135 sites that at one time had Southwestern Willow Flycatcher territories, but were unoccupied as of the most recent survey (zero territories for one or more years). The most recent survey year is indicated.

We term these “extirpated” sites, though it is important to recognize that a particular site could become occupied again in the future. If flycatchers are detected at any site in subsequent years, that site will no longer be considered “extirpated” and would be removed sites from this list. In past years there have been 45 sites that were unoccupied for one or more years but were subsequently reoccupied by flycatchers.

Site Name	Site Code	Year	State	Reference
Agua Hedionda - Macario Canyon	AHMACA	2001	CA	W. Haas per Kus 2002 table
Ash Meadows NWR - Carson Slough	AMAMCS	2006	NV	Klinger and Furtek 2007
Amargosa River - Oasis Valley - Springdale	AMOVSP	2006	NV	Klinger and Furtek 2007
Bill Williams Buckskin	BWBUCK	2006	AZ	Graber et al. 2007
Bill Williams - Cave Wash	BWCAVE	2006	AZ	Graber et al. 2007
Bill Williams Delta Marsh Edge	BWDEMA	2006	AZ	Graber et al. 2007
Bill Williams Gemini	BWGEMI	2006	AZ	Graber et al. 2007
Parkview Fish Hatch	CHPARK	2001	NM	Williams 2002
Colorado River - Grand Cyn RM 246 L	CO246L	2006	AZ	Graber et al. 2007
Colorado River - Miles 257.5 to 257.0 R	CO257R	2005	AZ	English et al. 2006
Colorado River - Grand Cyn RM 259.5 L	CO259L	2005	AZ	English et al. 2006
Colorado River - Grand Cyn RM 259 R	CO259R	2006	AZ	Graber et al. 2007
Colorado River - Grand Cyn RM 263-262 L	CO263L	2004	AZ	Munzer et al. 2005
Colorado River - Grand Cyn RM 265-263 L	CO265L	2003	AZ	Smith et al. 2004
Colorado River - Grand Cyn RM 268-265 L	CO268L	2003	AZ	Smith et al. 2004
Colorado River - Grand Cyn RM 268-264 R	CO268R	2004	AZ	Munzer et al. 2005
Colorado River - Grand Cyn RM 270-268 L	CO270L	2003	AZ	Smith et al. 2004
Colorado River - Grand Cyn RM 272-268 R	CO272R	2004	AZ	Munzer et al. 2005
Colorado River - Grand Cyn RM 273-270 L	CO273L	2002	AZ	Smith et al. 2003
Colorado River - Grand Cyn RM 277-273 L	CO277L	2006	AZ	Graber et al. 2007

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Site Name	Site Code	Year	State	Reference
Colorado River - Adobe Lake	COADOB	2006	AZ	Graber et al. 2007
Colorado River - Big Hole Slough	COBHSL	2005	CA	Koronkiewicz et al. 2006
Colorado River Blankenship	COBLAN	2006	AZ	Graber et al. 2007
Colorado River - Cibola SW Landing Strip	COCIBO	2006	AZ	Graber et al. 2007
Colorado River - Draper Lake	CODRAP	2001	CA	Smith et al. 2002
Colorado River - Ferguson Lake	COFERG	2005	AZ	Koronkiewicz et al. 2006
Colorado River - Grand Canyon RM 28-29	COGC29	2005	AZ	English et al. 2006
Colorado River - Grand Canyon RM 50-51 L	COGC50	2005	AZ	English et al. 2006
Colorado River - Grand Canyon RM 65.3 L	COGC65	2004	AZ	Munzer et al. 2005
Colorado River - Grand Canyon RM 71 L	COGC71	2005	AZ	English et al. 2006
Colorado River - Gila Confluence 1	COGILA	2006	AZ	Graber et al. 2007
Lake Havasu - Neptune	COHAVA	2006	AZ	Graber et al. 2007
Colorado River - Hoge	COHOGE	2006	AZ	Graber et al. 2007
Kanab Creek - Town of Kanab	COKANB	2005	UT	Day 2005
Colorado River - Mittry Lake	COMITT	2006	AZ	Graber et al. 2007
Colorado River - Picacho East	COPICA	2005	CA	Koronkiewicz et al. 2006
Colorado River - Taylor Lake	COTAYL	2005	CA	Kenwood May 2007 file
Colorado River - Trampas Wash	COTRAM	2005	CA	Kenwood file May 2007
Colorado River - Waterwheel Cove	COWACO	2006	AZ	Graber et al. 2007
Colorado River - Walker Lake	COWALK	2005	CA	Kenwood file May 2007
Gila River - Dysart Road	GIDYSA	2003	AZ	Smith et al. 2004
Gila River - Earven Flat	GIEAFL	2005	AZ	English et al. 2005
Gila River - Fortuna Wash	GIFOWA	2006	AZ	Graber et al. 2007
Gila River - Fort Thomas Bridge	GIFTBR	1994	AZ	Paradzick et al. 2001
Gila River - GRSN031	GIGI31	2006	AZ	Graber et al. 2007
Gila River GRN010	GIGN10	2006	AZ	Graber et al. 2007
Gila River GRN011	GIGN11	2000	AZ	Paradzick et al. 2001

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Site Name	Site Code	Year	State	Reference
Gila River GRN015	GIGN15	2002	AZ	Smith et al. 2003
Gila River - GRN 033	GIGN33	2006	AZ	Graber et al. 2007
Gila River - GRS011	GIGS11	2006	AZ	Graber et al. 2007
Gila River GRS012	GIGS12	2006	AZ	Graber et al. 2007
Gila River GRS013	GIGS13	2003	AZ	Smith et al. 2004
Gila River GRS015	GIGS15	2002	AZ	Smith et al. 2003
Gila River - Guthrie	GIGUTH	2006	AZ	Graber et al. 2007
Gila River - San Jose	GISAJO	2001	AZ	Smith et al. 2002
Gila River - Smithville Canal	GISMIT	1997	AZ	McCarthy et al. 1998
Gila River - Solomon NW	GISONW	2006	AZ	Graber et al. 2007
Gila River - Whitlow Dam	GIWHDA	2006	AZ	Graber et al. 2007
Canebreak Preserve	KECANE	2003	CA	Jones and Stokes from Kus 2003
Nelson Reservoir	LCNERE	2006	AZ	Graber et al 2007
Las Flores Creek	LFLAFL	2006	CA	Kenwood file May 2007
Holcomb Creek - Little Bear Springs	MOLBRS	2004	CA	K. Kenwood file Sept 2005
Mojave River - Oro Grande	MOORGR	2004	CA	K. Kenwood file Sept 2005
Mojave River, Upper Narrows	MOUPNA	2006	CA	Kenwood file May 2007
Mojave River, Victorville I-15	MOVICT	2004	CA	K. Kenwood file Sept 2005
Meadow Valley Wash - Site 1	MVMV01	2006	NV	Klinger and Furtek 2007
Pahrnagat River - Crystal Springs	PACRSP	2005	NV	Furtek and Tomlinson 2006
Sulphur Creek	PHSUCR	2003	CA	J. Berkeley - Kus/Kenwood table
Bluewater Creek	RIBLUE	2006	NM	Baczek email 3/07
Rio Grande Velarde-El Guique	RIELGU	2002	NM	Williams email 3/03
Rio Grande Velarde-Garcia Acequia	RIGARC	2006	NM	Baczek email 3/07
Rio Grande - Hot Creek SWA	RIHTSW	2004	CO	Ecosphere 2006
Rio Grande Velarde-La Canova	RILACA	2006	NM	Baczek email 3/07
Rio Grande Velarde-La Rinconada	RILARI	2006	NM	Baczek email 3/07
Rio Grande Orilla Verde	RIORIL	2006	NM	Baczek email 3/07
Rio Grande - Casa Colorado	RIRGCC	2006	NM	Baczek email 3/07

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Site Name	Site Code	Year	State	Reference
Rio Grande Taos Junction Bridg	RITAOS	2006	NM	Baczek email 3/07
Santa Ana River - SR 38 Bridge Crossing	SA38BC	2005	CA	Kenwood file May 2007
Santa Ana River - Bear Creek	SABEAR	2004	CA	K. Kenwood file Sept 2005
Santa Ana River - City Creek	SACICR	2002	CA	K. Kenwood file Sept 2005
Santa Ana River - Deer Creek	SADEER	2004	CA	K. Kenwood file Sept 2005
Santa Ana River - East Etiwanda Creek	SAEECR	2001	CA	K. Kenwood file May 2006
Santa Ana River - Featherly Regional Park	SAFEAT	2001	CA	Kenwood Table 04/2005
Santa Ana River - La Cadena to Waterman	SALACA	2004	CA	K. Kenwood file Sept 2005
Santa Ana River - Metcalf Creek	SAMECR	2004	CA	K. Kenwood file May 2006
Santa Ana River - Mtn Home Village	SAMTNH	2004	CA	K. Kenwood file May 2006
Santa Ana River - Rattlesnake Creek	SARTSN	2004	CA	K. Kenwood file Sept 2005
Santa Ana River - San Timoteo Creek	SASNTI	2006	CA	Kenwood file May 2007
Santa Ana River - Strawberry Creek	SASTCR	2000	CA	D. Guthrie pers comm from B.Kus
Santa Ana River - Van Dusen Canyon	SAVDCA	2002	CA	K. Kenwood data file Sept 2005
Santa Ana River - Waterman Creek	SAWACR	2001	CA	SBCM per Kus 2002 table
San Gabriel River	SBSAGA	2005	CA	K. Kenwood file May 2006
San Dieguito River	SDSADI	2004	CA	K. Kenwood file Sept 2005
Santa Ysabel Creek - Tim's Canyon	SDTICA	2002	CA	K. Kenwood file Sept 2005
San Diego Creek - Laguna Lakes	SGLALA	2004	CA	K. Kenwood file Sept 2004
Los Pinos River - Bear Dance to 151	SJLPBD	2006	CO	T. Ireland email July 2007
San Juan River - Shiprock	SJSHIP	1999	NM	Fitzgerald unpub data
San Luis Rey River - Agua Caliente Creek	SLACCR	2001	CA	W. Haas per Kus 2002 table
San Luis Rey River, Couser Cyn	SLCOUS	2003	CA	K. Kenwood file Sept 2005
San Luis Rey River - Guajome Lake	SLGUAJ	2006	CA	Kenwood file may 2007

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Site Name	Site Code	Year	State	Reference
San Luis Rey River - Pilgrim Creek	SLPILG	2006	CA	Kenwood file May 2007
De Luz Creek - Camp Pendleton	SMDELU	2006	CA	Kenwood file May 2007
Santa Maria River, Lower	SNSMLO	2005	AZ	English et al. 2006
San Mateo Creek	SOSMCR	2006	CA	Kenwood file May 2007
San Pedro River - Apache Powder Rd	SPAPPO	2004	AZ	Munzer et al. 2005
San Pedro River - Bingham Cienega	SPBICI	2005	AZ	English et al. 2006
San Pedro River - Caggage Wash	SPCAWA	2005	AZ	English et al. 2006
San Pedro River - Hereford Bridge	SPHEBR	2006	AZ	Graber et al. 2007
San Pedro River - Indian Hills	SPINHI	2005	AZ	English et al. 2006
San Pedro River - Malpais Hill	SPMAHI	2005	AZ	English et al. 2006
San Pedro River - Soza Wash	SPSOWA	2003	AZ	Smith et al. 2004
San Pedro River, SR 90	SPSR90	2006	AZ	Graber et al. 2007
Salt River Inflow - Roos Lk: Lakeshore	SRLAKE	2006	AZ	Graber et al. 2007
Salt River - School House Point N	SRSCHN	2006	AZ	Graber et al. 2007
Salt River - School House Point S	SRSCHS	2006	AZ	Graber et al. 2007
Santa Clara River - Arco/Four Corners	STARCO	2005	CA	K. Kenwood file May 2006
Santa Clara River - Fillmore Fish Hatch	STFILL	2002	CA	K. Kenwood file Sept 2005
Santa Clara River - Saticoy	STSATI	2003	CA	K. Kenwood file Sept 2005
Santa Clara River - San Francisquito Creek	STSFQR	2001	CA	K. Kenwood file May 2006
Santa Clara River - Soledad Canyon	STSOCA	2004	CA	K. Kenwood file Sept 2005
Santa Clara River - Upper Piru Creek	STUPPI	2006	CA	Kenwood file May 2007
San Juan Creek - Canada Gobernadora	SUCAGO	2004	CA	K. Kenwood file Sept 2005
San Juan Creek - La Novia Bridge	SUNOBR	2005	CA	K. Kenwood file May 2006
Sweetwater Reservoir	SWSWRE	2006	CA	Kenwood file May 2007
Santa Ynez River - Gibraltar	SYGIBR	2002	CA	K. Kenwood file Sept 2005

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Site Name	Site Code	Year	State	Reference
Santa Ynez River - Lompoc	SYLOMP	2003	CA	Kenwood Table 04/2005
Santa Cruz River - Cienega Creek	SZCICR	2006	AZ	Graber et al. 2007
Temecula Creek - Aguanga	TEAGUA	2001	CA	K. Kenwood file Sept 2005
Verde River - Camp Verde	VECAVE	2005	AZ	English et al. 2006
Verde River - Davenport	VEDAWA	2006	AZ	Graber et al. 2007
Verde River, Ister Flat	VEISTE	2006	AZ	Graber et al. 2007
Verde River - Tavasci Marsh	VETAVA	1999	AZ	Paradzick et al. 2000
Verde River - Tuzigoot Bridge	VETUZI	2006	AZ	Graber et al. 2007
Virgin River - Littlefield	VILITT	2006	AZ	Graber et al. 2007
Muddy River - Moapa Valley	VIMUMV	2006	NV	Klinger and Furtek 2007